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The following abbreviations are used to indicate the nature of the subject matter :—

(Anal.) Analecta. **(Ans.)** Answers. **(Cor.)** Correspondence. **(Pat.)** Patent News.
(Rev.) Review or Trade Notice. **(Soc.)** Societies' Meetings.

Throughout the Index, items relating to the following are entered only in the following sub-indexes, which are placed in their alphabetical position in the main index :—

Bankruptcies, Companies Registered, Deaths, Exhibitions, Names and Marks, Trade, Patents (Authors of).

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APPENDIX.

The following Supplementary Index includes the entries referring to articles, etc., on Colour Photography which have appeared in the "British Journal of Photography" during 1921.

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Contents.

SUMMARY.

Mr. Raymond E. Crowther, in a contributed article, reviews some of the attempts which have been made in the past for desensitising of exposed plates as a means of developing in actinic light, and describes at length the results of the investigations of Dr. Lüppo-Cramer, according to which bathing with phenosafranine dye makes of development without a dark-room a readily practicable process. (P. 3.)

MM. Lumière and Seyewetz, in a short communication, give formulæ which they have worked out for quinone bleaching baths for the conversion of developed silver images into silver chloride or bromide. (P. 6.)

In a leading article we emphasise a few of the things which the beginner in studio lighting needs to keep before him in his study for proficiency in this art. (P. 2.)

Formula for the copper reducer, worked out by Mr W. J. Smith as a substitute for the costly and poisonous iodine-cyanide, will be found on page 7.

Other "Assistants' Notes" relate to vignetting and spotting. (P. 7.)

At the Royal Photographic Society, on Tuesday evening last, Mr. N. E. Luboshez gave a striking demonstration, by means of lantern slides, of the possibilities of "straight" lighting in photographic portraiture. (P. 9.)

The annual exhibition of apparatus and novelties for professional photographers, held by Messrs. Waltuch Smith, included this year a number of new introductions. (P. 10.)

A French contemporary has begun the publication of systematic abstracts of photographic literature. (P. 1.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

Mr. E. J. Wall, in a contributed article, makes an addition to the past literature of colour photographic processes, by quoting from the book issued in 1856, in which the Rev. L. L. Hill describes the method of direct heliochromy, which has been hitherto little known under the name of "Hillotype." (P. 1.)

Mr. F. E. Ives sends us revised formulæ for the bleach employed by him in the mordanting dye process, which he has continuously investigated during the last twelve months. He now uses a mixture of ferricyanide, bichromate and acetic acid. (P. 3.)

Some notes from a German source on the ill-fated career of Louis Ducos du Hauron have recently emphasised certain passages in the French inventor's life, which point to the year 1862 as that of his origination of three-colour processes. (P. 4.)

A French writer recently advocated the Simmen method of hypersensitising Autochrome plates as the most suitable for these plates as now made. (P. 4.)

EX CATHEDRA.

Fine Art Prints!

We note the appearance in the fine art publishing trade of prints from photographic originals in the shape of a series of semi-nude studies professing to illustrate the seasons. We have no desire to discourage such enterprise as this, which obviously opens still another avenue for profitable exploitation by photographers, but we cannot disguise a sense of disappointment that among so much that is of real pictorial merit the resort should be to work into which Art enters in insignificant proportion. We shall be told that "art" publishers must produce what the print shops can sell; and the argument is a sound one, for no one who takes a glance over the output of the fine art trade can have many illusions as to the kind of work which commands "big business." The print sellers, again, with equal correctness can pass the responsibility on to the shoulders of a tasteless public. Yet, when all this is admitted, there is still the occasion to plead that photographic works of real artistic merit should be given a chance. To deny that proposition is to relegate photography to an altogether inferior category, from which it will be still more difficult, as time goes on, for it to extricate itself.

* * *

Bibliography.

If the bibliographical treatment, which photography has received during the past few years—and is to receive upon a still more systematic plan—is maintained as years go by, the searcher of the future for any given item of investigation will have a very much easier task than in the past. The Monthly Abstract Bulletin, originated by Dr. Mees, and now in its seventh year of issue, has led the way in this respect. Although designed for the specific purposes of the staff of the Eastman Research Laboratory, and therefore planned upon a system which perhaps would not be that of a bibliographical work for general publication, it is, nevertheless, a valuable means of enabling anyone to know what is being published from month to month. We note also that in its issue of January 1 our contemporary "La Revue Française de Photographie" is issuing a supplement in the form of a sheet of abstracts, which present in an abridged form papers from the photographic and scientific press relating to photography and also notable patent specifications. The preparation of this supplement is in the capable hands of M. L. P. Clerc, to whose constant and expert labours those in France and in French-speaking countries are indebted for a knowledge of progress in other countries. But it is expected that in point of comprehensive range and scientific classification the "Abstracts Journal," to be issued by the Royal Photographic Society under the management of the Scientific and Technical Group, will leave little to be desired, and will provide the student, investigator or historian with an exact survey of the photographic and

photo-chemical literature of all countries, and will render easy the means of referring to the original of any given paper or communication.

* * *

Wanting It Both Ways. Not so very long ago we were taken to task in the German photographic press for venturing to suggest that few important original discoveries in photography had originated from the Central Empires. We were told that primitive people could think of an idea, but it required the genius which flourishes on the other side of the Rhine to make it of value; which, of course, contains an element of truth, but is not an answer to what we pointed out. Now, in a recent issue of "Photographische Korrespondenz" we observe an ex-enemy writer arguing precisely the other way about. It appears that the very beautiful device for soft focus effects embodied in the Eastman projection printer and worked out by Mr. C. W. Frederick, of Rochester, had its origin with a Herr Lenhard, who, in 1890, described glass plates etched in spiral or star pattern for this purpose. All we can say is that this original discovery has lain remarkably dormant for many years. According to the view which we have already quoted, the credit must be given to Mr. Frederick. We have become accustomed to the tortuous mentality which characterised much German propaganda; and it seems that this latter continues to display itself in respect to questions of technical invention.

THE STUDY OF LIGHTING.

The novice in portraiture can be excused for feeling somewhat bewildered when he visits an exhibition of modern photographs in the hope of learning something about the art of lighting the human subject. Usually, he will find such a variety of treatment that he will be led to the opinion that lighting is almost a matter of chance, and that what he had best do is to expose his plates under almost any conditions and trust to luck for the result. Such a conclusion would, however, prove fatal to his own prospects of turning out consistently good work, for though he might occasionally "fluke" a success, the lack of knowledge would prevent him from repeating it with such modifications as would be necessary with another sitter. Therefore, the beginner must learn to control his light. He must start on the simplest styles, and when these are mastered attempt those which are more ambitious.

Although servile copying of a style, whether it be that of a photographer or a painter, is to be deprecated in work which is to be shown to the public, it is invaluable to the student, whom we strongly advise to procure such portraits as appeal to his taste. Selecting, as sitters, such of his friends as have some resemblance to the originals, let him endeavour to produce something as nearly approaching his model photographs as possible. It is not to be expected that success will attend the first effort, but repeated attempts should be made until a near approximation is arrived at. Some of these attempts may appear more pleasing to the photographer than the original model, but they must be laid aside until the purpose aimed at, that of reproducing a particular effect, has been achieved. Such practice with various styles of lighting will rapidly bring a confidence and facility in working which could not be attained by years of unsystematic work.

To come to practical details of lighting, it should, in the first place, be understood that, provided a sufficient volume of light is available and can be made to fall upon the sitter at any desired angle, the actual design of the studio is of little consequence; moreover, that any effects obtainable by daylight can be equally well obtained by an efficient electric installation. Apart from the direction of the light, one of the most important factors is the distance between the light and the sitter, the lighting becoming softer the farther the sitter recedes from the light. This is most apparent with a light of small area, such as a single enclosed arc lamp, of course, properly screened, but it can easily be demonstrated with daylight (care being taken that the angle of the light is not altered) by placing the sitter at distances of four and seven feet from the light side of the studio, and if possible taking negatives at both positions. It may be useful to point out that the eye requires a good deal of training to appreciate variations in lighting, as it is necessary to ignore the effect of colour; negatives, being monochromatic, give a safer basis for comparison. A bust painted grey or buff is useful for experiments in lighting, or green or blue spectacles may be used to eliminate the colour factor. For the same reason it is not desirable to judge of lighting by inspection of the camera screen, since the effect, owing to the reduced size and the presence of colour, appears satisfactory in almost all cases.

Comparatively few photographers appreciate the value of translucent and semi-opaque screens which are used close up to the sitter. Many lighting problems which are extremely difficult of solution if the ordinary blinds are available, are very simple if local shading can be done. A couple of ordinary head screens, covered, one with butter muslin and the other with a thin dark material, should always be at hand; the latter is particularly useful to reduce the light on white drapery or to throw the hands into semi-shadow.

Reflectors should be sparingly used, and should be introduced only to obtain such effects as cannot be produced by direct lighting. This does not, of course, apply when the reflector is used as the principal source of light, as when the light of an arc lamp is directed upon a white screen, no direct rays reaching the sitter. In most studios white reflectors are *de rigueur*, and some careful portrait photographers whiten them frequently. At the same time we suggest the occasional use of a light-grey reflector, which, while it softens the shadows, does not betray its use, and is certainly less liable to give cross lights in the eyes. Another point in using reflectors is worth noting. If they are brought forward there is a tendency to destroy all the modelling on the shadow side of the face, but if kept well back, so that the front edge is level with the sitter's ear, there will be no risk of double lights in the eyes, and the delicate shadows in the face will be preserved.

One more hint. When arranging for strong effects in lighting, it is desirable to admit a fair amount of light at the farther end of the studio. This illuminates the whole subject with a very subdued light, which is much to be preferred to reflected light, from the small source of light which is actually producing the picture.

Holy Trinity, Hull.—A history of the parish church of Hull, by the Rev. G. J. Jordan, reaches us from the Oxford University Press. Apart from its story of an edifice which dates to at least 1182, the volume has an interest for us and, we are sure, for many of our readers, from the fact of its illustration throughout by photographs taken by Mr. T. C. Turner, of Hull, to whose kindness and generosity the author expresses his special indebtedness. One photograph, of the nave with the congregation standing during a service, is an instance of Mr. Turner's resourcefulness in architectural as in other branches of photography.

A PRACTICAL METHOD OF DEVELOPING WITHOUT A DARK-ROOM.

Although much has already been done to "lighten our darkness" in the dark-room by the introduction of gaslight emulsions and the study of the spectral sensitiveness of the various sensitive materials handled by the photographer—the outcome of such study being the excellent series of safelights which are rapidly displacing the once popular ruby glass and canary fabric of the dark-room lamp—it cannot yet be said that the average dark-room is a place in which one would care to spend one's leisure time.

Generally, the illumination is too feeble to allow of comfortable vision; the reading of labels on bottles, for example, necessitates an inspection close to the source of light and, what is perhaps worse, the dirt, which "the eye doesn't see, the heart doesn't grieve over" until an expensive negative is ruined by such "dirt." All too frequently the trinity which holds sway in the room where development is conducted is "Darkness, dirt and disorder." But "Progress," the heretic who cares naught for the prerogatives of established deities, is at work, and the time is not far distant when the so-called dark-room will be the most comfortable and inviting room in a photographic establishment. Indeed, for those who care to avail themselves of the latest discoveries, one may say that the day of the really light dark-room has arrived.

It often happens that those to whom information would be of most practical value have not the time or the convenience or perhaps the ability to assimilate such information and put it to the test of practice. This unfortunate state of affairs is, of course, not confined to the particular branch of industry in which we photographers are interested, but we cannot legitimately place that fact on the credit side of our scientific balance-sheet. In a measure we are ourselves responsible for the general failure to take immediate advantage of the published results of technical research of first-rate importance, for we cherish an obstinate conservativeness, and are all too loth to "try out" the "new thing." Contrast this state of affairs with the national spirit of America, where the quality of "newness" is considered a merit, and one realises at once the mainspring of the phenomenal rate of progress of the American. On the other hand, it would be unfair to accuse the young men of our profession of undue laxity, because they show but little inclination to unravel the reports on technical research which appear from time to time scattered throughout the various scientific journals and proceedings of learned societies. Unfortunately, in many cases scientists live with their heads in the clouds, and their utterances are couched in anything but lucid language, making the possession of a scientific education a necessity to the understanding of their effusions. The assistant therefore who intends to progress finds himself compelled to devote most of his leisure to irksome study. Once the elementals of chemistry, physics and mathematics have been mastered, however, it is surprising how easily the results of many researches can be assimilated and put into practice. For the comprehension of many researches fortunately no special scientific knowledge is necessary, and if the interest of chronological evolution is added in the presentation of the results the subject often becomes really fascinating.

"But what has all this got to do with the abolition of the dark-room?" may be asked. Everything; for one of the most interesting pieces of research has just led to results which enable one to have such a light in the dark-room that one may read the newspaper—or the "B.J.," if preferred—whilst developing the modern high-speed panchromatic plate in an uncovered dish.

It is a pity that the work which has led to so remarkable a result is that of a man who had not the good luck to be born an Englishman, for the circumstance that he was numbered amongst our late enemies is sufficient to prejudice many minds against his conclusions, and whilst one cannot but excuse such prejudice to a great extent, one rejoices that the average Englishman—sport that he is—very soon appraises his opponents' achievements at their true value, and commends where praise is due just as heartily as he condemns where condemnation is due. And now having cleared the air, let us begin at the beginning, and we shall see how simple research really is.

In 1898 Mercier was granted a patent for a process of correcting over-exposure effects. The process comprised a bathing of the plate in dilute solutions of various substances, including several of the well-known developers, with subsequent drying.

This patent attracted the attention of Lüppo-Cramer, who made tests under varying conditions of the substances referred to, and in 1901 published his conclusion that the major effect of the patented process arose from desensitisation of the emulsion by the solutions employed. He found that the specified substances desensitised to different degrees, but that generally with developers of the para-amino-phenol class the destruction of the original sensitiveness was of such an order that a plate bathed in a normally constituted developing solution could be exposed with impunity to a light which would fog a similar plate not bathed in developer. Here the matter rested for some time whilst other workers were endeavouring to facilitate development in actinic light either by the addition to the developing bath of dyes which would screen the plate from harmful light, as exemplified by the process patented by Ludwig in 1901 and that recommended by Lumière and Seyewetz in 1903, or by conversion of the silver bromide into iodide as suggested by R. Freund in 1909, and later modified by F. F. Renwick (1920).

Interest in the desensitisation aspect of the matter was revived in 1907, when Lumière and Seyewetz confirmed Lüppo-Cramer's results, and made the observation that mere wetting of a plate with water considerably reduced its sensitiveness. Lüppo-Cramer immediately returned to the subject, and found that whereas only a very slight diminution of sensitiveness resulted from the wetting of a plate, the desensitisation caused by immersion in certain developing solutions was quite marked with many types of emulsion, and, further, that the addition of sulphite to the developer powerfully inhibited the reduction in sensitiveness.

Continuing his work, and varying the developers and the methods of compounding their solutions, it was found that the greatest depression of sensitiveness was caused by dilute plain water solutions of amidol, triamino phenol, triamino benzol and triamino toluol in the form of their commercial salts—the hydrochlorides. Using a 0·05 per cent. solution of these compounds, for example, it was established that the sensitiveness fell, on bathing a plate for one minute, to one two-hundredth of its original value in the case of amidol, and as low as one six-hundredth of its original value in the case of triamino toluol hydrochloride. This led at once to a practical method of developing ultra-rapid non-colour sensitive plates in bright yellow light, all that was necessary being a preliminary bathing in the dark for one minute in a 1 2,000 solution of, say, triamino toluol hydrochloride. Thereafter the plate may be lifted from the solution in bright yellow light and developed by inspection in a light sufficiently powerful to fog wet slow bromide paper rapidly.

But in these days of the more or less common employment of ortho-, screened ortho-, and panchromatic plates the matter could not be allowed to rest at this stage of incompleteness, and it became necessary to find a substance which would desensitise these varieties of plates and render their development by inspection a feasible proposition.

The happy spirit of co-operation which is the mark of scientific workers in every country placed at Lüppo-Cramer's disposal the range of products manufactured by the German dye-making firms, and knowing what type of substance was likely to be of service by reason of its chemical constitution, it was not long before the problem was solved. The final choice was made of the dye known as phenosafranine, and the effectiveness of this body is such that for the development of non-colour sensitive plates in a yellow light bright enough to allow of the comfortable reading of newsprint at two yards' distance from the light, it is only necessary to replace one-tenth of the water used in making up one's favourite developer with an equal volume of a 1: 2,000 solution of the dye, and screen the plate from the light during the first half minute or so in the developer. An easier method, one which will no doubt commend itself to the English worker, and which is applicable with complete success to panchromatic plates, is the following:—

In the dark the plate is immersed in a 0.05 per cent. solution of the dye, and any time after one minute's immersion it may be removed therefrom in bright yellow light—or even by the light of a candle or oil lamp at a distance of 5 to 6 ft., and developed by inspection. The plate may be lifted from the developing solution and inspected by transmitted light with impunity, a circumstance which indicates that the action of the dye is not simply that of a screen serving to cut off harmful light. As a matter of fact, one minute's immersion of a dry fixed out plate in the 0.05 per cent. solution of the dye stains the gelatine a bluish shade of red which, when examined by the spectroscope, is found to transmit the whole visible spectrum, only partially absorbing a short section at the junction of the blue and green. The worker who develops continuously will place his plates in the dye solution contained in a tank and remove them as he is ready for developing them, being unconcerned whether he is dealing with an ordinary, ortho', or panchromatic emulsion.

It may be objected that the dark-room is not entirely abolished and that the process offers no advantages over the method of bathing the plate in the dark before development with a dilute solution of potassium iodide, as recently recommended by F. F. Renwick, but a moment's consideration will convince one that the new process marks a real advance, for the immersion of the plate in the dye solution necessitates only a dark cupboard or recess, and can be undertaken by the least skilled hand in the workroom.

As far as comparison with the potassium iodide process is concerned, it is only necessary to recall that, in addition to the disturbance of the density obtainable, it is necessary to remove the potassium iodide by washing in the dark, to use special developing solutions, and a potassium cyanide fixing bath, and contrast these conditions with those of the phenosafranine process, to rate the latter at its true value. In the new process there is no disturbance of the plate's characteristics; no washing after the one-minute immersion in the dye solution is called for; any developer may be used according to the particular fancy of the operator or the demands of the subject, and the usual hypo bath suffices for fixing. Further, the phenosafranine treatment considerably reduces the amount of chemical fog frequently encountered on panchromatic plates.

In one respect it is unfortunate that the most powerful desensitiser so far discovered happens to be a dye which, by virtue of its chemical constitution, tenaciously stains the gelatine. Somewhat prolonged washing in running water is necessary for its complete removal. This is not an uncompensated drawback, however, for one can be certain that when the film is washed free from dye it is also free from hypo. In cases where prolonged washing with water is inconvenient there are two methods available for hastening the operation. The first is to treat the developed, fixed and approximately hypo-free plate with a bath made by mixing equal volumes of a 2 per cent. alum solution and a 5 per cent. hydrochloric acid solution. The latter solution can be readily prepared by diluting one volume of the commericial acid with six volumes of water. The action of this bath depends upon the decomposition of the gelatine-dye complex by the acid, the strength of which is sufficient to act adversely on the gelatine unless the latter is protected—hence the use of the alum. Two or three two-minute changes of this bath allows of the removal of the dye by short subsequent washing. The second method of shortening the wash is the treatment of the hypo-free plate with a dilute solution of nitrous acid, whereby the dye is converted into a bluish violet compound which possesses but little affinity for the gelatine. The nitrous acid solution is conveniently prepared by dissolving five grains of sodium nitrite in two ounces of water and adding thereto ten minims of commercial hydrochloric acid. A four- or five-minutes' treatment with this bath should allow of a colourless film being obtained after five minutes' subsequent washing. In the writer's experience, the removal of the dye by simple water washing is preferable to either of the "short-cut" methods, and of these latter he prefers the acid alum treatment.

The dye with which Lüppo-Cramer carried out his research was the chemically pure product, and the writer has confirmed all his conclusions when using a sample of the same substance. This product in its pure form is not, however, an article of commerce, but the writer believes that a well-known firm of plate makers is about to place on the market a dye which exhibits all the desirable characteristics of pure phenosafranine. Further experiments are being made by the writer, details of which, together with an account of some remarkable actions of the dye-impregnated plates on developers, must be held over for a further communication. In the meantime it may be noted that the process is not protected by any patent, and since the staining of the film in no way interferes with inspection of the developing image—the suppression of tendency to fog actually facilitates critical observation—it is to be anticipated that the process will rapidly become popular.

RAYMOND E. CROWTHER.

A CRITIQUE OF MR. RENWICK'S THEORY OF THE LATENT IMAGE.

(A Communication from the Research Laboratory of the Eastman Kodak Company.)

In view of Mr. Renwick's recent letter to the "British Journal of Photography" on "Colour Sensitising by Mineral Salts,"[1] it appears that some discussion of his very interesting contribution to the theory of the latent image will be in order. The essentially new element of this contribution consists in the suggestion that, assuming preformed dispersoid silver in solid solution in the silver halide due to ripening, "it is this dissolved silver which first undergoes change on exposure to light."[2] The change effected is supposed to be a conversion of the originally very highly dispersed form to a more condensed one, "the gel or electrically neutral form of colloid silver being regarded as the germ or catalyst required to promote development."

Mr. Renwick now regards his results on the chromatising effect of potassium iodide and cyanide solutions,[3] as also the

1. "B.J.," December 3, 1920.

2. "Photographic Images, Visible and Invisible," by F. F. Renwick (the Hurter Memorial Lecture), "J.S.C.I.," *39*, 156 (1920).

3. "B.J.," November 19, 1920.

[illegible] described by Messrs. [illegible] supporting this theory, the [illegible] advanced that the preformed [illegible] bromide (Ag Br) retains [illegible] sensitiveness, so that [illegible] formed.

Before discussing [illegible] latent image itself, [illegible] stand or fall with this [illegible] as a consequence [illegible] hypothesis, leading back [illegible] and subsequently improved [illegible] solid solutions are formed [illegible] discussed by Lippmann, [illegible] and, though not necessarily [illegible] does not, necessarily [illegible].

With regard to the [illegible] from desensitization [illegible] ments by Mr. [illegible] Bullock were known to [illegible] Hence, the apparent [illegible] plete darkness throughout [illegible] physical development [illegible] of a red [illegible] re-aggregation or re-distribution [illegible] explanation of these effects [illegible] long hypothesis. It is evident [illegible] with Lippmann's [illegible] ing idea [illegible] mechanism [illegible] (KI) reacts [illegible] iodide (AgI), [illegible] some silver bromide (Ag Br) [illegible] admitted), yet both can effect a [illegible] sense. Again, in the Captain-Bullock effect [illegible] action is not brought about by [illegible] (neutral to alkaline) solution, [illegible] bisulphite (AgHSO$_3$) or H_2O [illegible] an alkaline bath, etc. Obviously [illegible] to the "Silver Bromide Grain" [illegible] and myself, I have provided [illegible] silver latent image and failed [illegible] and so autocatalytic in character [illegible] to us, since 1917. [illegible] follows:—First, a [illegible] to solid silver, followed by [illegible] ions, which are known to [illegible] ions favour reversal. But [illegible] of this hypothesis, it [illegible] theory. It seems to [illegible] peculiar effects to [illegible] may be wholly accepted [illegible] an developed silver for [illegible] promising.

The [illegible] original [illegible] ing, [illegible] to criticism [illegible] (sol. to gel [illegible] to be a [illegible] of ultramicroscopic [illegible] visible particles [illegible] there appears [illegible] effected in solid [illegible] potassium iodide [illegible] itself more [illegible] luminous [illegible] also effected by light. In [illegible] Nordentroem may be [illegible] of light [illegible] exhibit [illegible]

4. "B.J. [illegible]
5. "J. Am. [illegible]
6. Lehmann, physik. [illegible]

possible differences in dispersity.[7] If I may be again permitted to refer to unpublished work I should like to note in this connection a possibility, discussed in the monograph cited, as to phase sensitising, as distinct from frequency-sensitising. By this is to be understood the possibility of an optical resonance (photo-chemical) effect being enhanced for any frequency region by regularising, or harmonising, the phase of the incident light waves.

This hypothesis is susceptible of testing by comparison of the photographic effect of illumination differing in respect of the phase harmony (coherence) of the vibrations, but having the same average energy. The statement by Slade and Higson[8] in a recent paper that the same total light energy distributed over a wide spectral strip is less effective than that amount concentrated in a narrow strip requires confirmation before it can be considered in terms of this hypothesis.

Another debatable point is the function of gelatine. It may be that the colloid silver theory assigns too much of a secondary rôle to the gelatine, as simply furnishing colloid silver; there is evidence, to be brought forward later, that the silver bromide emulsion is not only a dispersion of silver halide in gelatine, but also of gelatine in silver halide.

To sum up, I do not feel convinced that Mr. Renwick's hypothesis as to the latent image is adequate, but it is certainly a valuable positive contribution to the theory, and may contain a considerable part of the truth.

S. E. Sheppard.

7. The bearing of change in dispersity on developability will be discussed by Mr. Trivelli and the writer in a forthcoming article.
8. "Proc. Roy. Soc.," A98, *154* (1920).

QUINONE AND OTHER OXIDISING AGENTS FOR THE CONVERSION OF SILVER IMAGES INTO BROMIDE OR CHLORIDE.

The conversion of the silver of silver images into silver chloride, and particularly into silver bromide, is frequently employed in several photographic operations. The process may be carried out by employing either the perchlorides or perbromides of certain metals, or mixtures of halogen acids (or their alkaline salts) with various descriptions of oxidising agent. The methods of conversion into chloride or bromide by means of these various agents may be classified, according to their mode of action, as follows:—

(1) Solutions containing chlorine, bromine, hypochlorites or hypobromites, producing chlorine or bromine in a form capable of acting upon the silver of the image, e.g.:—

Chlorine water.
Bromine water.
Hypochlorites.
Hypobromites.

(2) Chlorides or bromides of metals, in which salts part of the chlorine or bromine acts upon the silver of the image (which functions as a reducer) and produces the soluble chlorides or bromides of the metal in a lower state of oxidation which do not enter into the composition of the image. The following compounds are utilisable in this way:—

Ferric chloride or bromide.
Ceric chloride or bromide.

(3) Metallic chlorides or bromides which act similarly to those just mentioned, but give rise to insoluble compounds of a lower degree of oxidation which enter into the composition of the image. The following substances behave in this way:—

Mercuric chloride and bromide.
Cuprie chloride and bromide.
Potass chloro-chromate.

(4) Mixtures of free hydrochloric or hydrobromic acid (or of a chloride or bromide in admixture with sulphuric acid) and an oxidising agent which, in presence of the silver image, liberate chlorine or bromine, which exerts its chlorising or bromising action on the silver image. These conditions are fulfilled when using the following oxidising agents:—

Potass bichromate, chromic acid.
Potass permanganate (followed by bisulphite)
Ammonium persulphate, potassium ferricyanide.

(5) Mixtures which directly liberate chlorine or bromine in presence of a chloride or bromide and of the silver image, but without addition of acid.

Potassium permanganate.
Potassium ferricyanide.
Ammonium persulphate.

All the foregoing are mineral substances; hitherto organic compounds capable of liberating chlorine or bromine from hydrochloric or hydrobromic acid in presence of the silver image, and thus permitting the conversion of this image into chloride or bromide, as in the case of the mineral oxidising agents, have not been pointed out.[1]

We have observed, however, that this reaction can take place with benzoquinone and its sulphonic derivative, the peculiar use of which for various photographic reactions we have already noticed. It is sufficient to add to its solution in water a little hydrochloric or hydrobromic acid or a mixture of sulphuric acid and a chloride or bromide.

The reaction which takes place can be represented by one or other of the following equations:—

$$C_6H_4\begin{matrix}=O\\=O\end{matrix} + 2HCl + Ag_2 = C_6H_4\begin{matrix}OH\\OH\end{matrix} + 2AgCl$$

(or HBr) (or AgBr)

$$C_6H_4\begin{matrix}=O\\=O\end{matrix} + 2N\ Cl + H_2SO_4 + Ag_2 = C_6H_4\begin{matrix}OH\\OH\end{matrix} + 2AgCl + Na_2SO_4$$

The proportions of the reacting substances which correspond with these equations, on the basis of 5 gms. of quinone (which dissolves in the cold in 1,000 c.c.s. of water), are as follows:—

(*a*) For conversion into chloride—

Quinone	5 gms.
Sodium chloride	6 ,,
Sulphuric acid	3 c.c.s.
Water	1,000 ,,

(*b*) For conversion into bromide[2]—

Quinone	5 gms.
Potass bromide	11 ,,
Sulphuric acid	3 c.c.s.
Water	1,000 ,,

These solutions allow of the silver image on either a plate or paper print being rapidly converted into chloride or bromide without staining of the gelatine. The process of conversion into bromide is more rapid than that into chloride. The images which have been treated in this way can be subjected to the following series of processes such as are commonly employed in respect to negatives or prints which have been converted to chloride or bromide:—

(1) Reduction by a developer. This reduction restores the silver in the metallic state, and modifies the original colour of the image without producing any appreciable intensification. On the other hand, conversion of the chloride or

1. MM. Lumière and Seyewetz themselves have shown the utility of a mixture of quinone or quinone sulphonate in admixture with bromide for intensification and colour toning. See "B.J.," Dec. 16, 1910, p. 949.—Eds.
2. The alkaline chloride or bromide and the sulphuric acid can be replaced by the corresponding quantity of hydrochloric or hydrobromic acid.

bromide image into silver sulphide by means of alkaline sulphide produces a certain amount of intensification.

(2) Reduction of the dense parts of the image by chemical reduction of the chloride or bromide of silver by a developer whilst this process is stopped before it has affected the heaviest deposits. The image is then treated with hypo, which dissolves the silver chloride or bromide not acted upon by the developer.

(3) Toning of positive prints by re-development or by conversion into sulphide.

It will thus be seen that benzo-quinone or its sulphonic derivative in the presence of hydrochloric or hydrobromic acid (or of substances which generate one or other of these acids) constitutes a convenient and new process for the conversion of the silver image into one which consists simply of silver chloride or silver bromide without the addition of any other substance.

A. AND L. LUMIÈRE.
A. SEYEWETZ.

THE NEW SECRETARY OF THE R.P.S.

SINCE there are very many members of the Royal Photographic Society who have not the opportunity or occasion to visit the Society's house, the portrait of the newly-elected secretary, Mr. H. H. Blacklock, which we reproduce, will no doubt be of interest, particularly to members outside the London area. Mr. Blacklock is of the excellent age of 35, a time of life at which many of the

illusions of youth have been rejected, and when the prospect of a spell of years of full mental and physical activity lies in the future. It would be difficult for anybody to draw up a schedule of the qualifications to be desired in a secretary for the R.P.S., but it seems to us that Mr. Blacklock's career up to the present time suggests that his experience fulfils the chief requirements at Russell Square. After filling a post for some years in an insurance office in his native city of Bristol, he was for a considerable period secretary to the British Chamber of Commerce for Italy at Genoa. On his return to England, journalism occupied him for a while, and during recent years he has been secretary of the Royal Society of Painters in Water Colours, and of the Royal Society of Painter-Etchers and Engravers. Whilst holding these positions he was, during 1916, 1917, and 1918, secretary for the exhibition of the London Salon of Photography. Commercial manager, journalist, and exhibition organiser appear thus to be fortunately blended in him, and these qualifications, combined with an attractive personality, should make him an efficient and successful promoter of the progress of the Royal Photographic Society.

AN ELLIOTT AND FRY FESTIVITY.—On December 30 at the Portman Rooms, Baker Street, W., the staff of Messrs. Elliott & Fry Ltd., held their annual gathering, which took the form of a most successful dance and whist drive. There were about 120 present.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Smith's Reducer.

DURING the war, when the price of all chemicals, especially those depending upon the base, potassium, went up almost sky high, Mr. W. J. Smith, of the Bolt Court School, published a formula for a reducing solution as a substitute for the iodine and cyanide reducer so necessary for the production of screen negatives from which the half-tone blocks are printed from on copper. Directly after publication I tried the formula, and at once recognised that it was in every way superior to the old iodine-cyanide preparation, giving cleaner results, and being far more controllable.

Although published during a time of stress, the formula seems but little known, a fact brought to my notice rather forcibly during a lecture I gave before the R.P.S. This reducer can be made up in bulk, and always be ready for use, not made up at the last moment, and be either too weak or too strong.

The formula itself is quite simple, and is made up in two solutions :—

A.—Copper sulphate	... ...	1 oz.
Common salt	... ...	1 oz.
Water	... ...	25 ozs.

When dissolved add sufficient liquor ammonia to re-dissolve the whitish precipitate first formed. The result will be a clear solution of ultramarine colour.

B.—Hypo	... ...	5 ozs.
Water	... ...	25 ozs

For use mix in equal parts, and dilute as may be found desirable.—W. T. WILKINSON.

Vignetting.

WHEN a tricky vignette has to be printed in a frame on any "development" paper it is often difficult to see just what the vignetting card is doing, especially with dense negatives. In such cases good results may be obtained by replacing the wooden back of the printing frame by a sheet of clear glass—an old plate-glass does well if cleaned—the springs of the frame being bent slightly, if required, to hold all firm. The whole is then held up to the printing light, frame in one hand, vignetting card in the other, when the amount of paper exposed by the card is viewed from behind through glass, paper and negative, and the size and softness of the vignette can be judged to a nicety.

It sometimes happens that a print from part of a negative is required on a white background. This is easily obtained by placing the bromide or gaslight paper in position on the negative in printing-box or frame and lightly pencilling the required outline on the back of the paper by aid of the transmitted safe-light. Exposure is now made without moving the paper, which is subsequently soaked for a few minutes in clear water and laid, face up, on a sheet of clear glass. This is then held up against any safe-light, when the pencilling will show up clearly enough to allow of the required parts being developed with a suitably sized brush. It is well to have a basin of water handy for swilling in case of the developer running where not required.—A. U.

A Spotting "Tip."

SPOTTING on glossy paper which has to be glazed is always a bit of a nuisance, but excellent results can be obtained by using waterproof drawing ink—for instance, "Mandarin." After spotting, the ink is allowed to become quite dry, when the print may be soaked and squeegeed on a ferrotype in the usual way. When the print is stripped the spotting will be perfectly imperceptible. Titles and so forth can be written or printed and glazed in the same way. Waterproof ink can also be used to block out a background when an odd print or so of statuary or anything of that sort on a solid black or coloured ground is required. In this case the print needs mounting carefully, as the ink, after glazing, is fairly brittle.—A. U.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, December 20 to 24 :—

PLATE HOLDERS. No. 36,269. Plate holders for cameras. H. R. Eason

PHOTOGRAPHY.—35,988. Photography. F. W. Kent.

CAMERAS.—No. 36,083. Photographic film cameras. K. Koehl

TRIPODS.—No. 35,873. Tripod mountings for photographic cameras. B. L. Oldfield.

X-RAY PLATES.—No. 36,112. X ray plates. A. L. Landau and L. A. Levy.

CINEMATOGRAPHY.—No. 35,695. Cinematograph projectors. F. M. Beesley.

CINEMATOGRAPHY.—No. 35,696. Cinematograph film-feed mechanism. F. M. Beesley.

CINEMATOGRAPHY.—No. 35,859. Cinematograph apparatus. W. van den Broeck.

CINEMATOGRAPHY.—No. 36,072. Cinematographic projecting-apparatus. H. Brown and E. E. Cadett.

CINEMATOGRAPHY.—No. 36,018. Cinematograph projectors. F. Stock.

CINEMATOGRAPHS.—No. 35,815.—Cinematographs. J. Szczepanik.

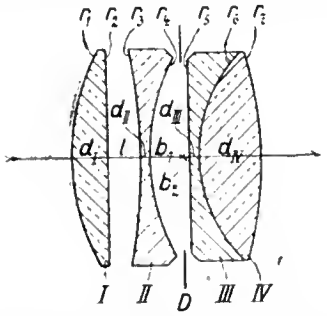
COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

FOUR-LENS ANASTIGMAT OBJECTIVES.—No. 146,213 (November 14, 1917). The invention relates to photographic lenses consisting of four glasses, two of which are joined in a collective cemented surface, while between the other two, which are disposed at one and the same side of the cemented lenses, and of which the outer one is a collective lens and the inner one a dispersive lens, there is an air space, and they form a pair of facing surfaces having a negative power. The object of the invention is to secure in addition to the chromatic and a good astigmatic correction, as just attainable in the present type of objectives, which is described, for instance, in the Patent Specification 13,061 of 1902, a still better spherical correction than hitherto obtained in this type.

According to the invention such improvement is obtained in an extraordinary degree by so choosing the radius of curvature of the cemented surface that it amounts at least to one-tenth, and at the most to one-half of the focal length of the objective,



and by additionally so choosing the kinds of glass for the two cemented lenses, that the difference between their refractive indices for sodium light lies between 0.05 and 0.02.

In the known objectives of the present type, besides an anastigmatic flatness of the field extending over a comparatively large angle, a spherical correction had been attained so far that rays of a certain finite height of incidence, generally the rays impinging upon the marginal zone and the axial ray possessed a common axial point of intersection, hence the same intersectional distance. However, all other rays impinging between these distinguished rays showed a spherical aberration, which from the axis onward ascended from zero up to a maximum value and from there up to the distinguished zone again descended to zero. By choosing the radius of curvature of the cemented surface and the kinds of glass for the two cemented lenses in accordance with the present invention, the ascent of the spherical aberrations may be counteracted, and a more favourable course of the aberrations extending over the whole aperture of the objective be attained. When, in the customary manner, the differences between the intersectional distances of rays of any height of incidence and the intersectional distance of the axial ray are designated as abscissæ and the heights of incidence as ordinates, it is possible to ensure that the curved line which connects the corresponding points for rays of a different height of incidence—and which always must (from the axial point of intersection onward after initially turning aside from the axis of ordinates, in its further course within the area corresponding to the aperture of the objective) again approach this axis, whereby in a given case it intersects this axis within the aperture-area—contacts in the point of intersection of the axes with the axis of ordinates in a higher order than hitherto, or that the curve gets two turning-points. For both kinds of course of the curve the highest amount of the spherical aberration existing within the entire aperture-area may be kept in substantially lower bounds than hitherto. In most cases it will also prove possible to have the curve intersect the axis of ordinates within the aperture-area of the objective, which will allow of the objectives corresponding to the invention to be designated as spherically corrected in the usual sense. When the curve of aberration, as is the case in the last named course, possesses two turning points, then as a rule two such points of intersection will be obtained. However, sometimes the kinds of course of the curve as described will not permit the curve to intersect the axis of ordinates within the aperture-area, *i.e.*, it will be impossible to obtain a spherical correction in the usual sense. But even in such cases in objectives corresponding to the invention the maximum amount of the aberration may still be kept within substantially lower bounds than hitherto possible in objectives of the present type. Moreover, in objectives corresponding to the invention the difference between the refractive indices of the two cemented lenses is great enough for maintaining characteristic effect, which the cemented surface produces on the correction of oblique pencils.

The drawing shows a constructional example of an objective corresponding to the invention in axial section.

In this example the two lenses with an air space between, marked I. and II., are separated from two cemented lenses, marked III. and IV., by a diaphragm D, the outer lenses of the two cemented lenses being a collective one and the inner lens a dispersive one. This objective is to be introduced into the path of the rays in such a manner that the single collective lens faces the object. The objective is intended for use for a maximum relative aperture of I : 5.5, and the anastigmatic flatness of the field extends to about 60 deg. In the drawing and in the table r_1, r_2 . . . signify the radii of curvature, d_I, d_{II} . . . the axial thickness of the lenses, b_1 and b_2 the distances from the diaphragm D to the adjacent lens vertices, and l the central thickness of the air-lens between the glass-lenses I. and II. The numerical values of these magnitudes are proportional numbers applying to the focal length of the objective of 100 units. The kinds of glass used are characterised by the refractive index n_D relating to sodium light, and by the reciprocal power of dispersion γ. The data of construction are as follows :

Radii of curvature :		Thickness and distances :	
r_1	$= +20.09$	d_I	$= 3.24$
r_2	$= +\infty$	l	$= 2.96$
r_3	$= -53.71$	d_{II}	$= 0.82$
r_4	$= +18.89$	b_1	$= 2.96$
r_5	$= -1136.75$	b_2	$= 0.46$
r_6	$= +13.31$	d_{III}	$= 0.82$
r_7	$= -33.72$	d_{IV}	$= 5.66$

Kinds of Glass :

	I	II	III	IV
n_D	1.53227	1.56660	1.53212	1.57830
γ	58.3	42.9	51.3	54.0

Carl Zeiss, Jena, Germany.

New Materials.

CAKE-FORM PHOTOPAKE.—The Vanguard Manufacturing Company, Maidenhead, have issued their well-known blocking-out mixture in semi-solid form, contained in flat metal receptacles. Apart from the convenience, especially to the small user, of having the preparation in more concentrated form, dealers no doubt will appreciate the distribution of this well-known product in unbreakable receptacles. "Photopake," in its original liquid form, has been before the photographic public for over twenty years, and may be said to have established itself as the standard article for the spotting and blocking-out of negatives. The new issue is not made for the purpose of displacing the existing kind, but for supplying the material in a form which perhaps the amateur worker will prefer to have. It is issued in two sizes, price 1s. 6d. and 2s. 6d. Orders should specify "cake" by way of distinction from the liquid variety.

Commercial & Legal Intelligence.

LEGAL NOTICES.—The partnership between Eric Vine Colyer and Ernest George Southey, carrying on business as draughtsmen and photo-printers, etc., at 39, Cursitor Street, Chancery Lane, W.C., under the style of Colyer and Southey, has been dissolved by mutual consent. All debts due to and owing by the late firm will be received and paid by E. G. Southey, who will continue to carry on the business.

NEW COMPANIES

PEARSON AND DENHAM (PHOTO), LTD.—This private company was registered on December 24, with a capital of £12,000 in £1 shares (7,000 cum. participating pref.). Objects: To acquire the business carried on at Bond Street, Leeds, as Pearson and Denham, to adopt an agreement with A. A. Pearson and W. Denham, and to carry on the business of makers of and dealers in photographic apparatus and requisites, photographers, printers, etc. The subscribers (each with one pref. share) are: A. A. Pearson (chairman), Fairbourne, Fearnville View, Roundhay, Leeds, photographic dealer; W. Denham, 3, St. Michael's Crescent, Headingley, Leeds, photographic dealer. The permanent directors are: A. A. Pearson, W. Denham, and G. Denham. Remuneration of chairman, £250 per annum; of ordinary directors, £25 per annum. Registered office: 21, New Station Street, Leeds.

FORTHCOMING EXHIBITIONS

December 24, 1920, to January 8, 1921.—Scottish Photographic Circle. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

January 6 to 8.—North Middlesex Photographic Society. Hon. Secretary, E. C. Ridge, 88, Ambler Road, Finsbury Park, N.4.

January 22 to February 5.—Northern Photographic Exhibition. Latest date for entries, January 15. Particulars from the Hon. Secretary, Liverpool Amateur Photographic Association, 9, Eberle Street, Liverpool.

February 14 to 19.—Leicester and Leicestershire Photographic Society. Latest date for entries, February 5. Particulars from the Hon. Secretary, W. Bailey, Cank Street, Leicester.

February 19 to March 12.—Scottish Salon, Dundee. Latest date for entries, January 31. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, JANUARY 10.

Bradford Phot. Soc. "Tips and Dodges About Apparatus."
Cripplegate Phot. Soc. "Westminster Abbey." H. W. Fincham.
Dewsbury Photographic Society. Annual General Meeting.
Dundee and East of Scotland Phot. Soc. "Copying." M. G. Rae.
South London Phot. Soc. "More Gems of Architecture." E. R. Bull.
Walthamstow and District Photographic Society. "Toning Prints." E. Willcocks.
Welfare Camera Club, Linthouse. Annual General Meeting.
Willesden Photographic Society. Lantern Slide Competition.

TUESDAY, JANUARY 11.

Royal Photographic Society. (1) "Some New Directions for Photographic Research." Julius Rheinberg, F.R.P.S., F.R.M.S. (2) "A Monochromatic Illuminator of Special Design." F. C. Toy, M.Sc.
Bournemouth C.C. "Bromoil." Mr. Burroughs.
Doncaster C.C. "The Romance of the Rhine." Allan C. Ellis.
Exeter Camera Club. Annual General Meeting.
Hackney Phot. Soc. "The Preparation of Exhibition Prints."
Leith Am. Phot. Asso. "Picture-Making." J. Campbell Harper.
Portsmouth Camera Club. General Meeting.
Stalybridge Photographic Society. "Wandering in Southern Italy." T. H. Greenall.

WEDNESDAY, JANUARY 12.

Accrington Camera Club. Whist Drive.
Croydon Camera Club. "What can be done in a Photographer's Workroom." B. J. Rose.
Dennistoun Amateur Photographic Association. "With Allenby through Palestine." W. Butcher & Sons.
Ilford Phot. Soc. "Maytime at Lake Geneva." W. Sandersoh, J.P.
Partick Camera Club. "Amateur Photographer." Prize Slides.
Photomonographic Society. "An Introduction to the Study of the Hydroida." E. Cuzner.
Rochdale Phot. Soc. "Colour Photography." H. Dawson.
Woodford Phot. Soc. "Ramble Round Dorking." A. H. Redman.

THURSDAY, JANUARY 13.

Brighouse Photographic Society. "Here and There with a Camera in the North Riding." E. S. Maples.
Camera Club, The. Criticism of Members' Exhibition, by Mr. F. C. Tilney.
Dundee and East of Scotland Photographic Society. "The Charm of Venice." Rev. J. R. Forgan.
Everton and District Phot. Soc. "Jersey." W. A. Mackie.
Hammersmith (Hampshire House) Photographic Society. "The Pyrenees." M. O. Dell.
Hull Photographic Society. Y.P.U. Slides.
North Middlesex Photographic Society. "Toning and Staining Bromides and Slides." E. C. Ridge.

FRIDAY, JANUARY 14.

Bedford C.C. "Elementary Photography of Animals and Birds."
Dennistoun Amateur Photographic Association. Bromide Enlarging.

ROYAL PHOTOGRAPHIC SOCIETY

Meeting held Tuesday, January 4, the president, Dr. C. H. Bothman, in the chair.

Mr. N. E. Luboshez delivered a lecture on portraiture by artificial light, in special reference to the results which he obtained when giving a demonstration before the Society some months ago. He showed a large series of lantern slides, many of them prepared from the negatives taken on that occasion; others of subjects which he had photographed in various parts of Europe, and still others from reproductions of portraits by Rembrandt, Hals, and other masters.

Inasmuch as a lecture by Mr. Luboshez, because of its exuberant flow of language and its spasmodic deviations into side issues, almost defies transliteration in cold print, it must suffice to say that the present discourse had for its chief theme the preservation of unity of lighting in photographic portraiture. Mr. Luboshez laid stress on this again and again in showing portraits which he had made by every known source of illumination, arc light, half-watts, mercury-vapour, magnesium ribbon and daylight. Some of his comparative examples were exceedingly striking, in particular a series of portraits of Mr. J. C. Warburg, of whose grave and philosophical countenance a strikingly false rendering was produced by a species of "fancy" lighting; the obvious truth and dignity of portraits almost identical in pose, but with a unified lighting, was exceedingly striking. But Mr. Luboshez is a wizard,

who shows astonishingly clever and beautiful things, but finds it difficult to explain the *modus operandi*. However, wizardry, even if it is not explicit, can be highly stimulating: and no one could listen to Mr. Luboshez and see his examples without realising what an immense distance most photographers have still to go before they can claim a mastery of lighting the sitter for the photographic process. With Mr. Luboshez, who has sat at the feet of the old masters, the technique of lighting has become an instinct, and, moreover, has become inseparable from the development of the plate. Mr. Luboshez said that he developed his plates by the tank system, but it is inconceivable that, with his finely balanced sense of the gradations which a negative should exhibit, he is ever able to leave a plate to the blind operation of time development.

A short discussion followed, and a most cordial vote of thanks was accorded to Mr. Luboshez.

News and Notes.

Royal Photographic Society.—The following members have been admitted to the Fellowship:—Mr. E. A. Bierman, Capt. F. R. Logan, Rev. H. O. Fenton, Mr. Thomas A. Scotton, Mr. H. B. Goodwin, and Mr. Horace Jackson.

The Wellington Calendar for the present year is an exceedingly handsome art board bearing a charming photograph of a child's head and a tear-off calendar, which revives the quaint drawings which at one time were an attractive feature of Messrs. Wellington & Ward's advertisements. A copy of the calendar will be gladly sent to any *bona fide* professional photographer who has not yet received a copy on application to Messrs. Wellington & Ward at Elstree, Herts.

Anglo-German Debts.—British nationals, who have registered claims against German nationals in respect of pre-war debts, will shortly receive a notification from the Clearing Office that the last day for making the necessary statutory declaration in support of their claims is March 31, 1921. No claim in respect of pre-war debts will be admitted which is lodged after that date, unless the Controller of the Clearing Office is satisfied that the omission to lodge the declaration by the date mentioned arose from circumstances for which the creditor could not justly be held responsible.

Twenty-five Years of Motoring.—Our admirable contemporary, "The Autocar," has just issued a souvenir booklet, which marks the completion of twenty-five years of publication. The booklet contains a reproduction of what is evidently a photograph of King Edward VII. on his first motor drive in 1898 in a two-cylinder Daimler car, the mere outward shape of which tells us how rapid the development of motor vehicles has been. A host of personages in the motor industry testify with such unanimity to the valuable services which our contemporary has rendered, that it is almost superfluous for us, as regular readers of its pages, to add a tribute from the standpoint of the motoring public.

The Year's Patents.—Messrs. Rayner & Co., patent agents, of Chancery Lane, E.C., state in a letter to the Press that the past year shows the highest number of patent applications ever registered in the British office, the total being slightly over 36,600 against 32,853 in the next best year of 1919. While these figures prove the active interest taken in inventions, it must be remembered that there had been a great influx of foreign patents last year owing to the extension of time allowed by the Peace Treaty for the taking of English patents under the Convention; but an equal privilege is also allowed to British inventors in taking patents abroad. Unfortunately, this arrangement does not apply to U.S. America, which State has not yet signed the Treaty. British inventors, however, should know that they can still file patents in Germany up to January 10, and in France until March 31, for any inventions they patented here during the war period.

Annual Exhibition at Messrs. Wahltuch, Smith & Co., Ltd.—Messrs. Wahltuch, Smith's exhibition at 30, Chapel Street, Salford, Manchester, opened this year rather earlier than usual. An excellent assortment of furniture, accessories and materials were presented for the approval of photographic visitors. The principal item of the show is a new bevelling machine designed to cut circles and ovals either inside or out. With this machine the photograph to be bevelled is clamped to a movable board, and the knife is set by means of a gauge, which allows very rapid adjustment. In cutting, the knife itself is stationary, while the board carrying the photograph moves. An important point with this machine, as all who have experience of bevel cutting will appreciate, is the movable knife which can readily be sharpened, stropped, or replaced. This machine is certainly a useful innovation for those who study the art of photographic mounting.

Some very good designs in furniture are on view, a noticeable point about Messrs. Wahltuch, Smith's furniture being the fact that it is at once light, strong and durable. An improved set of children's Dutch furniture suggests many possibilities. The original white has been dropped in favour of dark oak upholstered, but the Dutch paintings are retained. The small chairs in the Dutch set are so built that they can be placed together in different ways so as to form two different sized settees and a *tête-à-tête* seat, while the different pieces are light and pretty. Two very comfortable types of cane seat are shown, and a notable high-backed chair specially designed for evening dress portraiture. This piece suggests dignity at the very first glance. A new model of settee is being made with and without arms, and some very neat oak tables with antique polish are on view. It is noticeable that prices in these lines are in many cases reduced.

As might be expected a very comprehensive set of backgrounds in grey and light sepia is on view. There are backgrounds here to suit every kind and style of portraiture, and almost every type of sitter. A point about all the firm's backgrounds is that they are the sole work of the firm's artist, and any desired modification in any design is readily undertaken to suit individual requirements, while purchasers' own designs are painted to order. The grounds on show are executed in greys and sepias.

A new camera stand combines lightness, strength and rapid adjustability in a large degree; it is provided with the usual raising, lowering, tilting motions, and these are all operated by slight pressure, while the base of the stand is so shaped as to provide receptacles for slides. This stand is marked at the moderate figure of £6 6s.

The Dallon washer is an enamelled iron structure on the cascade principle, and should wash prints in a clean and efficient manner; it is made in four standard sizes, and can be made in any other size to fit special requirements. An adjustable hanging dark-room lamp is so made that it can be hung at any desired angle without any trouble, and its inclination altered at a moment's notice. A simple red lamp to fit an ordinary electric light also seems to be useful. A new type of hypo-alum toner is constructed of white enamelled iron, and made large enough to hold anything up to 20 x 24. The well-known "Anysize" strip printer has been simplified and improved, and printing on this machine of anything from 1½ ins. to 8½ ins. wide, solid, masked, or vignetted, should be simple, rapid and sure. A new machine, the "All-work," is shortly to appear.

Among the many sundries shown are specimens of the Pytram specialties, including models for use with child studies, and the pieces of ornamental furniture in copper. Among animal toys for the studio a little dog forces itself upon the attention of visitors by his loud, insistent barking. This accessory, which can be held in the palm of the hand, is not meant for photographing, though the face is most real, but for attracting the attention and interest of little people, and it should prove a godsend to many harassed operators.

A novel piece of drying apparatus is a line which winds out of a small metal fixture, and can be stretched across the work-room either single or double. When not in use the line is drawn back into the fixture where it does not intrude itself on one's view.

In materials, Messrs. Wahltuch, Smith & Co., Ltd., are putting forward their gaslight papers for studio use, and the many specimens shown emphasise the argument that to work in comfort does not mean a poorer quality of output, but just the reverse. Some specimens on slow, soft paper in particular show results that could hardly be equalled, and certainly not excelled on any bromide paper. It certainly appears that slow papers which can be worked in plenty of light are going to oust popular bromide from the position it has so long held.

Correspondence.

***Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

***We do not undertake responsibility for the opinions expressed by our correspondents.*

RAILWAY PHOTOGRAPHERS.

To the Editors.

Gentlemen,—I note a letter in your last issue signed by Mr. I. Tennant Woods, in which a reference is made to my father and myself. It would be most interesting to learn who was the first railway photographer.

My father commenced taking photographs for the Midland Railway about the year 1877, and held the position until his death in 1894. I joined him at the beginning of 1883, and succeeded to the post, and have held it ever since.

The 26 in. x 21 in. camera, which was fitted with a 20-in. focus Ross portable symmetrical lens, was first used in the early 'eighties, and was the one employed in photographing the first Convention group in 1886; it is still in use.

Previous to 1881 wet plates were used of 15 in. x 12 in. size, and it was no small matter, I can assure you, using these up and down the line (I have recollections of going several trips as a boy) photographing bridges, &c., for the engineer.

I thank Mr. Woods for his kindly remarks.—Yours faithfully,

T. A. Scotton, F.R.P.S.

PAPER NEGATIVES WITHOUT GRAIN.

To the Editors.

Gentlemen,—Referring to the article under the above title in the current issue of the "Amateur Photographer" of December 22, I am sending a few specimens with notes on my experience.

Some two or three years ago I had occasion to enlarge some very small photographs from paper negatives about ½-in. square. They were made by placing a piece of glossy P.O.P. in contact with the positive prints, same size, and printing by daylight in an ordinary printing frame many years ago.

The usual procedure of making contact prints and then enlarged negatives on glass did not prove the least satisfactory, and the idea occurred to me to make enlarged positive prints direct from the small negatives in the same way as I would copy any ordinary photograph in making a copy negative on a glass plate. This I found to be a great improvement. I saw at once great possibilities in this process and made two exposures on ordinary bromide postcards of one of my assistants, which proved quite satisfactory. Being then too busy with war work to follow it up, I did nothing further in the matter until the spring of this year.

I am sending you herewith some prints and the negatives on bromide paper made at that time in May of this year; also a cutting from the "Greenock Telegraph" of June 3, in which you will see a notice of the same in photographic column. No doubt better results could be got, as these are practically a first attempt. Bromide paper is too slow for portrait work in the studio, and the latitude in exposure is not so great as with glass plates. I wrote to several large firms about supplying negative paper with rapid emulsion, but failed to interest them, and got no encouragement. However, as Mr. Stewart says, "this is not merely a theoretical proposition," and it is bound to come, even if it should have to come from Germany.

Platino matt paper, such as Mr. Stewart has used, is about the worst he could use. I am inclined to favour Wellington carbon surface. Glossy is good enough for view work, but the carbon surface is better for studio portraits, and can be retouched. This I do with a sable as in spotting prints.

I do not mount the negatives on cardboard, as Mr. Stewart suggests. I get much better results by squeegeeing it on to a piece of glass, and all the better to "copy" or "print" while wet. This is the speediest way to get a print for urgent purposes, as you need not fix the negative more than a minute or so, after which it can be put back into the hypo. again.

The unmounted negative, if dried, can be put into a printing frame with a border paper negative in front, and with the centre cut out showing the print through; a print with a border can then be got with one "impression." In fact, there is no end to the variety of ways it can be used, such as in sketch work, etc., impossible with plates.

As to cost, my first whole-plate negative was made at a cost of one penny, against one shilling and twopence for glass plate, plus developer.

The process seems to be very adaptable for copying engravings, as you will see from the enclosed print. In fact, I have done worse work with a glass plate negative. When I can get a supply of suitable paper coated with rapid plate emulsion I am sure my plate bill will not be so high. Many amateurs who only possess a small snapshot camera will not be able to use this process unless they have an enlarger, but I am sure many professionals may find it of great advantage.

The whole-plate portrait of a lady enclosed was made with an 8-in. T. T. and H. Cooke anastigmat at *f*/6, six seconds exposure, and is quite passable for a postcard lens. The reason was to get speed.—Yours truly,

Norman Hunter.

The Studio, Port Glasgow.

December 27, 1920.

[Our correspondent's results are very interesting. Considering the very smooth surface (semi-glossy) of the paper on which the prints are made, grain is little in evidence, particularly in one example. The practicability of negative paper turns in the end on the retouching question. At present we do not think it can be said to be fully demonstrated, but Mr. Hunter has certainly described methods which contribute to a solution of the problem.—Eds. "B.J."]

THE POSITION OF PHOTOGRAPHIC SOCIETIES.

To the Editors.

Gentlemen,—A feeling of fairness compels me to politely disclaim "Fuller Hope's" kindly reference to myself in his interesting letter of last week, which pictures a gloomy state of affairs. It is true that a band of willing workers and cheerful souls contribute in large measure to the "aliveness" of the Croydon Camera Club, but all admit its popular and hard-working secretary, Mr. Sellors, stands easily first, with the president, Mr. Keane, a good second. My subsidiary and distressing position involves little labour, but does subject me to the secretary's careful attention when anything happens to go wrong, or not exactly right. Those who know him will comprehend what this implies.

It is to be hoped that secretaries of societies will give their views and express their opinions on the letter of "Fuller Hope." Permit me formally to subscribe myself,—Yours very respectfully,

The "Office Boy."

WARMING THE STUDIO.

To the Editors.

Gentlemen,—I was very interested in reading your article on "Forms of Heating Studios and Workrooms" in the "B.J." of December 24 last. It has been my experience to find many studios insufficiently heated, and in many cases without heating apparatus of any kind. This must be very detrimental to both the operator and sitter, especially where ladies and children are concerned, and most of your readers will admit the importance of having a warm and cheerful atmosphere in the studio.

It appears to me that an ordinary coal fire, gas, or anthracite stove, is quite unsuitable for a studio on account of the dust, dirt and fumes, also the unequal heat they give. I have recently come across a new invention, which struck me as being ideal, and which, I think, surpasses any method of heating and ventilating yet obtained, and should appeal especially to the photographic trade. This invention is known as the "Ventihota," of Argyll Street, Oxford Circus, W., and directly I saw the apparatus working I came to the conclusion it was the most suitable for photographic studios and workrooms. The apparatus is artistic and neat in appearance, and will keep a room or studio at a comfortable and even temperature at an appropriate cost of 6d. for twenty-four hours.

Fresh air is automatically drawn in, warmed and distributed, and any bad air expelled. Many of your readers must have experienced the difficulty of clearing the studio of fog, even after it has cleared outside, but by the use of this invention it would be replaced in a very few minutes by warm, pure air, which flows in at the rate of 3,000 cubic feet per hour. The "Ventiheta" is adapted for either gas or electric current.—I am, yours faithfully.

FREDERICK E. JONES.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C. G.—Certainly, there is no objection to doing as you say; it is the usual course unless arrangements are made for exclusive use by one periodical.

W. C. B.—The "Agenda Lumière" is only published in French. Parts of it are however obtainable in English in the literature published by Mr. T. K. Grant, 89, Great Russell Street, Bloomsbury, London, W.C.1.

G. P.—No licence is required for carrying on the business of developing and printing amateurs' films, except that if you do not trade under your own name you require to be registered with the Registrar of Business Names, 39, Russell Square, London, W.C.1, at a cost of 5s.

M. L.—You would of course study the wishes of your customers, as much depends upon the method of working up. In the ordinary way we should recommend such a paper as Ilford rough, which has only a moderate grain and which takes water or oil colour and chalk equally well.

B. T.—(1) The only two lamps which we can connect with your question are the "Pointolite," of the Ediswan Electric Co., Ponder's End, Middlesex, and the focus type of the "Osram," made by the General Electric Co., Magnet House, Kingsway, London, W.C.2, in a series of candle powers. (2) As regards formulæ for tank developer you cannot do better for small quantities than use any ordinary pyro-soda, diluted with 3 or 4 times its bulk of water.

P. S.—Reducing the depth of sulphide-toned bromides is rather a tricky business, but most toned bromides will be appreciably reduced in depth by immersion in cyanide solution. We do not recall the formula you quote, but we should say it would work as well as any other. But at the same time we don't think that any formula for the reduction of sulphide-toned prints is really perfectly satisfactory, since there is always the liability of both the colour and the gradation of the print suffering.

M. A.—From what you tell us it looks as though you cannot do with a lens of greater focal length than 7 ins. for your full length postcard work. We suppose, although you do not say so, that the Homocentric and the R.R. do not get all the figure on the plate, but we think a 7-in. lens would just about do that. If that is so, then you really would require for good definition all over the postcard plate an anastigmat of, say, *f* 6 aperture. A portrait type of lens has not sufficient covering power, nor have most R.R.s. If you are not very particular as to speed there is no doubt you could easily choose a suitable lens from the list of one or other of the second-hand firms.

F. B.—We think there is nothing in pyro for the colder tones, rather the other way about. The odourless toners give a somewhat less yellow tone, but the thiomolybdate is not now on the market, and the only toner of this kind is that sold in the form of tabloids by Burroughs Wellcome. We think your best plan is to use either the Greenall method or the Bennett method. Of course the Bennett method has mercury in the bleacher, and to that extent is open to objection on the score of permanence, but we think the results are reasonably permanent when the after bath consists only of sulphide. With some papers a great improvement in tone in the way of avoiding yellowness is obtained simply by giving a preliminary bath of sulphide before carrying out the usual process.

G. K.—Without any doubt whatever flashlight has considerable disadvantages for studio portraiture. It is not so much the effect in the portrait of the sudden flash, since the photograph is taken before the effect of the flash has been felt. But there is the difficulty of making a series of exposures, due to the accumulation of smoke and also to the sitter becoming nervous unless the flash is almost silent. The smoke nuisance can, of course, be perfectly obviated by burning the flash in a chamber with a draught pipe to the outside air, and providing a thoroughly good powder is used you can obtain suitable methods if ignition for fairly silent working, although this is a difficulty if you want to make certain that the flash goes off at a given instant. The best advice we can give you is to be advised as regards the design and equipment of an installation by a specialist in flashlight appliances. Mr. D. Charles, of 45, Beaufort Road, Kingston-on-Thames, is well qualified to supply outfit to any required specification.

F. H.—(1) No doubt development prints, bromide and gas-light, will come to no harm through the presence of even a fair proportion of mild acids, such as salicylic or boric, in the mountant, but it is just as well to avoid anything of an acid nature as a preservative, for the reason that any, even feeble, acid will give rise to stains if prints have not been as completely fixed as they ought to have been, whereas a neutral mountant would probably avoid development of such stains. We think pure carbolic acid is a suitable preservative, although it is not much used commercially. The best of all for your purpose probably is thymol, used in the proportion of, say, 2 or 3 grs. per oz. by weight of the mountant. (2) There is no difficulty whatever in securing exposures of one or two seconds by means of electric light, that is to say, the half-watt lamps. Dependent on the size and colour of the walls of the studio the total candle power requires to be from 3,000 to 6,000 best divided between lamps each of 1,000 c.p. For practical purposes of regular work such an installation, which is easily arranged, is immensely superior to any magnesium installation. We know French photographers have rather a liking for flashlight in the studio, but we imagine that arises, in many cases, from unavailability of electric current. In our opinion the electric light is very greatly a more satisfactory and commercial method.

THE BRITISH

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Contents.

SUMMARY.

We publish this week a contribution by Lt.-Col. H. S. L. Winterbotham, of the Ordnance Survey, in which is reviewed the development, before, during and after the war, of aerial photographic methods for the production of maps. Lt.-Col. Winterbotham proceeds to draw his conclusions from this experience, and sums up the present status, as regards accuracy and economy, of aerial processes of mapping. (P. 16.)

Mr. Alfred Watkins, in some notes on factorial development, expresses his dissent from some of the conclusions recently advanced by Dr. B. T. J. Glover, and emphasises items from his experience of measurement methods of development. (P. 15.)

Mr H. W. Bennett at the Croydon Camera Club gave revised formulæ for the toning of bromide prints to colours ranging from engraving black to sepia. (P 26.)

In a leading article we urge upon professional portrait photographers the advantages to each individually, as well as to the profession as a whole, of preparing work to be submitted for inclusion in the exhibition of professional portraiture to be held in April next in connection with the forthcoming Congress. (P. 14.)

The very ingenious process of Mr. Elwin Neame for the photographing of a sitter (in the studio) against any natural background is described in the patent specification recently issued. (P. 21.)

A background possessing perspective space may contribute to composition of a portrait in a way which the customary flat surface cannot. (P. 14.)

A contributor to "Assistants' Notes" gives practical hints on photographing blue prints. (P 20.)

The Council of the Royal Photographic Society have awarded the Progress Medal to Mr. F. F. Renwick for his researches into the chemistry and physics of photography. (P. 25.)

A medal, and premium of 800 dollars, have been awarded to Dr Mees in accordance with an ancient American endowment. (P. 13.)

At the Royal Photographic Society on Tuesday evening last a demonstration was given of the process of development in full light by means of a desensitiser which has been worked out by Dr. Luppo-Cramer. (P. 25.)

The Manchester Amateur Photographic Society is raising its subscription from 7s. 6d. to one guinea, in order to meet the greatly increased costs of maintaining a full service for its members. (P. 23.)

The use of liquid Indian ink, in a greater or lesser state of dilution, forms a ready method of spotting bromide prints. (P. 14.)

Dewing of the lens through taking a small camera from the warmth of the pocket into a cold atmosphere may be a cause of veiled negatives. (P. 14.)

To-morrow (Saturday) is the last day for the receipt of exhibits for the Northern Photographic Exhibition which opens on January 22. (P. 13.)

EX CATHEDRA.

The Northern. To-morrow (Saturday) is the last day for the receipt of entries for the forthcoming Northern photographic exhibition at Liverpool. Those who may have delayed delivery of their intending exhibits until now should note that prints should be consigned to the Walker Art Gallery, Liverpool, but glass transparencies to the Liverpool Amateur Photographic Association, 9, Eberle Street, Liverpool. We hear that the exhibition, which opens on Saturday, the 22nd inst., is assured of being a great success, a success upon the scale of the shows which were held in the years before the war. Liverpool is fortunate in obtaining such an excellent place for the exhibition as the Walker Art Gallery, where conditions for the proper display of pictures are in many respects ideal. The organisers, and particularly the honorary secretary of the exhibition, Mr. Geoffrey E. Peachey, have left no stone unturned to bring together a great collection, representative not only of pictorial photography, but of the work of photographers in other fields, such as colour photography, nature study and scientific applications. Too wide an announcement of the period during which the exhibition remains open cannot be made: namely, from January 22 to February 5.

* * *

A Medal for Dr. Mees. We see it recorded in the United States Press that a John Scott Medal and premium (of 800 dollars) have been awarded by the Directors of City Trusts of the City of Philadelphia to Dr. C. E. Kenneth Mees for special researches on the structure of photographic images. The award has been made from an ancient bequest of John Scott, an Edinburgh chemist, who in the year 1816 established a fund from the interest on which distributions were to be made to "ingenious men and women who make useful inventions." By an extension of the terms of the endowment it was decided a year or two ago that the award and grant might be made to the author of any invention which, in the opinion of the trustees, might add to the "comfort, welfare and happiness of mankind." The researches carried out by Dr Mees and his colleagues in respect to which the award has now been made include the constitution of light-sensitive silver compounds, the sharpness of developed images, rendering of fine detail in photographs and "graininess" of the photographic image. The cynical may perhaps be prompted to inquire which of these, add directly to the comfort, welfare or happiness of mankind, but that would be to take a short-sighted and superficial view; for these questions, as our readers know, form part of the fundamental structure of photography, and any researches which contribute to their better understanding enlarge the field of photography as a whole and facilitate its usefulness in the world's work and play.

For Pocket Camera Users. Those photographers who use small pocket cameras should at this season of the year be on their guard against a defect that sometimes appears in negatives that strongly resembles light fog; in fact, we have known it mistaken for this. We refer to the condensation of moisture upon the front glasses of the lens when the latter is first exposed to a cold outside atmosphere after being carried for some time in the owner's pocket. Only the other day we were consulted as to some very foggy-looking negatives taken with a C.D.V. pocket camera. The origin of these was subsequently traced to the cause we have mentioned. It is well at this time of year prior to making an exposure to examine the lens carefully to see if it is quite free from cloudiness. If this latter exists it should be carefully removed with a fine handkerchief. This trouble generally manifests itself only after a great change in temperature such as from the user's pocket to the open air. Hence it is far more likely to be met with when using a small pocket camera than when a field outfit is carried in its case. After a lens has been exposed to the new conditions for a short time the moisture that may have collected will gradually vanish and its reappearance is unlikely, though it is well to be always on the watch for it.

* * *

Spotting Bromides. A method of taking out defects in bromide or gaslight prints, which may be commended to the amateur worker, is by means of a mapping pen and the "indian ink" sold in a liquid form for the use of draughtsmen. The ink, if too intense in colour, may be freely diluted with boiled or distilled water to the required degree, and in this way the tone of any part of the print may be easily matched. A good plan is to dilute one part of the ink with four parts; another, with eight or ten parts; and another, with sixteen parts of water. These three solutions are kept in small bottles, and the worker is then equipped for spotting a large number of prints and possesses a medium diluted to any required density. A fine mapping pen should be chosen, and an attempt made to take out the defect with one application of the pen. This is quite an easy matter; indeed, far more so than is the case when using a fine-pointed sable brush, unless the worker is practised. The method here advocated is of especial value for amateur workers, though, no doubt, some of our professional friends may find occasion for it. A point in its favour is that the ink is fixed and will not rub off; a decided advantage over water-colour and pencil spotting, especially upon glossy surface prints.

* * *

Perspective in the Background. It is somewhat curious to observe how seldom, in portrait photographs, the background is anything more than a flat surface. The choice of a background which shows the sitter in what is unmistakably part of a room is of such rare occurrence that it seems worth while to draw photographers' attention to the fact. In a recent issue of the "Professional Photographer" are a dozen reproductions of portraits from the P.P.A. exhibition of professional portraiture, and one of these stands out from the others by reason of the naturalistic effect obtained by the position of the sitter in the corner of a room. The predominance of the flat background is no doubt a heritage from the traditions of the portrait painters. While, no doubt, it eliminates difficulties which attach to a background which has perspective qualities, there is also no doubt that it presents opportunities for natural effects of lighting and of posing which are not afforded by the plain artificial ground. For example, it needs no demonstration to show that a balance of light and shade can almost always be obtained more readily in a background which is an angular space presented to the camera than in one which is a flat surface. The line where the two surfaces of the solid angle join may often be a feature of some difficulty, requiring to be softened, either at the time of making the exposure or afterwards on the negative.

THE INCENTIVE OF EXHIBITIONS.

Those of us who can recall the photographic exhibitions of the seventies and early eighties of the last century can realise the great change that has occurred in the style of work and the personnel of the exhibitors. In the early days the technique of photography had to be acquired by long study and practice, and, unfortunately, the qualities which made for success in this direction were not those which are popularly supposed to be wedded to the artistic temperament, so that the exhibited work was usually more conspicuous for mechanical perfection than for pictorial quality. Professional work then formed a much larger part of the show than it does at the present time, and it was considered as a point of honour by many firms to send representative exhibits year by year.

Time has altered all this. The introduction of bromide paper has placed the amateur with his Kodak almost on an equality with the professional, and the skilled manipulation which was needful to produce perfect large photographs on glossy paper has had to give way to pictorial interest. This, we think, no one will deny is all for good as regards the artistic status of photography, but it has destroyed the professional workers' interest in exhibitions generally, and this is certainly to be deplored by all who are interested in upholding the standard of professional photography either in portraiture or commercial work.

There is, however, one exhibition which is exclusively professional, viz., that held annually under the auspices of the P.P.A. at the Horticultural Hall, Westminster, in April. Here admirable examples of the current output of many of the best known workers are to be seen, and every photographer who can manage to visit it should not fail to do so, as he will there learn as he can in no other way, however closely his own pictures approach the high-water mark of modern photography. He should avoid the error of carping at work which he cannot equal, remembering that with many men there are many minds, and that a style of portraiture which does not appeal to his taste is not necessarily a bad one.

Good as is the moral effect of an exhibition upon the beholder, it is still better upon the exhibitor, particularly in the preparatory stage. It is a direct incentive to the production of the best work of which the individual is capable, and this is what the great majority of photographers need. In the ordinary way competition in quality is the last idea which enters their minds. Price-cutting, free sittings, window-dressing are all used in the hope of bringing business, but the actual quality of the photograph, provided it does not fall too low, is not considered.

Competition with the work of others is essential to progress in any art. No artist or craftsman can be assured that he is doing his best if he immures himself in his workshop and refuses to compare his work with that of his contemporaries, and undoubtedly exhibitions afford the readiest means for such comparison.

It is a great mistake to delay the preparation of exhibition specimens until within a week or two of the sending-in date. Every exhibition secretary can tell of exhibits

which have arrived just too late and were therefore rejected, and of others which have arrived in time but which were despatched with a feeling that better could have been done if a little more time were available. It is not too early to-day to prepare for an exhibition in April next, or in September next for that matter.

The exhibitor must be a good sportsman. If his work is not accepted by the judges or selecting committee, he must not begin to cry out about favouritism or incompetence, but try to find out in what respect it is lacking in attractiveness. At the same time the verdict need not altogether be regarded as final. Whistler was rejected by the Academy at one period, and his work was decried by such a popular critic as Ruskin; but time has justified the artist's methods, and his works are now properly appreciated. The remembrance of such happenings should prevent a feeling of discouragement in case of rejection, provided that there is a sufficiently firm conviction that one's work deserves a better fate.

We have referred more particularly to the Congress Exhibition because the professional photographer will here find himself upon more familiar ground than at the two older shows, the R.P.S. and the Salon. These, however, must not be overlooked, nor must it be imagined that only freak pictures have a chance of acceptance. The essential requirements for these exhibitions are pictorial interest and originality of treatment as well as good technique, and it is useless to send ordinary show-case work, no matter how good it may be. And, lastly, although most exhibitors prefer to submit large prints, size alone is not an important factor. An effective picture may be made on a whole plate or even smaller, and there is sometimes a delicate quality in a direct print which is lost in an enlargement.

NOTES ON FACTORIAL DEVELOPMENT.

THE valuable articles by Dr. B. T. J. Glover in the "British Journal of Photography" of December 17 and 24 last explore in detail and with accuracy the strong points and the weak points of factorial development, although, as I shall explain, I strongly disagree with one or more of his final deductions.

There is much need for careful work like Dr. Glover's, especially if it would take the form of information as to the factors to use for different developers, a point on which there is a great paucity of recent information. When I first devised and published the method (as an adjunct to systematic exposure by aid of actinometer) about 1894, I devoted two or three years of experimental work to giving all the information I could as to factors. But after a year or two I found that users began to regard me as one whose business it was to mix up and test their pet developers for them and to give them the result in reply to a post-card inquiry "thanking you in anticipation." And as I had no pecuniary interest in their use of the method, and had to devote the experimental energy which I and a trained assistant possessed to work on the speed of plates (which was and is a necessary adjunct to my business as a maker of exposure meters) I had to cease making any new trials for factors. It is a matter which really concerns the makers of developers or sellers of plates and papers. Messrs. Wratten (now of Messrs. Kodak) realised this as regards giving a factorial method for the development of lantern plates, but little else has been done. Dr. Glover's articles, unfortunately, only give one factor, that of 11 for bromide paper with the Eastman amidol formula. I do wish that makers would systematically, from their own trials, give factors for their own developer formulæ.

I thoroughly agree with Dr. Glover that factorial development has great advantages for development of bromide papers. I have before me a frame of six bromide prints from the same negative which I exhibited at the Royal Photographic Exhibition a few years after I discovered factorial development. It was, I know, well before 1904 when the first edition of my Manual was published, for I have always had in that book a page on factorial development for bromide papers. In this trial I took six different makers' papers, widely varying both in exposure speed and rate of development. I first ascertained the H. and D. speed of each paper (a troublesome matter), and having found by trial and error the right printing exposure for one paper behind the negative, I gave all the others exposures varying inversely with their relative speed. Then each was developed in a metol-quinol developer for four times the appearance of the image. The result was six prints practically identical. Other trials confirmed this.

Now for the point on which I disagree with Dr. Glover, both on theoretical grounds and on the results of long practical experience (my own and hundreds of others) in the method.

I think that he is fundamentally wrong in his final classification of classes of work for which factorial development is unsuitable.

In particular, I know that he is wrong in saying that it is unsuitable for development of plates exposed on outdoor subjects.

Let me first take the theoretical objection. It is also necessary to clear the way by pointing out that no available method of development is free from certain serious defects or contingencies which have to be guarded against in practice, and that to point out such defects is not sufficient to condemn the method. Otherwise, all methods have to be condemned. For example, if a plate maker makes an actual test of each batch, and gives accurate time and temperature development information for the emulsion as he sends it out, the user has still several very probable chances of going wrong which he must keep in mind. First, some emulsions alter in development speed within a month or two; secondly, all emulsions "go off" in development speed if kept long enough; thirdly, developers of the same formula vary in speed with different makes or purities of chemicals; fourthly, developers "go off" in energy if kept. Strangely enough, the factorial method overcomes in practice these peculiar weak points, although it has some of its own.

Factorial Weakness.

The weak points of factorial development are, firstly, that it gives a slightly varying time for two plates, one slightly over, the other slightly under exposed, whereas theoretically both should have the same time for development; secondly, that the observed time selected for the "time of appearance" varies a little in different subjects. Now these two objections have to be kept in mind and guarded against. But they are objections which come just as much into practice in the classes of work which Dr. Glover pronounces to be suitable (bromide printing, lantern plates, studio work, and copying by artificial light) for the factorial method as they do in those classes (outdoor subjects, enlarged negatives and positives) which he pronounces unsuitable.

I think that Dr. Glover has made a serious mistake in assuming that these classes of work done with artificial light tend to greater accuracy of exposure than those by fluctuating daylight. I know I can take any box of plates (when the speed has been tested) and with the aid of an exposure meter (an actual actonometer test) secure at first trial an exposure

within 50 per cent. of an ideal exposure, and this limit, provided there is a bit of sky or white object in the subject, does not lead to appreciable error in factorial development. On the other hand, if I am given a packet of bromide paper and an unknown negative to print from, my gaslight and distance may be "standardised" to my heart's content, but I know of no way of getting a correctly exposed bromide print except by "trial and error," that is, by exposing some trial slips. And if a negative of a different type is substituted, another trial must be made. In other words, a standard light does not ensure a standard exposure, and in practice the use of an actinometer exposure meter standardises outdoor exposures (together with indoor ones) more accurately than "trial and error" does for studio and artificial light work.

Dr. Glover (page 763) gives an example in which the "minimum correct exposure, calculated by meter of an open landscape" was 1-45th second, the time of appearance being 22 seconds. He exposed other plates for 1-22nd and 1-10th seconds, and got lessened times of appearance of 20 and 18 seconds. He appears (although he does not mention it) to assume that the man exposing the plate would deliberately give the wrong exposure of, say, 1-10 instead of the shorter one, and on that assumption states it is "a type of work to which factorial development is least suited."

Let me point out that if he gave a similar test with bromide printing in which one minute was known to be the correct exposure and a time of appearance quoted for this, and two other exposures of two and four minutes also given with their times of appearance, and followed the same reasoning (that the user would give the wrong exposure), he must also inevitably arrive at the same conclusion, that factorial development is quite unsuited for bromide printing.

To come down to real use of the factorial method for daylight (outdoor and indoor, developed together if need be). It is a big success used on these practical lines. All exposures calculated by meter. The sky or a bit of white in subject taken for the observation. Abnormal high-lights, as the sun in the evening sky, or over-exposed window in an interior, are passed over, and a lower high-light observed. Or in an abnormal subject with no high light, like a carved panel in dark wood, it is developed in the same dish for the same time as a subject with a normal high-light. In fact, the way to avoid the weak point in factorial development is to develop in batches, not less than four plates in one dish, to pass over any exceptional high-light, and to take the normal (or average) high-light for the time of appearance from which to calculate, and to give the same total time of development to all subjects in the dish.

A Long Experience in Method.

I have now developed gelatine plates for forty-five years, and have followed three systems:—

From 1876 to 1894 I used "inspection and judgment" only.

From 1894 to 1910 I used "factorial development" only.

From 1910 to 1921 I used "thermo time development" only.

The first change from inspection to factorial conferred an enormous advance in getting uniformity and obviating errors. The second change from factorial to thermo was taken because I wished to work with tanks and to do without a dark-room light, especially as I am red colour-blind.

Both the factorial and thermo methods have given me uniformity and tolerable certainty, but, to be quite frank, I think that I have secured slightly the largest proportion of "just right" negatives during the time I used factorial development. I have been "let down" several times in the thermo time method by plates or developer being different to what I anticipated, and the method does not give such a clear warning as does the factorial method.

As all this experience was with outdoor subjects, with church and other interiors, and as I have received scores of letters testifying to the success of others with factorial development in their hands, with similar subjects, I think I am justified in disputing Dr. Glover's claim that factorial development is "not suitable" for outdoor subjects. It is just on this work that it earned whatever reputation it possesses.

Perfecting Factorial Development.

I have repeatedly pointed out that the one weak point of factorial development could be obviated, and its other great advantages secured, if plate makers would issue with boxes of plates trial slips impressed with light images (in bars) of a standard light-impression from which to take the "first appearance" observation. This should be a standard multiple of the inertia of the plate, and it is a curious advantage that even if the "standard light" of different makers should vary, this light-impression would be the same standard for all if each used the same light to make the impression as was done to make the inertia test.

ALFRED WATKINS.

THE DEVELOPMENT AND PRESENT POSSIBILITIES OF AIR PHOTOGRAPHY FOR MAPPING.

DURING the war a great impetus was given to this latest method of survey. From balloons, or kites, air photography had been gradually evolving for 70 odd years, but the introduction of photography from airships and from aeroplanes, combined with the necessity of mapping inaccessible areas, led to the extensive use of air photographs for the revision of existing maps and for the detail survey over triangulated areas. The actual sphere of usefulness and limitations of the air photograph do not seem to have been grasped, however, by many more than the surveyors and some of the photographic staff employed on these war surveys. Even to these few the economic possibility of the method is still an uncharted region, for no statistics as to cost were kept, as far as I know, and as a consequence many extravagant claims as to the possibilities and economy of aerial photography for mapping have been made.

The present article is an attempt to outline, in two parts, the development of air photography as a survey method and the stage it has now reached.

PART I.—THE DEVELOPMENT OF AIR PHOTOGRAPHY FOR MAPPING.

Pre-War History.

The idea of replacing the personal work of the surveyor and topographer by photo-mechanical means dates from the time when both balloon and camera became available. We have literature on the subject which covers the last seventy years, and a fair measure of success was secured even before the war.

The camera, of many different designs, sometimes single, sometimes multiple, was used at lowish altitudes from fixed balloons or even kites. A recent German publication states that such a system had its first application in war at Solferino and its next at Richmond. Now the balloon does not lend itself to the taking of a series of plates more or less parallel to the earth's surface. This is obviously impossible if the balloon is stationary, and when it is free its movements are naturally erratic and more or less unforeseen. Photographs taken for mapping

...were then taken obliquely at an angle of ... (below the horizontal), of something of the order of 30 deg... ...ower to cover as much ground from a single station as ... The actual position of the balloon in space was ... fairly enough determined either by intersection from ground ... stations or by photographing a base in the form of ... (of known dimensions) immediately below the balloon. ... early experiments were very widely distributed ... Americans, Russians, Germans and Austrians all ... So far, these oblique photographs were regarded ... views of flat ground. No corrections could ... ...fluence of height or ground form. Towards ... last century a big stride was made by the ... photogrammetry from the air, whereby ground ... contours could, theoretically, be dealt with, although ... success can hardly be said to have been obtained ... 1905 and 1914, however, renewed progress ... special instruments were manufactured by Zeiss ... photography and for measuring angles upon ... negative or upon contact prints. It may be said that ... of both detail and contours from oblique photographs ... practically possible, but that the calculations ... too cumbrous and involved to hold out hopes of ... success. These latest developments were, I believe, ... German or Austrian. It will be seen, then, that on the ... break of war the Central Powers had secured a substantial ... lead.

War Experiences.

It is probable that photography from aeroplanes (as distinct from balloons) had reached the stage of development at which it began to be of use to the map-maker quite early in 1915 in all the larger armies. The first photograph used for mapping purposes by us, for example, was one of Neuve Chapelle, taken immediately after the battle. French and British methods developed side by side, and naturally took on the same complexion. German methods, influenced by their experience and hampered by the Allied command of the air, were somewhat different. In each case, however, they were governed by some common factors, which should be noted.

In the first place, air photography was not begun ... for mapping, nor was it, except in rare circumstances, ... exclusively directed to that end. This fact had ... influence upon the development of mapping from air photographs, because the surveyor was not consulted in the design of camera, or in the methods of photography.

Secondly, the airmen were never able to give up much space to the camera and its fittings, because they had to carry such armament, and were seldom allowed by enemy aircraft and by anti-aircraft guns to give their whole attention to photography.

These two factors were responsible for the fact that ... surveyors made few special demands upon the airmen, ... were content to take whatever photographs were ... without further ado than to ask for some lenses ... focal length than was usual for intelligence work, ... larger areas might be covered upon a single plate.

Still more important in its bearing upon our ... mapping from air photographs on the Western ... existence of a fairly universal trigonometrical ... a fairly complete series of cadastral plans ... No doubt the Allies were here in a happier condition ... Germans, but it was in the main true that ... the Western Front had a skeleton ready to hand ... only a photographic field sheet, as it were, ... theodolite. It is in the development ... photography, or of photography on a vertical ... angles measured by its aid, that progress must be ... In determining the positions of additional control points ... is of the photograph taken vertically downwards ... (the horizontal plate) that one naturally turns for the ... and correction of detail and such photographs ... procurable if the aeroplane can fly ... be mapped. One further item must be ... the French, Italians, Americans ...

...were ... necessary to the ... from ... ...ntinuously ... We ... on the subject ... photography ... the Western ... ...here than ... ...ring, the net ... photographs, ... spaces in the ... control points. ... ...ire of interest ... ...gaps in the con... ...of traversing, ...were as nearly as ... found that by putting ... ...a great ... ...and that ... great ... ...ally, be ... ...the sur...

eyor to reach so fair a degree of accuracy that for his 1 in 0,000 scale it was unnecessary to "rectify" each photo-graph, and the photo-traverses were pasted on to brown paper and then photographed up or down to the correct scale. So omparatively well did this photo-traverse scheme work, that where there were particularly few trigonometrical points, addi-ional control points were fixed by flying over and photograph-ng the sides of triangles, and thus fixing the position of the apices, just as the detail surveyor does by measuring the sides of triangles with his chain. A further point of interest lay n dealing with the distortions due to the steep and hilly nland areas. Wherever you meet with differences of height on the ground you must get differences of scale on your photo-graph, for the scale depends upon the height of the camera above the ground, and we get a certain amount of displace-ment which can best be understood by taking a concrete case. Supposing we take a photograph from a camera held rigidly vertical, nearly, but not quite, over some factory chimney. The ray from the lens to the top of the chimney, then, is not absolutely vertical. and if prolonged to cut the ground will fall to one side of, and not over, the base of the chimney. Now nothing that one can do to the resulting photograph will put the top of that chimney in its right position in plan, but the displacement becomes less as we get nearer to the centre of the photograph.

It is partly because of this trouble, due to differences of height and partly to the trouble of tilt, that experience led surveyors to use no more than one-third of each photograph and to arrange for a correspondingly larger number of exposures.

One more point of interest from Palestine (and Mesopo-tamia) is that air photo-topography proved most valuable, as one might have foretold, for mapping large Eastern towns, with their tortuous and narrow streets.

We may now sum up the experience gained by us in the war.

Firstly, we invariably had a network of triangulation on which to base our new surveys, and sometimes we had reliable old cadastral surveys also.

In the second place, all photography for mapping was done from a camera held as nearly vertical as possible; but

Thirdly, we had failed to evolve any means of holding it absolutely vertical, and practically every photograph was sensibly distorted in consequence.

Fourthly, we mapped at scales which varied from 1 to 6 in. to the mile. At the larger scales every photograph had to be rectified, and at the smaller scales, after considerable train-ing of the pilot, it was found possible to use photo-traverses.

Fifthly, we dealt with the problem as if the earth were flat (a safe assumption in Flanders!), and we evolved no method of actually measuring differences of height or of contouring, although we made use of the stereoscopic effect visible from two photographs which were partly of the same area.

In short, we had made it a quick and efficient, though not necessarily a cheap, method of detail survey at medium scales, but had in no way made it possible to dispense with the trig. observer or the contourer.

Our British experience is probably representative of that gained by the Allies in general. Indeed, German methods and achievements followed on much the same lines, with this essen-tial difference—that they did occasionally employ photogram-metric methods from the air, and were able to contour inacces-sible ground to some extent in consequence. We know this from articles which have appeared since the war in German surveying papers, but I am bound to say that one could not have suspected the fact from an examination of German war maps. It is probable, too, that much of the German mapping of our trenches and of the area in our occupation was done from oblique photographs.

Post-War Experience.

The important problems confronting the air photo sur-veyor of to-day have resulted in a good deal of research but little practical advance as yet. There are, however, three post-war air surveys of interest to mention. Most interesting is a survey carried out in North Africa by the French. The problem confronting the surveyor in this instance might occur frequently in war. The French outposts ran along the edge of a very mountainous, difficult, and hostile country, which could not be entered by surveyors. It was desired to map a strip of 60 kilometres broad. Triangulation had been pushed up to the outpost line. The programme of work may be considered under the headings:—

Additional trig. control: Fourth order.
Air photo-control: Fifth and sixth orders.
Air photo-topography.
Air photo-contouring.

The first stage was to intersect with the theodolite a number of peaks, and these are classed by the French as the fourth order of control, and serve as the base for the fifth and sixth orders. To carry out these further controls planes ascended nearly, but not necessarily quite, over trig. points, and took panoramas as nearly in a vertical plane as possible. These panoramas included various already fixed peaks, and the position of the camera at the moment of exposure was resected from these known points. The positions of exposure were then plotted and forward rays to other points were drawn in. By repeating these panoramas at a variety of points and at different altitudes a number of points of the fifth order were established. Points of the sixth order followed in much the same way, but with the difference that they were intersected by rays measured on panoramas taken during flights over the ground to be mapped, in conjunction with the air photo-topography, and corresponding to marked hori-zontal plane photographs. The photo-topography was done on a cinematograph film, exposures being governed mechani-cally, and the result, controlled by its sixth order interpola-tions, was plotted from compiled and mounted photo-traverses. Here we see, then, a further development of Hamshaw Thomas's traverse scheme. Finally, heights were calculated from the plotted distances, and from vertical angles measured on the vertical panoramas, starting from the height as given on the barograph in the aeroplane. It is noteworthy that no claim is made of an accuracy greater than that wanted for a survey on the 1 in 200,000 scale, and it is probable, I think, that errors in linear measurement between control points are of the order of 1/500 (which may there-fore reach a sensible total), and errors of altitude of the order of ± 100 ft.

Quite recently, in an Engineering Supplement of the "Times," we read of American experiments in air photo-hydrography and air photo-topography. Little progress seems to have been made in the former, for it was found that contrast in tone on the photograph did not correspond neces-sarily to relative depth, but followed more generally the colour of the bottom.

The air photo-topography, however, proved its value in the revision of a coastline strip, which was chosen as one of the natural subjects for this method. Here again we find the air photo-traverse employed without rectification of the indi-vidual photographs. A noteworthy feature of this survey is the reliance upon a camera controlled by gravity and fitted with spirit-levels—which adds another confirmation to the soundness (within certain limits) of our war procedure in Palestine.

The third and last survey to mention is one reported in a German work on photo-grammetry from the air. A party of trig. observers preceded the photography and fixed an addi-tional number of points in the area in question, and another survey party named, and revised on the ground, the plotted map. Air photography was entrusted with the fixing of addi-tional points from the measurement of horizontal and vertical angles on negatives taken obliquely, with photo-topography partly from these obliques and partly from horizontal plane photographs, and with photo-contouring.

The most interesting feature of this survey, and of the literature which deals with it, is that it establishes definitely that the position (and height) of exposure in space, and the direction and magnitude of tilt, can be fixed easily enough

if three known points appear on the photograph, and it describes instruments for calibrating the lens and for angular measurement on the negative (which is tilted to correspond to its position at the moment of exposure).

PART II.—THE PRESENT POSSIBILITIES OF AIR PHOTOGRAPHY.

It will be convenient to a résumé of the subject to adopt the following headings and to omit an unnecessary repetition of the prefix "air."

1. Photo-control.
2. Photo-traverse.
3. Photo-topography.
4. Photo-contouring.

1.—Photo-Control.

All previous surveys have emphasised the fact that photo-control cannot give an adequate support for a map, except for short distances. It may follow either from oblique or from vertical-plane photographs, and in either case, to be of value, from refined measurement on the plate. It postulates interpolation from previously fixed points appearing on the plate (and a determination of the magnitude and direction of tilt in the case of obliques). A high order of accuracy in measuring angles from photographic plates has been obtained for some purposes, but so far photo-grammetry has not given us much precision for surveying, and, with the added difficulties of resecting in space and then rectifying it is not to be expected that the error of linear measurement will fall below something of the order of 1/500, if indeed it falls so far. It is, in my opinion, highly unlikely that any graphic interpolation depending on geometrical construction or upon any mechanical device will give us results which will do more than hang two or three photographs together. To mention one point alone, the lens itself must be carefully calibrated, and the corrections which result to the position of points on the photograph may assume serious dimensions. In German practice the angular measurement on the plate follows from observation with a specially-designed theodolite looking through the lens used in the aeroplane (or one precisely similar) at the plate which is set to the actual angle of tilt.

At this present moment we have no experience in the provision of a photo-control, although the matter is in capable hands, and we may hope for speedy developments.

One may say at once, however, that no photo-control is likely to do more than amplify the trigonometrical control, or carry us some few miles from it, and that only where suitable and identifiable points are to be seen on the negative.

No photographic method will give control points in a forest, for example.

2.—Photo-Traverses.

A photo-traverse is a form of control from the horizontal-plane plates, and has proved its utility, but it must be remembered that it can give accurate results only in flat country. Its value must depend largely on the previous training of the pilot and upon the vertical position of the optical axis. Now to ensure the latter we can, at present, do no better than hope for a steady "air speed" and rely upon gravity and the spirit-level. It is suitable for scales smaller than 1 in 20,000. A gyroscopic attachment has often been discussed, and may yet appear, however, in which case greater accuracy may result.

3.—Photo-Topography.

With our control (and possibly traverses) plotted, we now turn to the detail, and here we must think in the first instance of scale. No photograph will give a ground plan of a thick hedge, or the boundary of a wood, or of a house with eaves, etc. It can, in fact, give only what it sees, and, as has frequently been pointed out, it cannot hope to give us cadastral plans whenever overhanging detail is met with. For large-scale maps (shall we say from 1/5,000 to 1/20,000) each photograph must, at present, be "rectified," but if we secure a good gyroscopic or other device for holding the optical axis vertical, we may escape this laborious step. Indeed, we must do so, on economic grounds, if photo-topography is to compete, over ordinary country, in the open market with the surveyor. For small scales and in flattish countries trained pilots have already shown us that "rectification" is unnecessary, except perhaps under war conditions. In Palestine the errors in position due to the hilly nature of the ground were assessed at a general figure, of about 70 metres, and one can see that special rectification must follow in mountainous country.

4.—Photo-Contouring.

To be of any accuracy, heights must at present be calculated from vertical angles measured on the plate and a previously computed height of the camera at the moment of exposure. Considerable calculation is necessary, but as a method it is feasible enough, and in the recent German survey, mentioned above, it is claimed that errors of height varied from one to two metres. It may become quite practicable to rely on stereo-photo-grammetry applied to two photographs "placed" on the detail and rectified, but we have no experience as yet in this method.

Finance and Summary.

Now, having discussed our various stages, let us turn to finance. One may assume that the taxpayer will remain indifferent as to which of his pockets the money comes out of. His chief pre-occupation will be the gross total. It serves no purpose, therefore, to assume, as recent articles have done, complacent departments which may, by timely loans of men and material, diminish the apparent total.

I do not myself see how the price per plate can be less than 15s. or so, if we allow for expenses in rectification and in fitting to the map. It is, however, useless to elaborate this point here, for there are no recorded figures to show us exactly where we stand. We must await experience. We can say, however, with certainty, that except in certain extreme types of country we may economise in time, but are unlikely to economise in money. These three points will help to realise the position:—

1. The Ordnance Survey is a standing proof that cadastral plans at a scale of 1 in 2,500 can be surveyed at a cost of £12 18s. a square mile (pre-war figure).

2. Our pre-war Colonial Surveys show examples of fully completed topographical surveys at 1 inch to the mile for 10s. a square mile, and ¼ in. to the mile for 5s. per square mile.

3. The inevitable preliminary to an air-photo survey is a triangulation and the inevitable sequel a visit to the ground for examination, naming, etc.

To sum up the present position we may then say:—

(a) As far as can be seen at present, air-photo surveys cannot give us cadastral plans.

(b) Medium scales (1 in 10,000 to 1 in 40,000) offer the most favourable sphere.

(c) There is no likelihood that photo-control can take the place of triangulation except within small areas.

(d) A visit to the ground will always be necessary for examination and naming.

(e) Photo-survey has taken its place as a method, and a useful one, but has not replaced, and does not seem likely to, except in special cases, the older methods.

(f) The Classes of survey for which air-photography is especially suitable seem to be:—

i. Where the ground to be surveyed is inaccessible to the surveyor.

ii. Revision for economic and statistical purposes where accuracy is not essential (e.g., areas under cultivation, index maps to properties, etc.).

iii. Plans of large towns, archæological sites, etc., at medium scales.

iv. River channels, estuaries, and deltas, where shifting detail and difficulty of survey combine to obstruct land survey.

(g) Existing methods of air survey have been sufficiently exploited already to allow of a fair estimation of their possi-

bilities. Progress will come most surely then from research and experiment directed upon the following (amongst other) points:—

i. The ensuring of the verticality of the optical axis.
ii. The measurement of magnitude and direction of tilt.
iii. Measurement on the plate of horizontal and vertical angles.

H. S. L. WINTERBOTHAM.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Photographing Blue Prints.

THIS work looks so easy, for a "blue print" is generally a dark blue, or fairly dark, but in reality it is a difficult proposition to anyone unaccustomed to the work. In practice there is only one plate that can be depended upon for emulsion to produce a good printing negative. The one plate is a backed process panchromatic; this with a red filter will give the operator a fine black and white negative.

These plates must be manipulated in total darkness, unless the photographer possesses a safelight, but for occasional work this expense can be overcome. But be quite sure there is no white or actinic light creeping in anywhere; and after the plate has been safely housed in the dark-slide, wrap the box containing the remaining plates in the usual black paper, tying a string round the same.

The plate being now safe in the dark-slide, proceed to focus to scale with the red gelatine filter fixed in position behind the lens with one or two drawing pins. Some operators unscrew the front lens and fix the filter in front of the diaphragm or stop, but it is best not to interfere with the lens, half a turn one way or the other may affect the definition. Others adopt a means of fixing the filter in the front, which is useful if you have glass filters, but modern "flats," as they are termed, run to pounds in cost. A 3-inch square gelatine filter is a convenient size, and cost before the war 3s.

The "blue print" is most conveniently photographed if placed in a printing frame with a glass in front. This is so easily shifted, whereas if drawing pins are used it means taking out 10 or 12, or even more, if the "blue print" is a large one and an alteration needful.

Finally, attend to the carbons, if you have not done so, as they may be required to run for fifteen minutes. The larger the reduction the smaller or less the exposure, so that as little as five minutes may suffice.

It is now presumed you have focussed up through the red filter, inserted the dark slide, seen to your lamps; now cap the lens and insert diaphragm *f*/45, but if the reduction is very considerable, say a 24 x 20 or 20 x 16 to postcard or quarter-plate, then *f*/64 is best. On the other hand, if you have to make a negative enlargement or only a reproduction the same size *f*/32 is correct, for that at the same size is equal to *f*/64 so far as aperture to camera extension is concerned.

Be sure to see that the light of the lamps is not reflected back into the camera from the printing frame. Take out the focussing screen, cover head with a dark cloth, and then look first one side and then the other. If the light shines in your eyes you may know it will spoil the negative. Alter the lights (do this with the open lens), re-insert the stop, and place the cap on the lens. Then insert the slide, draw the shutter and expose, taking a seat to avoid vibration. Have pencil and paper, and put down the exposure so that if a second plate has to be used there will be no doubt in your mind as to how long you gave the first. Full exposure with at least *f*/32 (but *f*/45 will generally be found better), full development, ample fixing, the usual washing and drying, a good, glossy, contrasty paper, and you can send the prints home with the knowledge that you can charge a good price.

The exposure may be anything from 3 to 15 minutes. Now, taking the dark-slide into the developing room, have something ready to cover over the dish, as few dark rooms are absolutely actually light-proof, and fasten the door. Insert plate in developer and cover it over, having previously taken the time. Then count the seconds, and, when five minutes is up, check yourself by the watch. It is well to let the plate develop for at least two minutes motionless, and then keep the plate well rocked to prevent any of the backing from settling on it. At the end of five minutes, turn on the red or green light, and just glance at the plate. Most likely you will give it another 60 seconds, then turn on the water into the developing dish, and give the plate a good swilling, take out, place in fixing bath, but do not leave the room unless you can gain access to the outer world without admitting actinic or white light, for even in the hypo these panchromatic plates are remarkably sensitive; it is very desirable that a good fixing be given; 15 minutes is none too long. I remember a case in which a plate seemed longer than usual in fixing. I turned on the light behind the yellow lantern. I held a 24 x 20 plate to the light, but a patch in the corner was not fixed; it caught the light, although perhaps only exposed to it for 10 seconds. After washing and drying, that corner was found the next morning to have a dense patch which caused a lot of trouble, all of which might have been avoided by five minutes more in the hypo.—A. C.

FORTHCOMING EXHIBITIONS.

January 22 to February 5.—Northern Photographic Exhibition. Latest date for entries, January 15. Particulars from the Hon. Secretary, Liverpool Amateur Photographic Association, 9 Eberle Street, Liverpool.

January 27 to 29.—Birmingham Photographic Society. Particulars from the Hon. Secretary, Philip Docker, Birmingham Medical Institute, Edmund Street, Birmingham.

February 14 and 19.—Leicester and Leicestershire Photographic Society. Latest date for entries, February 5. Particulars from the Hon. Secretary, W. Bailey, Cank Street, Leicester.

February 19 to March 5.—Edinburgh Photographic Society. Latest date for entries February 10. Particulars from the Hon Secretary, G. Massie, 10, Hart Street, Edinburgh.

February 19 to March 12.—Scottish Salon, Dundee. Latest date for entries, January 31. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

March 16 to 19.—Hackney Photographic Society. Latest date for entries, March 1. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9..

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—We are glad to see that our Birmingham friends are raising their banner again by holding their annual exhibition at the galleries of the Royal Society of Artists, New Street, Birmingham, from January 27 to 29 next. On this occasion the exhibition will be limited to the work of members, except in two classes, which are open to residents in Warwickshire, Worcestershire, or Staffordshire. We daresay the Society is right in the view that the day has not yet arrived for resuming the open exhibitions which in former years were a notable feature of its activities, and at which on several occasions new lights in the pictorial world would first make their appearance. But the many able members within its own ranks will no doubt be fully equal to bringing together a strong exhibition of both pictorial and scientific work.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, December 29 to 31, 1920 :—

OPTICAL PROJECTION.—No. 36,277. Optical projection system. P. Blackman.

FILMS AND PLATES.—No. 36,415. Photographic films and plates. Dye Impression Photos, Ltd., and W. H. Edridge.

CAMERAS.—No. 36,618. Photographic film cameras. K. Koehl.

OPTICAL PROJECTION.—Nos. 36,600 and 36,601. Optical projection apparatus. J. M. McAlery.

CAMERAS.—No. 36,602. Photographic apparatus and cameras. J. M. McAlery.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

NATURAL BACKGROUNDS IN PORTRAITS.—No. 153,111 (August 7, 1919). The invention relates to photographic apparatus for taking pictures with a background of any desired character.

The object of the invention is to construct apparatus for carrying out the known method of photography in which a given subject is first taken on a sensitive plate with a dark background and the usual lighting scheme, and thereafter a bright background is substituted, and the same sensitive plate in the camera exposed thereto through a positive plate in contact with the sensitive plate.

A transparent platform is provided upon which the sitter is posed, say a platform of glass, provided with a dark background formed, for instance, by one or more wings sliding transversely on rails and operated by suitable levers and cords from a point adjacent to the camera. Behind this movable background is located a source of light, say a sheet of white linen, behind which are mounted a series of lamps adapted to shine through the sheet when required, and also capable of being brought into action by suitable levers and cords operated from near the camera, preferably at the same time as the removal of the dark background. A transparent glass plate placed just behind the sitter may or may not be used for posing purposes, but an essential point of the invention is that the transparent platform should allow of the light from the bright background passing all around the posed figure to the camera lens, especially under the base of the figure.

To prevent an abrupt division where the outline of the figure is set within the background in the final picture a novel vignetting device may be employed which consists of an ordinary vignetting card, but combined with a corresponding semi-transparent plate which assures a hazy effect upon the negative when placed in the path of the light-rays from the bright background to the camera.

It will be noticed that the figure is on the opposite side of the camera lens to the positive of the background, and it is during the exposure of the latter that the semi-transparent vignette plate acts, and preferably it cuts off or only partly exposes the transparent base which would otherwise pass light from the background beneath the posed figure.

Advantageously the camera may be mounted within a movable camera room in which the photographer works, which room he can move along rails by suitable lever mechanism, and from which room he can not only change the background, but at the same time switch off the front lighting member and switch on the rear lighting members.

In operation, the photographer, having posed the sitter on the transparent platform with the dark background behind, takes a photograph on his sensitive plate in the ordinary way, the focussing of the camera to get the necessary clearness and size of picture being obtained by the photographer moving the camera room bodily on rails on the floor. This done, he then pulls another lever which removes the dark background, switches off the front lights and at the same time lights up the bright background behind it instantaneously by mechanism for the purpose, and quickly inserts his background positive plate in front of his negative plate or film, and the bright background causes a print of the positive to be transferred to the negative except on the portion thereof covered by the image of the sitter.

The vignetting arrangement is placed outside the camera room, being covered by a black ground during the first exposure, which ground is pulled away, leaving the semi-transparent glass

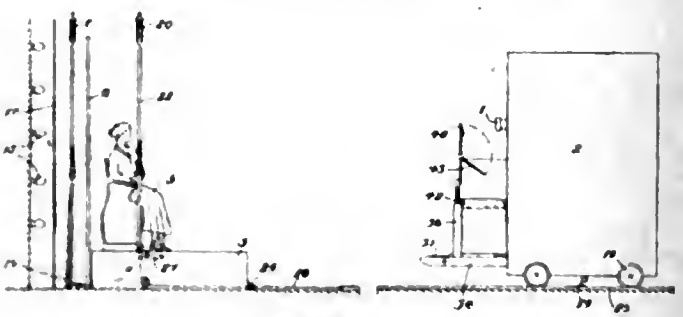


Fig. 1.

vignetting plate lighting up the background positive, but delineating the silhouette of the part of the sitter which it covers.

By this invention a most natural effect is produced, which can be carried so far by means of the vignetting arrangement as to cover any portion of the figure of the sitter by the background that many be desired, and a very pleasing result is thus obtained.

In the drawings, 1 is the camera supported on the usual stand in the movable camera-room 2. 3 is a platform constructed with a glass top 4 in order that it shall be transparent. 5 indicates the subject to be photographed in the form of a figure in a chair resting on the platform 4. 6 is a sheet of glass immediately behind the sitter 5, which may be useful for posing the latter in accordance with the ideas of the photographer. 7 is a rail extending completely across the platform

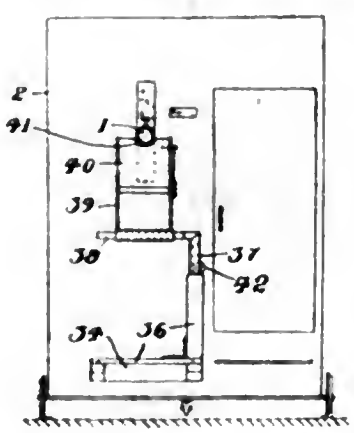


Fig. 2.

but high above and carrying, by means of the pulleys 10, 11, a pair of screens 8, 9 formed by frames covered with black velvet, the frames being attached by cords 14, 15 to balance weights 12, 13 respectively, and being further provided with interlocking catches 16, so that they may be drawn together and connected at their meeting edges. Immediately behind this black screen 8, 9, is provided a stationary frame over which is stretched white linen or other fabric forming a luminous surface 17 when the rear lights are illuminated. Conveniently upon a second ceiling rail 20, a pair of side wings 21, 22, also formed of black velvet stretched on a frame, may likewise be connected to counter-weights 23, 24. These side wings may conveniently

be kept in place by means of catches 26, 27 carried on the side of the platform and operated against a spring by means of a cord 28 and suitable guide pulleys such as 29, 29, the cord being carried into the interior of the camera room 2 so that by withdrawing the catches 26, 27 the side wings are withdrawn. Conveniently also the cord 30 connects with the cord 28, and

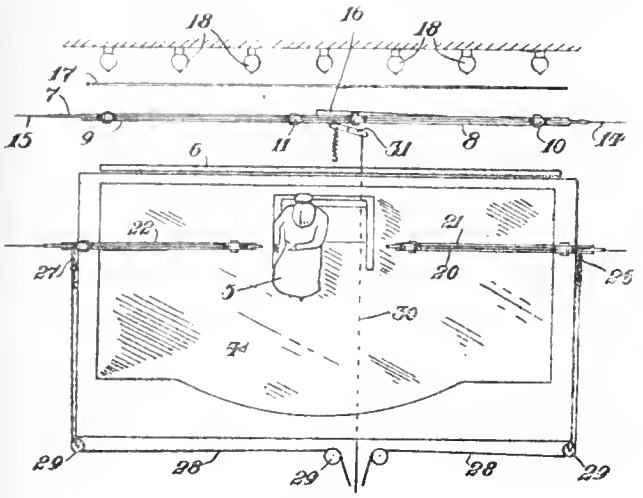


Fig. 3.

by operating the pivoted lever 31 pushes one side of the back screen 8 away from engagement with the portion 9, whereupon the weights 12, 13 cause the withdrawal of these screens forming the black background. At the same time a continuation of one of the cords 28 or 30 operates a switch which puts on the lights 18 and puts out any lights there may be forward of the sitter 5. Simultaneously the operator within the camera room 2 places a transparency or positive plate of a suitable scene in front of the dry plate, whereupon the light, showing through the screen 17, photographically affects the sensitive plate through the transparency and exposes the image therefrom on the negative except where the light from the luminous surface 17 is stopped out by the figure of the sitter 5, which therefore remains as in the original exposure; no other exposure of this figure 5 occurs because the forward lights which made the original exposure are put out and no reflection of light therefore occurs from the sitter.

Referring to figs. 1 and 2, 34 is a bracket projecting from the dark room 2 upon which are rods 35 carrying the frame 36, of

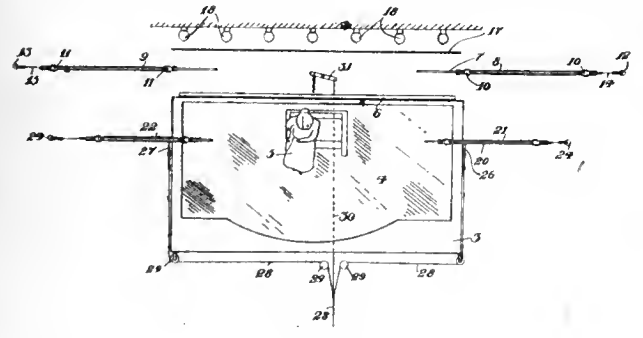


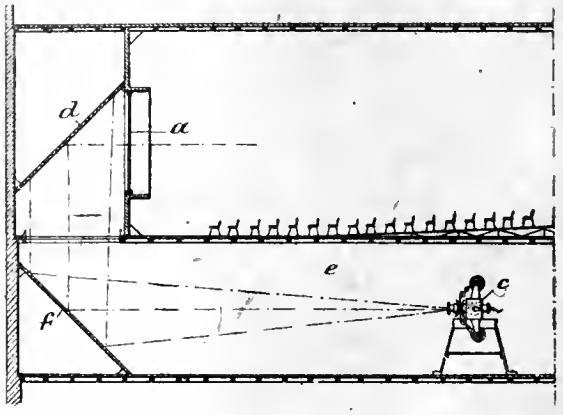
Fig. 4.

which one corner is formed as a hollow upright and receives the leg 37 of an angular support having the transverse leg 38 upon which slides the frame 39 provided at its upper end with the semi-transparent screen 40 preferably of ground glass having the vignetting recesses 41 removed therefrom. The frame 36 may be slid along the rods 35 to suit the longitudinal position required for the vignette frame 40, and the height thereof may be adjusted by means of a rack and pinion 42 operable by any convenient means from within the camera room.

It should also be noted that the camera room 2 can move to and from the platform 3 by reason of it being carried on wheels 19 working on the rails 25.

The vignetting glass 40 is provided with an opaque cover 43, which is used to cover up the surface 40 when the first exposure is made, and the purpose of the vignetting device is that, when making the second exposure in order to obtain the background on the dry plate, it may be made through the ground glass 40 surrounding the vignette recess 41, which will permit a reduced amount of light to pass through and thus enable any boundary line between the actual image of the sitter and the image of the background to be softened so as to proceed from one image to the other without a hard and fast division. For example, supposing the figure of the sitter is given a background showing a portion of sea, it may readily be arranged so that portions of the figure are hidden by the sea, with the result that the effect is exceedingly natural and hardly observable as not being taken in the actual sea. Stuart Elwin Neame, 4, Onslow Place, South Kensington, London.

Optical Projection.—No. 147,340 (July 14, 1919). The invention relates to the projection of pictures in rooms lighted by daylight or by artificial light, and consists in placing the projecting apparatus in a room above or below that in which the screen is viewed, the images being thrown on a translucent screen by means of an inclined mirror arranged behind and adjacent to the screen path for the light is greatly extended. This arrangement is possible if there is a suitable cellar *e* below the theatre. The projecting apparatus c can be placed in the cellar, and it is only necessary that there should be a second mirror *f*



which deflects the rays of light from the horizontal into the vertical direction. Petra Aktiengesellschaft für Elektro Mechanik, Niederwallstrasse, 18-20, Berlin, C. 19, Germany.

The following complete specifications are open to public inspection before acceptance :—

Printing Boxes.—No. 155,790. Boxes for photographic printing. E. Golesceano.

Cinematography.—No. 155,793. Cinematograph apparatus. Petra Akt.-Ges.

Cinematographs.—No. 155,764. Cinematographs. J. Szczpanik.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Sensima.—No. 408,884. Photographic chemicals, photographic plates and photographic films. L. Gevaert et Compagnie, 23, Septe Straat, Vieux-Dieux, Belgium, manufacturers of photographic materials. October 19, 1920.

Negopock.—No. 408,817. A folding photographic camera. The Russian Company for Foreign Trade, Ltd., 57, Shoe Lane, London, E.C.4, merchants. October 18, 1920.

Ossal.—No. 374,868.—Irradiating or lighting-up screens for Röntgen-ray work, being for surgical or curative purposes. Chemische Fabrik von Heyden Aktiengesellschaft, 57, Leipzigerstrasse, Dresden, Saxony, manufacturers. September 26, 1916.

New Books.

Pearose's Annual, 1921. Edited by William Gamble, F.R.P.S.. London and Bradford: Percy Lund, Humphries and Co. 10s. 6d. net.

We are glad to see this annual review of the photo-mechanical crafts making its appearance with almost its former punctuality. For twenty-three years, first as the "Process Year Book," under Mr. Gamble's editorship, it has made itself a repository of technical contributions by leading process workers, and, moreover, has discharged what is perhaps a still more useful function, namely, that of recording, in the shape of its numerous supplemental plates, the actual commercial progress which is made year by year in processes of reproduction in monochrome and colours. In both of these respects the current volume takes a fully deserved place among its predecessors. The editor's review of the present technical status of reproduction methods and of possible development is perhaps the most interesting item of the literary contents. Mr. Gamble, whose touch with the process trade is of the closest, cannot record striking developments in any of the existing processes, but he casts a prophetic and, as some may think, a somewhat over-sanguine glance into the future, and foreshadows great developments, not simply in photo-mechanical methods, but in the displacement of established systems of type-setting by photographic and photo-mechanical processes. He refers to several inventions which have for their object the production of printed text by methods of offset-litho or rotary photogravure, that is to say, by systems which reject the customary operation of setting up type by hand or by a composing machine. We don't suppose that linotype operators feel their occupation to be immediately threatened by the prediction of the "photo-comp." who will use an automatic camera for the production of letterpress letter by letter by photographic processes, and will thus cut out the whole machinery of setting type by hand or by the casting methods of the Linotype or the Monotype. It would indeed be a whirligig of destiny if almost the least organised body of workers (photographic assistants) were to prove themselves the displacers of the most firmly entrenched body of trade unionists. However, Mr. Gamble writes hopefully, and Mr. Arthur Dutton, the inventor of the "Photoline" process of typeless printing, has something to say, but no more than to make one wish he had written at greater length, on this new application of the photographic process.

Individual contributions in the volume are by Mr. Charles T. Jacobi, who has an interesting account of the Plantin Museum at Antwerp; by Messrs. W. J. Smith and E. L. Turner, who write of slide rule and graph methods of calculation in process work; by Mr. R. B. Fishenden, who has a note on high-light processes in photo-lithography; by Mr. James G. Gray, who records progress in intaglio engraving machines, and by Mr. H. Mills Cartwright, whose contribution is on the use of irregular grained screens for photogravure. It will thus be seen that intaglio and lithographic methods secure the lion's share of notice in the literary part of the "Annual," and the same may be said of the many illustrations of process work. The frontispiece is a fine specimen of photogravure in colours by the Rembrandt Intaglio Company, which contributes also a typical example of its work in monochrome in the shape of a reproduction of a portrait by Greuze. Messrs. Blades, East and Blades, Harvey Barton and Company, John Swaine, and Messrs. Penrose themselves are other contributors of rotary photogravure prints. The examples of half-tone are chiefly in colour and well illustrate the present high level of work for catalogue or book illustration. Altogether, Mr. Gamble and those who have supported him with contributions or illustrations may be congratulated upon bringing together a most valuable work, in the production of which they owe a great deal to the taste and skill of the printers and binders, Messrs. Percy Lund, Humphries.

Photographic Companies.—Messrs. Jordan and Sons, of Chancery Lane, in their table of company registrations during the year 1920, state that during the first six months 28 private companies were registered with a total capital of £249,783; during the second half of the year 17 private companies were incorporated with a capital of £132,750.

New Materials.

Sensima Ultra-rapid Plates. Made by Gevaert, Ltd., 115, Walmer Road, North Kensington, London, W.10.

Hitherto the firm of Gevaert has not issued a plate of "ultra-rapid" sensitiveness. Since the addition several years ago of the manufacture of plates to that of the many varieties of printing papers, for which they have secured the highest opinions, they have been content to establish their good name in reference to materials for negatives by means of a series of plates of more moderate speed, ranging from 225 to 275 H. and D., and including an orthochromatic and a non-screen variety in the list. But, rightly or wrongly, the cry is for extreme speed, and it was inevitable that Messrs. Gevaert, in taking their place with British makers, should issue a plate of extreme speed. That they have not done so until now may fairly be taken as an indication that the step has not been made until the resources of the Antwerp factory had been applied to produce an emulsion deserving the reputation, as regards speed and other qualities, which their other manufactures have consistently maintained.

The new plate, the "Sensima," is now issued as of the extreme speed indicated by the H. and D. rating of 500, that is to say, about twice the sensitiveness of their "Special Sensitive." The nomenclature of plates is unfortunately not always a clear guide to relative speed. A maker adopts an appropriate title for his most rapid plate, and then, when he goes one better, is sometimes hard put to it to find a name for one still more rapid. But after all there is as little in the name of a plate as in that of anything else; the photographer, and particularly the portrait photographer, regards it simply as a reminder of the brand which he has found to fulfil his requirements. And our own experience of the new Gevaert plate tells us that he will not be disappointed in memorising "Sensima" as a synonym of extreme speed. We think that exposures at least as short as those permitted by any other may be given to it, and there will be no fault to find in its rendering of gradation in the less illuminated parts of the subject. Moreover, it develops readily to good vigour and, for a plate of its speed, stands a surprising amount of forcing in development when exposure has been below even the minimum which it may receive. It is evident that the plate represents the most modern skill of the emulsion maker. Messrs. Gevaert can confidently class it with their earlier issues and with their printing papers as the product of the most refined scientific manufacture; and to those who have regularly employed these materials perhaps no more convincing statement of its merits could be made.

Manchester Amateur Photographic Society.—A courageous step has been taken by the Manchester Amateur Photographic Society in raising its annual subscription from 7s. 6d. to £1 1s. For several years past the funds for the increasing costs of running the Society have been raised by various special efforts and appeals, but it has been unanimously decided by the Council of the Society to place the subscription at a figure which will remove the necessity for these irregular means, and will, moreover, allow of a forward movement being undertaken which has, in a measure, been forced upon the Society by the impending termination of the lease of its present premises. The opportunity now offers of securing a better suite of rooms in the same building, where more ample accommodation for lectures will be available, as well as rooms for enlarging and developing, and also, it is hoped, an electric studio. Moreover, if the membership continues at a sufficient number, it is hoped to keep the premises open during the day as well as in the evening. It is evident from all this that the Manchester Society clearly recognises the important work which it can do for the many amateur photographers within the crowded Manchester area, and we cannot have any doubt that those who are already members, as well as many who at present are outside its ranks, will rally to its support, and thereby will contribute to the increased usefulness of a centre of photographic activity which in the past has rendered most valuable services.

Commercial & Legal Intelligence.

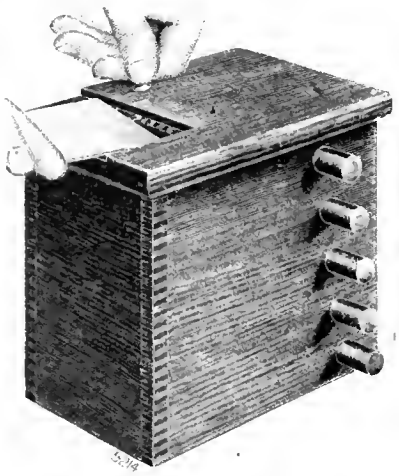
NEW COMPANIES.

ALEXANDER WILSON (BLYTH), LTD.—This private company was registered on January 3 with a capital of £2,000 in £1 shares. Objects: To take over the business of an optician and dealer in photographic apparatus and accessories, carried on by A. Wilson at 32, Regent Street, Blyth, as Alexander Wilson. The first directors are: A. Wilson (permanent), 11, Barnard Street, Blyth; C. S. Hiles, 112, Gladstone Street, Blyth. Secretary: C. S. Hiles. Registered office: 32, Regent Street, Blyth.

New Apparatus.

A Negative Numbering Machine. Made by Houghtons, Ltd., 88-89, High Holborn, London, W.C.1.

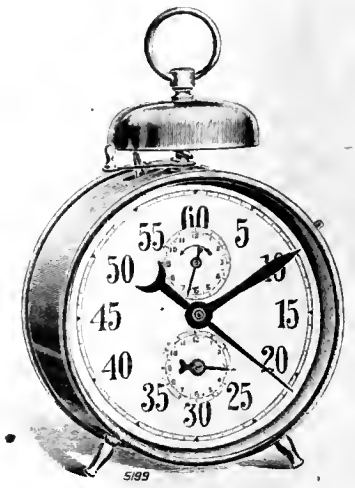
A DARK-ROOM accessory, primarily for the professional photographer, has been introduced by Messrs. Houghtons for the purpose of providing a photographic means of impressing any desired series number upon a plate before exposure. The machine is really a photographic version of the familiar perpetual dating stamp. It consists of a closed box with a light-tight cover, and containing five narrow endless bands, each of which includes a strip of celluloid negative bearing the numerals 0 to 9. Each band can be separately adjusted in position by an outside winding handle over an aperture below which is a small electric lamp, worked by a dry battery. Thus any required number from 1 to 99,999



may be arranged over this aperture. The lid of the box has in it a slot corresponding in size and position with the row of figures brought immediately below it by suitable adjustment of the numeral negative bands. It is also provided with a right-angle stop or rebate into which the negative is simply put, film down, of course, and exposure then made through the composite numeral negative. The required number is thus obtained on the extreme margin of the negative on development. The apparatus is an ingenious attempt to provide an indelible numbering of negatives. It is supplied, complete as we have here described it, price £2 15s.

The Ensign Dark Room Clock. Sold by Houghtons, Ltd., 88-89, High Holborn, London, W.C.1.

THIS new pattern of a dark-room clock is most conveniently designed, and has all the movements necessary for dark-room work, that is to say, for fixing, washing, and similar somewhat protracted operations, as well as for exposure and development. The 4-inch dial of the clock is boldly lettered, as shown in the drawing, in 5-second intervals, the large hand taking one minute to traverse the outer circle of numbers. At each passage of the finger over the 60-second mark a bell is rung, this movement providing a useful warning of the end of periods of time between one and two minutes. At the same time the smaller hand, which moves over this outer



scale, registers minutes, whilst the small dial in the lower part of the face registers hours, and is divided for reading with sufficient accuracy to one-eighth, or at any rate one-quarter of an hour. The upper small dial permits of the clock being set to ring the bell at the termination of any required period. It will thus be seen that these features comprise all those which are of practical service in the dark-room; and it should be added that there is also fitted a start and stop lever, and also a movement for putting the gong out of action. A clock of this universal type undoubtedly serves a very great many useful purposes and adds a desirable element of certainty to almost every photographic process. The price of the clock is 27s. 6d.

PHOTOGRAPHIC PHOTOMETRY AND THE PURKINJE EFFECT.—A paper on this subject by F. E. Ross, of the Eastman Research Laboratory, appears in the "Astrophysical Journal," of September, 1920. According to an official abstract, the increase in diameter of a star's image is proportional to the logarithmic increase of exposure time, and it is proposed that when this is measured with an artificial star the coefficient of increase shall be called the *astro-gamma* because of its analogy with the factor which is termed *gamma* in photographic work. Both gamma and astrogramma are dependent upon the wave-length, and photometric measurement of stars made photographically must take into consideration this variation of gamma and astrogamma with wave-length. These effects are considered in the paper. Some results obtained with long exposure where the light source is very weak are also given. The theoretical considerations involved are dealt with here.

LIGHT-INTENSITY AND EXPOSURE TIME.—A paper on this subject by F. E. Ross, of the Eastman Research Laboratory, appears in the "Journal of the Optical Society of America," of September, 1920. According to an official abstract the equations connecting photographic density with exposure which have been proposed by Abney, Hurter and Driffield, Elder and Channon are critically discussed. In particular certain theoretical objections to the Hurter and Driffield formula are advanced. The author proposes a new formula, the underlying idea being the separation of the grains of an emulsion into different classes, according to their sensitiveness. The thickness of the emulsion is taken into consideration, and is measured not in microns but by number of layers of grains. The mass-action equation is assumed to hold for each group. All formulæ are compared with two types of measured characteristic curves, in one of which the "toe" is prominent, in the other, it is almost absent. It is difficult to include the characteristics of "toe" and "shoulder" in any simple algebraic formulæ. These peculiarities point to the existence of secondary phenomena.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, JANUARY 16.

South London Photographic Society. Visit to Bankside

MONDAY, JANUARY 17

Bradford Photographic Society. Yorkshire Photographic Union Night. Prints and Slides.
Catford, Forest Hill and Sydenham Phot. Soc. "Ireland." C. H. Oakden.
Cleveland C.C. Discussion on Printing Processes.
Cripplegate Photographic Society. "Bromoil."
Dewsbury Photographic Society. "Yorkshire Villages (Revised)." W. E. Gundill.
Walthamstow and District Phot. Soc. "Retouching the Negative" S. B. Goddard.
Willesden Photographic Society. "Passe-partout and Mounting." W. Fraser Black.

TUESDAY, JANUARY 18.

Royal Photographic Society. "Falconry." Captain C. W. R. Knight, M.C., F.R.P.S.
Bournemouth Camera Club. "Sir Walter Raleigh." Mr. Ibbett.
Dennistoun Amateur Phot. Assoc. Visit to South Glasgow C.C.
Exeter C.C. "Lantern Slide Making." W. T. Aviolet.
Hackney Phot. Soc. "With Allenby through Palestine." W. Butcher and Sons.
Leeds Phot. Soc. "Pictures of Italian Life." Alex. Keighley
Manchester Amateur Phot. Soc. Lantern Slide Evening. "Some Bye-Paths in Lantern Slide Making." James Shaw.
Portsmouth C.C. "Panchromatic Photography." Kodak, Ltd.
Rotherham Photographic Society. "Photography: Its Present-day Importance." A. Dordan-Pyke.
Stalybridge Phot. Soc. "Vitegas Paper." J. W. Pickering.
Walthamstow and District Phot. Soc. "Oil and Bromoil." G. E. H. Rawlins.

WEDNESDAY, JANUARY 19.

Accrington Camera Club. "Pinhole Photography and Salted Papers." W. Dunbury.
Borough Polytechnic Phot. Soc. "With Allenby through Palestine with a Watch-Pocket Carbine."
Croydon C.C. "Something Different." H. P. C. Harpur.
Dennistoun Amateur Photographic Association. A.P. Prize Slides
Edinburgh Photographic Society. "Improvement of the Negative Print." A. H. MacLocas.
Halifax Scientific Society. Y.P.U. Lantern Slides.
Ilford Photographic Society. Slides and Prints.
Partick Camera Club. Lantern Slide Competition.
Rochdale Phot. Soc. "Combination Printing." J. C. Wild
Woodford Phot. Soc. "The Choice of a Plate and a Printing Process." E. Marriage.

THURSDAY, JANUARY 20.

Birmingham Photographic Society. "Bromide Printing by Contact." E. A. Bierman.
Brighouse Photographic Society. Y.P.U. Lantern Slides.
Camera Club, The. "Shakespeare in Peace and War." Sir Frank R. Benson.
Everton and District Phot. Soc. "Enlarging." J. R. Hall.
Gateshead and District Camera Club. "Flashlight Photography." W. F. T. Pinkney
Hammersmith (Hampshire House) Photographic Society. "Canterbury Cathedral." H. W. Fincham, F.S.A.
Hull Photographic Society. Colour Workers' Evening
North Middlesex Phot. Soc. Demonstration Wellington Materials.

FRIDAY, JANUARY 21

Bedford Camera Club. "Psychic Photography" (Ladies' Night.) S. W. Woolley.

ROYAL PHOTOGRAPHIC SOCIETY.

MEETING held Tuesday, January 11, the president, Dr. G. H. Rodman, in the chair

The president announced that the Council had awarded the progress medal of the Society to Mr. F. F. Renwick for his researches into the chemistry and physics of photography. He felt sure that members of the Society would heartily approve this tribute on the part of the Council to the value of the extensive scientific investigation work which Mr. Renwick had done. Members present endorsed this view by their applause.

Mr. Julius Rheinberg then read a paper entitled "Some New Directions for Photographic Research," in which he dealt with the physical changes occurring in colloid substances rendered sensitive to light. He instanced the applications of a change in physical properties of bichromated colloid to the manufacture of mosaic colour filters for screen-plate colour photography, and gave a general and somewhat rapid description of the details of a process which he had worked out, and which depended upon variations in permeability of a colloid coating. Mr. Rheinberg gave examples of the use of the much-neglected method of rendering a colloid insoluble or impermeable by means of ferric salts, and then, by exposure to light, producing a greater or less degree of solubility or permeability.

The lecturer also referred to experiments which he had carried out for finding a solvent of pyroxyline which was free from the objection of the varying rates of volatilisation possessed by alcohol and ether as ordinarily employed in admixture for this purpose. He had found that methyl alcohol could be used as a single solvent, but had the drawback of yielding an opalescent collodion film. This latter defect, however, could be avoided by employing ethyl alcohol in moderate proportion with the methyl alcohol. Mr Rheinberg suggested applications of such solvents, for example, in simplifying the technique of the wet-collodion process.

On the proposition of the chairman a very cordial vote of thanks was accorded to him.

In the absence of Mr. F. C. Toy, who was to have read a paper but was prevented by illness from being present, Mr. B. V. Storr, with the assistance of Mr. H. Flower, gave a demonstration of development in bright light by means of the pheno-safranine desensitising process described by Mr. Raymond E. Crowther in last week's issue of the "B.J." Mr. Storr briefly reviewed the experiments of Dr. Luppo-Cramer, and traced the use of dyes of the safranine class from the observation that the oxidation products of certain developers were active in desensitising a plate. The action of the pheno-safranine was undoubtedly a desensitising and not a screening one, since the dye could be used as a preliminary bath which was applied for a minute or so, after which the plate could be developed in a bright light, such as that of a yellow safe light a candle a few feet away, or the ordinary electric illumination of a room—according to the character of the original emulsion. Mr. Storr thought the preliminary bath method was a better one than the addition of dye to the developer, since at certain concentrations there might be precipitation of the dye by the alkali of the developer. A dye solution of 1 : 10,000 was strong enough for ordinary special rapid plates; 1 : 5 000 was recommended for panchromatic plates. His provisional measurements of the reduction in sensitiveness by the use of the bath were that an ordinary plate became of 1/600th of its original sensitiveness, whilst a panchromatic was reduced in sensitiveness only to about half this degree. Mr Storr and Mr. Flower successfully developed a number of plates, both ordinary and panchromatic, in full light, and it was announced that a suitable dye for the process is shortly to be placed upon the market by Messrs. Ilford, Ltd. Some samples were distributed to members.

Votes of thanks to the demonstrators brought a very interesting fixture to an end.

CROYDON CAMERA CLUB.

ALTHOUGH a new acquaintance to the majority, an old friend to many turned up last week in the virile person of Mr. H. W. Bennett, F.R.P.S., who has been somewhat out of the limelight in recent years. Perhaps he is best known as the redoubtable champion of control in development; in these times rather the *rôle* of a heroic Horatius Cocles, for the bridge has to be defended against ever-increasing hordes of time-servers. However, the battle cannot be said to be actually won or lost by either side, though the contest is shorn of its ancient fire and fury. Excellent negatives are produced by both systems, even that hopelessly unscientific pyro-ammonia developer, favoured by many of the best workers in the past, rendering splendid prints when plates responded more kindly to the volatile and, as claimed by some, versatile alkali.

Mr Bennett is also known as a skilful architectural photographer, and is also possessed of a pretty habit of evolving formulæ of utility. Apropos of formulæ—the younger generation of photographers may fail to realise the magic attendant on photo-prescriptions in the past, and how carefully choice specimens were safeguarded, even to the extent of placing misleading labels on bottles containing the solutions. One pictorialist and highly-respected

journalist (no connection with the "B. J."), if memory serves aright, used to compound his pet developer for bromide prints from three bottles, respectively labelled A, B, and hypo. Privileged persons who were admitted to his dark-room during operations, and subsequently did some Sherlock Holmes' business on the clues afforded, spoilt a considerable quantity of paper.

"The Toning of Bromide Prints" furnished Mr. Bennett's theme on this occasion, and capitally he dealt with an ever-interesting subject. A large number of very excellent prints, toned various shades, from an "engraving" black to a warm sepia, illustrated the lecture. Emphatically he denounced the doctrine of fitting the printing process to the negative, which was on a par with the dictum of "Smith (Minor)" that "the horse is a noble animal, but if unkindly treated he ceases to do so."

The so-called "platino-matt" bromide papers were regarded by him as a very poor imitation of platinotype, and he invariably employed an "ordinary" (semi-matt) brand, Wellington's "cream crayon," in fact. Since the war he had found it gave warmer sepias, and this had necessitated a slight variation in his formula for securing varied tones. To obtain the finest quality it was essential that the prints be dried first.

Personally, he was a keen opponent of mechanical procedures in photography, the development of bromide prints excepted. Here correct exposure and full development for a fixed time was compulsory for best results. Also, fresh developer for each print should be employed. This might sound expensive, but was not so, as with a little practice 2 oz. of developer was sufficient for a 12 × 10 print, and even ½ oz. for a quarter-plate. Most of his prints had been developed with Johnson's amidol (equal to the German product in every respect), and he invariably used an acid fixing bath—one ounce of potass metabisulphite to the pound of hypo.

His bleaching bath is composed of the two following stock solutions :—

A.—Potass ferricyanide	1 oz.
Potass bromide	1½ oz.
Water to make	9 ozs.
B.—Mercuric chloride	60 grs.
Potass bromide	60 grs.
Water to make	5 ozs.

Sulphiding Solution.

Pure sodium sulphide	1 oz.
Boiling water to make	9 ozs.

To prepare the sulphiding solution : Take a mineral-water bottle with rubber-sealed stopper; mark to indicate 9-oz. level; warm bottle gradually; insert sulphide and pour on boiling water. Insert stopper and shake till sulphide dissolved, removing stopper now and then to allow steam to escape. When solution has cooled, filter and restore to bottle.

For a warm sepia or brown tone, take 40 to 60 minims of A to every ounce of water. Colder tones are given by varying the proportions of B to A, as follows :—

A.	B.	Tone.
40 Minims.	20 Minims.	Cool sepia.
30 ,,	30 ,,	Colder sepia.
30 ,,	50 ,,	Brown-black.
30 ,,	90 ,,	Engraving black.

As the tone gets colder less exposure is required. Assuming 10 seconds to be right, employing A solution only, then exposures in the above table will be 9, 8, 7, and 6 seconds respectively.

As pointed out by the late Mr. Haddon, he said, whenever a mercuric salt is brought into contact with gelatine, a weak mineral acid bath should follow. Therefore, rinse the prints and pass them through three one per cent. baths of hydrochloric acid (1 dram to 12 ozs. approx.) and wash for ten minutes before sulphiding.

The lecture was followed by a lively discussion, mainly on Mr. Bennett's apparent belief in the almost absolute permanency of *properly treated* bromide prints, especially sulphided ones. Short of destroying the support, he doubted if the latter could be reduced. Obviously, he has never tried acid-permanganate, to mention one reducer, which will clean up the image to the vanishing point. This, by the way, has no direct bearing on permanency, acid-permanganate not being a constituent of the air in terrestial climes. A most hearty vote of thanks was accorded for a really first-class technical evening of the "blooming practical" order, and many expressed a wish to see the lecturer again in the near future. He certainly can make an evening go with a swing.

News and Notes.

Hampshire House Photographic Society.—There will be two open classes, one for prints and the other for lantern slides and transparencies, at the exhibition of the Hammersmith Society, to be held at Hampshire House, Hog Lane, London, W.6, from April 21 to May 19. Mr. F. J. Mortimer will act as judge. Prospectus and entry form from the hon. sec., Mr. C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

Hackney Photographic Society.—The annual exhibition will be held in the Town Hall, Hackney, from March 16 to 19. In addition to a number of members' classes, there is an open class for prints of any subject in which silver and bronze medals will be placed at the disposal of the judge, Mr. G. C. Weston. The last day for the receipt of entries is Saturday, March 12. Prospectus and entry form may be obtained on application to the hon. sec., Mr. Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

Correction.—Mr. F. J. Mortimer points out to us that the reference last week to Mr. Blacklock as secretary of the London Salon of Photography needs to be corrected. Mr. Mortimer has been honorary secretary of the London Salon for a number of years past; Mr. Blacklock was employed in a secretarial capacity in the years mentioned in our notice of last week.

Edinburgh Photographic Society.—The forthcoming exhibition will be divided into three sections :—I., Landscapes, seascapes and kindred subjects; II., portraiture and figure studies; and III., lantern slides. In the two former classes the judges will be Messrs. Henry W. Kerr, R.S.A., R. Burns, and J. Campbell Harper. The exhibition will be held from February 19 to March 5 in the Society's Hall, 38, Castle Street, Edinburgh, from which address the prospectus and entry form may be obtained. The latest day for delivery of pictures is February 10.

One-Minute Photography.—A booklet reaches us from the Magna Plate Company, 2 and 47, East Borough, Scarborough, containing particulars of the cameras for outdoor one-minute direct portraits on cards and buttons. The Magna Company supplies several sizes of camera for this business, and also the requisite sensitive cards and buttons. Moreover, it is ready to supply formula for the making of the emulsion, either gelatine or collodion. The booklet is more than a catalogue, for it contains formulæ for the combined developing and fixing solutions required in this branch of work, and also notes on the making of these portraits by flash-light. It is within our own experience that the information contained in it is of a kind which is very widely sought, and we have no doubt that there will be many applications for the booklet, which is issued price 6d.

Submarine Photography from Aeroplanes.—Writing in the "Geographical Review" on the subject of aerial photography as an aid to geography, Mr. Willis T. Lee, of the U.S. Geological Survey, deals at length with the application of this process to photographing and mapping submarine features. The visibility of objects at great depths in clear water from a point far above the surface has been a well-known phenomenon since the wartime period of "sub" chasing by aeroplane. It is said that objects 45 feet under water have been successfully photographed, and that with the proper plates and light-filters the presence of submerged objects invisible to the eye is revealed by the camera. It has been found possible to use this method of observation to some extent in detecting and mapping sand bars, shoals, drowned terraces and channels. Mr. Lee presents several photographs illustrating the results of the method. Not all photographs of coast lines reveal these subaqueous features. Certain conditions of the atmosphere and the water seem to be necessary for photographing them. "In studying the underwater features as shown in photographs," says

the writer, "caution and careful checking in every possible way are necessary. Changes in hue in the photograph might be due to sediment in suspension rather than to differences in depth of water."

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE POSITION OF PHOTOGRAPHIC SOCIETIES.

To the Editors.

Gentlemen,—The letter from "Fuller Hope" in your issue of the 31st ult. gave us rather a shock. We had no idea that photographic society life was in such a grave condition. Young and inexperienced as we are, we are moved to contribute our view of the situation, in the hope that it may be of use to any of the "moribund" societies who may be roused to struggle for a livelier existence.

We would advance the following as proof that the photographic public still needs us, despite the "general simplification of photography." In a recent trade competition there were about 23,000 entries, and, writing recently about the work of the judges, the Editor of "The Amateur Photographer" said: ". . . the first selection left over 100 prints in some of the classes. . . The first selection is necessarily the easiest. . ." We believe there were eleven classes in that particular competition, so about half the prints entered were bad enough to be ruled out in the first selection. So there are upwards of 10,000 camera users about who aspire to win prizes, but lack the technical knowledge which might push their prints past the judges' first selections. Some of them may belong to societies, but if London suburban societies with membership rolls of 100-150 cannot muster more than a dozen to a meeting, and the position is as bad in the provinces, it seems a safe deduction that the said aspirants do not attend meetings. The gallant few who sustain the spark of life in these decaying institutions must be old hands. The inference is obvious—the recruits to amateur photography cannot digest the fare provided. If methods of management are being used which were successful before the war, and years before that, one can cease to wonder. The youth of England might commence the study of English with the works of George Meredith, with equally good results.

Whatever may be the case elsewhere, in photography the war has left us in a new world, and we must produce arrangements which will fit its conditions. If we are honestly to work for the advancement of amateur photography we must open our doors with no half-hearted welcome to the army of "beginners." As little strangers in the photographic family they must have first and chief consideration. Numbers of them will never rise above "button pushing," but we must endeavour to make things so easy and pleasant for them that the maximum and not the minimum number will so rise. Under present conditions large membership is a necessity, and we can only look to present-day beginners to make good the ravages of time in our ranks.

We had a large increase to our membership when we announced our intention of catering specially for less advanced workers. That was in September last, and although we have not yet secured 100 members, we have succeeded in keeping those we have interested in our meetings—our average attendance is about 50 per cent. of our membership. We have had a room adapted for enlarging and general dark-room work, and are starting the year with a short series of lessons in enlarging. After that our members will have the use of the room, and as much assistance and advice from more advanced workers as they care to ask for. We are shaping our whole policy on these lines, and may say that Chelsea's plan of members' evenings, praised by "Fuller Hope," appears to us much more likely to hold a society together than a long series of lantern and other lectures of that sort. Of course, the advanced members must also be provided for, but really they want very little holding together as compared with present-day beginners.

We must apologise for the length of this letter, but, as coming from a society unhampered by pre-war traditions, we thought it might be of value.—Yours faithfully,

THE CATFORD CAMERA CLUB,
F. COLEMAN, Hon. Sec.

St. Lawrence Parish Hall, Holbeach Road, Catford.

CHARGES FOR COPYRIGHT REPRODUCTION.

To the Editors.

Gentlemen,—In your issue of December 24 it is erroneously stated that on November 23 the Committees appointed by this Association and the Professional Photographers' Association agreed upon a new scale of charges, which you reproduce. The arrangement was that the scale should be submitted by the Committees to their respective Councils for consideration. My Council decided to decline the proposed terms, so that no agreement has been concluded. Will you please insert this correction and oblige.—Yours faithfully,

E. O. NORTON, Secretary,
Weekly Newspaper & Periodical Proprietors' Association, Limited.

5 Bouverie Street, Fleet Street, London, E.C.4.
January 5, 1920.

TWO OR THREE DIMENSIONS: IDEALS IN PORTRAITURE.

To the Editors.

Gentlemen,—Having been very busy, I have only just come across the letter in the "B.J." for December 24 by Mr. F. C. Tilney. I have not time for correspondence of this sort, but I cannot let pass the inconsistency of Mr. Tilney's remarks. He does not appear to have looked at my paper as a whole, and has missed my object in quoting Mr. Konnody's criticism. He also seems limited in his ideas when he asks, "How is it possible to look at a photograph and forget that it is flat?"

My point is that many painters and photographers try, and successfully try, to get over the flat surface and imitate a rendering in the round, the province of the sculptor. Mr. Tilney says it is on record that Philip IV. momentarily mistook "The Admiral" of Velazquez for the man himself. Does Mr. Tilney wish to drag Velasquez's art to the level of photography as practised by himself? If Mr. Tilney had reflected, I think he would not have quoted this record to bolster up his argument. It was a far bigger thing than a "similation of reality" that led Philip IV. into his mistake.

Mr. Tilney mentions Rembrandt and Turner. I wonder if he has heard of Puvis de Chavannes?

Mr. Tilney may not agree with the value placed on the work of El Greco, and he is quite entitled to his opinion, but why introduce a lot of extraneous matter and accuse me of so much that I did not say, because he is not able to understand what I did say?

In closing, I might say that Mr. Konnody's peculiar form of mental aberration seems to be shared by quite a number of cultivated people.—Yours faithfully, EDWARD DRUMMOND YOUNG.

QUINONE BLEACHERS.

To the Editors.

Gentlemen,—I observe that in the article in your current number dealing with the conversion of silver images into bromide or chloride, MM. Lumière and Seyewetz state that the use for this purpose of benzoquinone in conjunction with hydrochloric or hydrobromic acid has not previously been pointed out.

May I remind you that in your issue of November 5, 1915, you published a communication from me in which I dealt with this particular method at some length, and directed attention to certain practical advantages offered by it. You summarised this on page 383 of the "Almanac" for 1917.—Yours truly, JOHN GOULDING.

Wellington Road, Bridlington.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

B. A.—There is not very much to choose between the 3½ by 2½ and the 4¼ by 3¼, but we think the better choice for anyone who is a careful worker in the way of focussing and development is the 3½ by 2½. The lesser size of plate makes a very considerable difference in the bulk and weight of the camera, and if enlargements are made the results are practically as good.

T. and Co.—The "Journal of the Optical Society of America" is of comparatively recent establishment, and we have not the name of its publishers, or even the address of the headquarters of the society. But we have no doubt that the periodical can be supplied by Messrs. Williams and Norgate, 14, Henrietta Street, Covent Garden, London, W.C.2, who are agents for many scientific periodicals published in the United States.

H. S.—Exposures of one-tenth of a second, such as are given in ordinary cinematograph working, are easily within the capacity of negative cinematograph film exposed in thoroughly good light at *f*/22, and, therefore, the good definition you have seen may be due to stopping down for the sake of depth, although we think the fineness of definition given by the lens at a larger aperture enters considerably into the question, as does also the development of the film.

W. A.—(1) Yes, certainly, by burning a length of ribbon on each side of the lens. It doesn't matter whether the pieces are burnt at the same time, or one after the other. (2) A glossy surface paper should be used, or at any rate one of the semi-matt variety. (3) Yes, use semi-matt, many makes of which will allow of all necessary working-up. (4) We don't think our estimate of value is worth anything, but, say, £2 to £2 10s. We should think the set is worth little more than the selling price of the lens.

M. E.—We don't think there is any hard and fast rule. We understand that the bride is supposed to come out of the church holding the left arm of the bridegroom, and, therefore, it might very well be argued that she should appear in this position in photographs taken after the ceremony. Still less is there any rule for the arrangement of the relatives of the bride and bridegroom. We certainly do not think that it is customary to divide them into two lots on the ground of the respective relationship.

W. W.—Probably the lens is one of the ordinary types of rapid rectilinear as fitted to the cheaper descriptions of camera. There is probably nothing special about it as regards its optical performance. No doubt it can be used at the larger unmarked aperture, if there is no objection to the sacrifice of a certain amount of definition in the margins of the plate. The best method of cleaning the lens is to wipe it gently with very old cotton fabric, such as an old handkerchief, if necessary moistening with a little spirits of wine.

M. W.—So far as our knowledge goes the only country on your list in which there are notable women photographers is America, where a few women, such as Mrs. Gertrude Kasebier, Miss Mathilde Weil, Miss Helen M. Murdoch, and others, have from time to time shown work at the exhibitions of the Salon or the Royal Photographic Society. So far as we know there are no specimens of their work available in this country, and the only means, and that not a very reliable one, of ascertaining their addresses, is by looking up the catalogues of the Salon or the Royal.

S. A.—You can get a faster sensitising preparation, namely, that formerly in use for the so-called "Solar" enlargements, but the coating is by no means as rapid as bromide paper, and requires fairly long exposure by artificial light, whilst the results are far inferior in gradation to the print-out method. We think your best plan for artificial light printing would be to use a transfer method, preferably the Kerotype, materials of which are obtainable from Marion and Co. The results in the way of transfer of the image to silk, satin, etc., by this process are exceedingly pleasing.

A. W.—Under the 1911 Copyright Act it is not necessary to do anything in order to obtain copyright. Copyright is held to be automatically created by the production of the work, that is to say, presuming that the work has literary or artistic merit. The question, however, of the ownership of the copyright at its first creation is another matter. In this respect the 1911 Act is practically on all fours with the preceding Act as regards photographs or drawings, that is to say, if you do the work "on your own" the copyright is your property, whereas if you do it to the order of some other person and are paid or ought to be paid by him, then the copyright is the property of that other person.

N. E.—The customer has a right to have even the first proofs copied if he so wishes since the copyright in the work which he has ordered is his property. But if he does that he thereby, in the clearest manner, renders himself liable to you for payment for the work of taking the negatives, these latter remaining in your custody. In view of the rather sharp method which he has adopted, we do not think that one guinea per negative is an out-of-the-way charge, and we certainly think that if you sue him in the County Court for this amount you will readily recover it. You have the very powerful argument that he thought it worth while to have your photographs copied, but not worth while to pay for them.

W. A. W.—(1) Cameras for such small size of plate are difficult to find among the cheaper models. There were one or two imported from Germany before the war, but we cannot find anything answering to your description on the market at the present time. Moreover, we think makers are quite right in holding aloof from such small, and at the same time, cheap types of camera, for, if you will take our advice, you will choose either a box form of camera, or else one of the more expensive models, say second-hand. Unless the back and front of a folding camera of this small size are absolutely rigid and keep in correct alignment the results will be most disappointing, and that is why the available models are either of the solid metal box form, such as the "Verascope" or "Blocknote," or, if folding, somewhat expensive. (2) We confess we have never seen anything of the kind you describe, but we should think the effect must be produced by outlining the parts of the subject with a varnish, which dries with a gloss, such as ordinary "church" varnish. If you could obtain a specimen of the result and send it to the Vanguard Manufacturing Company, Maidenhead, no doubt they could supply a varnish suitable for the purpose.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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Contents.

SUMMARY.

The recent paper by Mr. F. F. Renwick before the Royal Photographic Society describes the remarkable action of a solution containing iodide upon an exposed plate, and its application to development in full light; also the colour-sensitising action of a solution of iodide or cyanide. (P. 34.)

Mr. J. I. Crabtree, of the Eastman Research Laboratory, has worked out a process of producing reversed dye images, based on the observation that a tinted film is bleached in an acid fixing bath in those parts of the film occupied by the silver image, which latter can afterwards be removed with a mixture, such as Farmer's reducer. (P. 32.)

Dr. B. T. J. Glover and Mr. E. A. Bierman discuss the question of factorial development, the one in relation to error in outdoor exposures, and the other, particularly, in reference to the strength of the developer. (P. 41.)

In a short contributed article "Thermit" speculates on the possibilities of home cinematography. (P. 31.)

In a leading article we give some hints on the considerations which determine the fixing of the cost of outside or commercial work, and consequently the price to be charged to the customer. (P. 30.)

From the legal standpoint a photograph upon which the owner, in the case of its loss or damage, may set a great sentimental value, is to be valued at the cost of producing it or replacing it. This view of the matter appears to be common to this country and the United States. (P. 29.)

The ultra-artistic window display is not always effective in the commercial sense. (P. 30.)

In the absence of a panoramic camera, long narrow views may be readily obtained by making two exposures on a somewhat square plate by means of a mask. (P. 30.)

A correspondent, "Comfort," confirms in emphatic terms from his own experience our recent recommendation of closed combustion stoves burning anthracite. (P. 40.)

Some practical hints on the advisable features of printing boxes for development papers are given in "Rajar Trade Notes." (P. 35.)

Among other practical hints given by Mr. B. T. Rose at the Croydon Camera Club, were some on matt grinding of glass, sharpening of knives, and making of strawboard boxes. (P. 40.)

Methods of stereoscopic cinematography and drawing by projection and the construction of a lens for forming highly minute images are the subjects of recent patent specifications. (P. 37.)

For the mounting of prints in albums, the dry-mounting process, by means of a press or a hot iron, possesses many advantages over the use of mountants containing water. (P. 30.)

EX CATHEDRA.

Photography in the Sixties. It must be somewhat surprising to a newcomer in photography, who happens to turn over the pages of one of the manuals of about the middle period of the last century, to observe how familiar are many of the drawings of apparatus even to his modern eye. The "Practical Photography," issued in 1863 by the Fleet Street firm of Bland & Co., a copy of which has come into our hands by the courtesy of Messrs. Holmes Brothers (London), Ltd., affords an instance of how very little progress there has been in the design of some of the staple appliances used by the photographer. The Kinnear folding camera, which was certainly a great innovation at the time, differs simply in detail from the most approved light-model cameras of the present day; the studio camera stand is even more akin to the apparatus to be found under every skylight, and repeating backs, vignetting glasses and view finders might almost represent the current stock of a photographic dealer. But one has to turn to the text, which is a manual of practice, in order to realise the difficulties of those who used either the wet-collodion or dry-collodion process, particularly in the Tropics, when the operations of development, etc., had to be done in an unventilated tent of a few cubic feet capacity at a temperature of over 100 degrees. Even in these practical matters the old manuals have their hints of present-day value, for example, that of Dr. Hill Norris, for the packing of his dry-plates in gutta-percha or other waterproof wrapping and enclosure in a boxful of bran.

* * *

The Value of Photographs. Our contemporary, "Studio Light," winds up the series of chapters which it has published on legal aspects of professional photography, particularly in reference to copyright and ownership of the negative, by a few notes in its current issue on the value which can be put upon photographs which have been lost or damaged. A photographer occasionally finds himself in an awkward situation through some photograph, entrusted to him by a customer, being lost in his own establishment or possibly in that of an enlarger or trade printer to whom he had sent it. In the United States, as in this country, the sentimental value which is attached by the owner to a photograph is not generally accepted in a court of law as a basis for the monetary compensation which the owner shall receive. Broadly, it may be said that its value will be appraised as the cost either of making it in the original instance or replacing it at the present time. Apparently, cases involving this question have been of rare occurrence in America, for "Studio Light" cites only one, and even in that the essential issue was side-tracked, although the court disclosed its opinion that, in the case of an undeveloped film which had a highly sentimental interest, no damage could be recovered above the value of the film in the

ordinary way of trade. On the other hand, when a dispute of this kind comes into a County Court, a good deal of casuistry can be employed by way of enhancing the value of the photograph which has been lost or damaged. It will be argued, on behalf of the owner, that some wretched collodion positive cost guineas to make or, on the other hand, can only be adequately replaced by a modern miniature; the lesson of all which is that though the photographer is in a pretty good position to resist ridiculous claims, the glorious uncertainty of the law makes it desirable to come to a reasonable agreement with the customer if that is possible.

* * *

Mounting in Albums. If the specialty be properly pushed, dealers and photographers can find some remunerative work in making up albums of amateurs' prints, either contact or enlarged. The dry-mounting process has in a way rendered this work much easier, since it is now possible to make the album close neatly when filled, which was difficult when wet mounting was the rule. There are, however, a few points to be observed. If the job is a high-class one, it is better to mount the prints on separate cards before binding, as this affords an opportunity to replace any which may have come to grief. This advantage is also possessed by the loose-leaf albums, the only drawback with these being their less finished appearance. When using ready-made albums it will often be found advantageous to use a flat iron instead of the hot press. With a really good tissue and a thinnish bromide paper the flat iron answers very well, and all risk of damaging the binding in the press is avoided. It is as well to remember that the quality of the card or paper leaves has much to do with ease of working; one sample which we have handled absorbed the shellac and thus prevented adhesion.

* * *

Window Displays. The window or show-case is often the only advertising medium used by a photographer, and it is essential that he gets the last ounce of "pulling" power out of it. To this end he should consider not his own artistic aspirations but the taste of the public in his locality. Moreover, if he is situated in a parade of shops he should to some extent conform to the general style of display. We are moved to make these remarks through observing two windows in a busy shopping centre. The one was fitted in waxed oak and dark cloth with a few excellent specimens, and the artificial lighting was subdued. No one stopped to look. It was a dull spot in a bright parade and was quickly passed by. Near it was the show of another firm professedly doing a cheaper class of business, although for the same quality of work the prices were practically the same as those of the other studio. This window was brilliantly lighted, the fittings were light in colour, and there was abundance of gilding. Here, hardly a moment elapsed without someone inspecting the window. This should be suggestive to those who find that the "art" style of display does not bring as much business as they can do with.

* * *

Panoramic Groups. Although the demand for this special kind of group photograph has declined with the demobilisation of the great army, most photographers have at some time or other to take groups which are long and narrow in shape. While a camera of the Cirkut or the older Al Vista types is the best for the purpose, quite passable results may be obtained upon the half (lengthways) of an ordinary large plate. With a 15 x 12 camera two exposures, each 15 x 6, may be made upon the same plate, by using a sliding mask. As distant a point of view as possible should be chosen, so as to utilise a lens of as great a focal length as will include the whole subject. This minimises the broadening of the faces near the margins. If the lens is of the rectilinear type the group should be arranged in a curve, but not so deep a one as is required by the Cirkut. In order to equalise the illumination a rather small aperture, say *f*/22, or in good light *f*/32, should be used and a full exposure given. With a 400 H and D plate one second at *f*/22 should be ample in fair daylight at this time of year.

COSTING FOR OUTSIDE AND COMMERCIAL WORK.

In every well-organised manufacturing concern there is in operation some system of ascertaining the cost of each job which is executed, so that a fairly correct idea can be obtained as to the profit which has been made upon it, if a previous estimate has been given or that a fair and remunerative price can be fixed if no such contract has been entered into. In only a few cases do we know of this being done by photographers, and only then by trade and commercial houses as distinguished from the all-round worker. The consequence is that very much work is done, if not at an out-of-pocket loss, at such a small profit that it is hardly worth touching. On the other hand, those whose business is mainly portraiture are apt to make charges which, although quite justifiable for artistic work, are too high to encourage those who require photographs for trade purposes to use them as freely as they would do if they could be obtained at a commercial price.

Much unpleasantness with customers may be avoided by having an agreement, in writing, if possible, as to the price of any job before it is commenced, although it is difficult to arrive at the happy medium which will be agreeable to both parties without a fair experience in this class of work. We offer the following hints on the various factors which have to be considered in estimating, and although, at the beginning, there may have to be a certain amount of guess work, a nearer approximation is made by guessing at certain details than by guessing at the cost in a lump.

Usually, photographers in a moderate way of business forget that besides being workmen they are traders, and if they get a moderate percentage over out-of-pocket expenses, consider it as profit when it is really wages and poor wages at that. It is necessary, therefore, to include one's own wages as a part of the cost before reckoning on gross profit, and to remember that out of gross profits have to be taken what are known in business circles as "overhead or standing charges," which include such items as rent, rates, lighting, cleaning, repairs, and redecorations, renewals of apparatus, packing and postages, stationery and the like.

The first item which will occur to most is that of materials—plates, paper, mounts and chemicals. These should be taken at list prices, the trade discounts being considered as covering waste. Next comes labour. This must be calculated upon the time actually taken upon the job, whether the work be done by the principal or by an employee, remembering that there is a certain amount of unused time to be covered under this head. Thus, if a man's wages for the week work out at two shillings per hour, it is necessary to estimate them at, say, half-a-crown to cover such periods as cannot be allotted to any order in particular. The wages of operator, printer, mounters and spotters must, of course, all be

treated in this way, and time occupied in travelling to and from outdoor jobs reckoned as actual work.

Tips, railway and cab fares, and any incidental expenses must also be added before we can consider the out-of-pocket costs as covered. Then comes the question of profit. Bearing in mind the two facts that overhead costs have to be met and that no trade discounts have to be allowed to the customer, it is fair to double the net cost; that is to say, to charge a pound for every ten shillings of the estimated cost.

This may appear an extravagant charge to some photographers of our acquaintance, and in their cases it would be so, for no care is taken to see that work is produced upon an economical basis. In many establishments a great deal of time and material is wasted, and it would be manifestly unfair to ask a customer to pay for this, plus 100 per cent. A systematic method must be adopted by the commercial photographer who is to build up a satisfactory business, and the portrait photographer will find it profitable to follow the same course, if he wishes to know what his prints cost him. Time and money spent in book-keeping are not wasted, even in a small business. If, for example, a stock account is kept, in which all plates and paper are entered as purchased, and a balance struck periodically between the number of plates purchased and the number of negatives finished, the paper used and the prints delivered, it is interesting reading. It would prevent the occurrence of such a case as once came under our notice, where an operator gained a reputation for good work by making about ten exposures on each sitter and selecting the best three for proofing.

It is the moral duty of the photographer to have all his apparatus and appliances ready for instant use. If he has to start on an outdoor job the only preparation necessary should be to fill his slides and, if necessary, to back his plates. If he goes in for catalogue work his special backgrounds, shades and supports should be ready to hand, so that he can start on his job without loss of time.

In the case of reprints from previous orders or from customers' own negatives it is safe to take as a minimum the prices quoted by a first-class trade firm, plus fifty per cent. It may sometimes pay to put such work out, and on this basis it can be done at a reasonable profit.

Amateur work hardly comes within the scope of this article, but we may give one word of advice. It is, to accept no work at less than the Kodak company's current rates. To attempt to compete with the chemists' sweated prices is futile, and such work is best declined. If it is pointed out that the work will be more skilfully done, and that a choice of printing methods is available, orders for better styles are often to be obtained.

There might be difficulties in the way, but it might be a benefit to the profession if the P.P.A. could formulate a *minimum* scale of charges for various classes of work, excluding portraiture, and circulate it privately among its members. Many photographers are sadly in need of some guidance in this direction, and quote hopelessly low prices, because they know no better, to the detriment, not only of their fellows, but of themselves. There are, of course, always outsiders who will cut prices as long as they can get credit for supplies for which they do not mean to pay, but these are a small body and need not be considered seriously.

SOME THOUGHTS ON HOME CINEMATOGRAPHY AND ITS POSSIBILITIES.

I was recently interviewed by a gentleman interested in home cinematography, and I am given to think that the line demands some attention from professionals. It is an innovation, and innovations are necessary from time to time to galvanise new life into business and to enable us to move with the times.

But new ideas and business stunts are not guaranteed winners from the start, and some thinking is wanted if we are to derive all possible benefit from a policy of being up-to-date. I have come to a few conclusions on the "potentials" of home cinematography (hereinafter referred to as H.C.), and though they may or may not prove sound, they will I think serve as a basis for deeper consideration by any professional interested.

The professional's interest will depend largely on the class of customer he caters for. If his clientèle is of the well-to-do variety, H.C. may prove a big thing for him, but for the man whose maximum prices are in shillings there is no very obvious probability of success. Given the right class of customer the question arises—what is the best way to offer the line to the public, seeing that the photographs themselves are of no use without a projector? Shall lengths of film be taken, printed and demonstrated, with the intention of selling the necessary projectors on the strength of the exhibitions, or shall the sale of projectors be concentrated on first? The first mentioned would seem to be the more promising way, but it presents something of a problem with regard to pricing. Obviously, the photography cannot be done at a nominal price unless the sale of a projector is a foregone conclusion, and given the foregone conclusion, which implies satisfaction with the film on the customer's part, there should be no need of a low price. On the other hand, can a high price be charged when a customer does not enthuse over the result and is not inclined to buy a projector, in which case the film is useless? I do not say that an equitable scale cannot be worked out, but it will require some thought.

Some types of sitters will, I think, take more kindly (and profitably) to H.C. than others. Children should prove the best sitters of all, for they are—even the clumsy ones—more natural than the average grown-up, and with the "keep-still" bogey absent make splendid subjects for photography. Another thing, living child studies will not be criticised by the persons they portray, and, consequently, will have a smaller chance of hostile receptions than that which unposed and unretouched work of adults is subject to at sitters' hands.

Next to children, I would expect elderly people to rank, particularly if the photographer will take the pictures in the sitter's own home. I can see grown-up sons and daughters in raptures over "that last one of pa driving his Ford-Royce" (or in his library or among his expripedia), and pictures of mother in her own domicile, though perhaps nearer to still-life portraits than actual "motion" pictures, will be greatly appreciated.

But as far as true portraiture goes I am not so optimistic with regard to the young grown-ups. If a portrait of a young lady—or a young man—is going to please its original, it must be at least a little idealised. This is done by lighting, posing and retouching. Now we can light a moving portrait with as great and even greater chances of idealism, and when in motion the absence of retouching is not quite so conspicuous, but how are we to pose a moving figure? Cinema actors may study deportment, and if they don't any awkward clumsiness they show is not going to damage the photographer, but this does

not apply to the public. To say that ungraceful or inartistic movements are all right because they are true to life will not do at all. One cannot take an unretouched "study" of a damsel sitting like a collapsed sack of flour and say it is all right, no matter how true to life and character it happens to be.

But even if my cynical views are borne out, the young grown-ups will still prove useful. Who is going to enthuse over projectors? If the young men don't I shall be surprised. And who is going to provide subjects for lively *genre* pictures where art and elegance in deportment are decidedly not wanted? The young men and women every time, and the wide-awake photographer who tries H.C. should not forget that there are such things as tennis racquets and motor bikes.

In concluding these speculative remarks, I might point out that they are possibly not in accordance with the views of manufacturers and others who have gone much deeper into the subject; but they do not pretend to be authoritative, and my only object in voicing them is to assist photographers' interest in the moving times.

THERMIT.

A METHOD OF PRODUCING REVERSED DYE IMAGES.

(Communication No. 97 from the Research Laboratory of the Eastman Kodak Company.)

In the course of a series of experiments on the effect of an acid hypo solution on various dye solutions and samples of tinted motion picture film, it was observed that on immersing certain samples of tinted film in the acid fixing solution, the dye was bleached out in the region of the silver image, while the high-lights remained unaffected; producing a result opposite to that of toning, namely, tinted high-lights and black and white shadows.

The possibilities of utilising the phenomenon in producing dye images were at once realised; and by simply removing the black silver image in a suitable solvent of silver such as Farmer's reducer, after bleaching as above, a reversed dye image was obtained; that is, starting with a positive silver image a negative dye image was obtained.

In the following experiments, images on motion picture film were used, though the methods are applicable to any gelatine silver image.

The effect under consideration was discovered when using methylene blue; but on testing a large number of other dyes it was found that dyes such as methylene green and, in general, dyes which are readily reduced to the leuco base can be used also.

It was found that two methods of procedure are possible as follows:—

1. Bleach the image in a mixture of the dye and bleaching bath; or.
2. First dye or tint the film, and then bleach.

1. The following acid hypo bleaching bath was used in the preliminary experiments:—

Acid Hardener.

Alum	56 gms.
Sodium sulphite	56 gms.
Acetic acid, 28 per cent.	400 c.c.s.
Water to	1 litre.

For use:—

Hypo (25 per cent. solution)	100 vols.
Acid hardener	5 vols.

In order to determine the active bleaching agent in this bath, tests were made with mixtures of dye and the individual ingredients in various combinations, and it was found that hypo in combination with hydrogen ions is the active bleaching agent. Thus, the following mixtures are inactive:—

Hypo + Dye,
Dye + Acid.
Dye + Sodium bisulphite,

while on immersing an image in a mixture of dye+hypo+acetic acid or sodium bisulphite or acid hardener, good results are obtained.

The following bleaching bath was found to give the best results:—

Methylene blue	1 gm.
Hypo	5 gms.
Acid hardener	2.5 c.c.s.
Water to	100 c.c.s.

On immersing a positive image in this solution for three or four minutes, the dye enters the high-lights, while the shadows remain clear, so that on washing and removing the silver image as described below a negative dye image is obtained.

2. By first tinting the film and then bleaching, stronger dye images were obtained as follows:—

Immerse the film for two or three minutes in the following bath, and rinse:—

Methylene blue	1 gm.
Ammonia (concentrated)	0.1 c.c.
Water to	100 c.c.s.

Now bleach in the following acid fixing bath until the shadows are black and free from dye:—

Hypo	5 gms.
Acid hardener	2.5 c.c.s.
Water to	100 c.c.s.

After bleaching wash for about ten minutes in running water and remove the silver image as described below.

When using method 2, if the bleaching is prolonged beyond a certain point, the dye in the high-lights commences to bleach out until, on prolonged bleaching, all the dye disappears. On subsequently removing the silver so as to reverse the image, very peculiar line images are obtained if the bleaching is prolonged beyond the point when all the dye is bleached in the shadows. It is better to bleach in a weaker bath than in a strong one, since this permits of greater latitude in working. With the above formula from one to two minutes is an average bleaching time. Around normal room temperatures (65 to 75 deg. F.) small changes in temperature have very little effect on the rate of bleaching.

After bleaching, the film should be washed about ten minutes in running water and immersed in the following bath of Farmer's reducer:—

Hypo	2.5 gms.
Potassium ferricyanide	1 gm.
Water to	100 c.c.s.

After all the silver is removed, the film should be washed for five or ten minutes and dried.

Other silver solvents such as a solution of iodine in potassium cyanide, iodine in thiourea, potassium ferricyanide, and ammonium thiocyanate can be used in place of the Farmer's reducer.

Theory of the Process.

The action of the bleaching bath is apparently to reduce the dye to the colourless leuco base in the region of the silver image, the leuco base washing out of the gelatine more rapidly than the dye. This leaves a reversed dye image with black silver in the high-lights, so that on removing this silver a reversed dye image is obtained.

The precise action between silver and acid hypo in the presence of methylene blue is difficult to explain. It was at first considered that the reaction between the silver image and the acid hypo is analogous to that between zinc and sodium

bisulphite to produce zinc hydrosulphite and sodium hydrosulphite, as represented by the following equation:—

$$Zn + 2NaHSO_3 + H_2SO_3 = Na_2S_2O_4 + ZnSO_3 + 2H_2O$$

Sodium hydrosulphite + zinc sulphite.

However, it was considered that silver is too noble a metal for the above reaction to occur in the absence of hypo, and this was confirmed by the following experiment:—

Finely divided metallic silver was heated for thirty minutes to boiling with a 25 per cent. solution of sodium bisulphite, to which was added 1 per cent. of acetic acid. On adding a little of the supernatant liquid to a solution of methylene blue, the dye was not decolourised, though on repeating the experiment with the addition of hypo to the acid bisulphite the liquid decolourised the methylene blue at once, thus indicating that a powerful reducing agent was produced. A blank experiment which consisted in heating together hypo and acid bisulphite showed that this mixture alone does not reduce the dye except in presence of silver.

These experiments confirm the practical photographic results, namely, that hypo is necessary for the reaction between the silver and the acid bisulphite to occur. In the case of zinc, the presence of hypo is not necessary.

The exact chemical nature of the substance formed which reduces the dye has not been discovered. During bleaching of the tinted film in acid hypo the silver image turns yellowish brown, and its light-transmitting power is visibly increased. On treating the bleached image with a 30 per cent. hypo solution or 5 per cent. potassium cyanide some of the image is removed, leaving a residual image apparently of silver which is soluble only in silver solvents such as Farmer's reducer.

The above explanation raises the question as to whether any reaction takes place in the ordinary course of fixing out a silver image in an acid fixing bath in the absence of methylene blue. Certainly no visible change in the image occurs at normal temperatures in two or three minutes with no apparent change of colour. Previous experiments have shown that silver dissolves slowly in a solution of hypo in the presence of air (the oxidiser), so that if methylene blue is regarded as the oxidiser the analogy in the case of the oxidation of silver by a mixture of acid hypo and methylene blue is complete.

A number of other bleaching baths can be used in place of the acid hypo, such as an acid solution of stannous chloride, acid amidol, and acid ferrous nitrate.

Several difficulties were met with in producing good dye images as follows:—

1. *Bleeding of the Dye.*—After dyeing in a plain solution of the dye, rinsing and bleaching, it was found that the dye readily washed out; in fact, almost as readily as the leuco base, so that weak dye images were obtained. Attempts were, therefore, made to mordant the dye as follows:—

A. By mordanting after dyeing by means of known mordants for basic dyes such as phosphotungstic acid and tannic acid. After dyeing, the film was given a short immersion in a 1 per cent. solution of phosphotungstic acid (which mordanted the dye almost completely) and then washed for ten minutes. This treatment resulted in patchy images, and it was not easy to subsequently remove the silver image in Farmer's reducer.

B. By mordanting after bleaching and washing and before removing the silver, better results were obtained, though some streaks appeared after removing the silver as above.

C. The best results were obtained by adding ammonia to the dye bath in the first place, which increases the rate of dyeing and retards the rate of bleeding on washing.

2. *Re-oxidation of the Leuco Base.*—The leuco base of methylene blue is readily oxidised back again to the dye by suitable oxidising agents; and under certain conditions with certain bleaching baths and washing in water containing dissolved air, after bleaching and washing the leuco base is oxidised back to the dye so that the film assumes the tinted condition again. The addition of a trace of sodium bisulphite to the wash water tended to retard this oxidation.

Re-oxidation also occurs in the Farmer's reducer if all the leuco base has not been washed out after bleaching, which explains the necessity for thorough washing after bleaching in the acid hypo.

Positive Dye Images.—During washing of the image after bleaching in the Farmer's reducer it was observed that in some instances a positive image was obtained, that is, the leuco base was mordanted to the silver image and was re-oxidised to the dye while the dye in the high-lights washed out, thus producing a positive image from a positive.

The mordant in this case is silver ferrocyanide formed in the Farmer's reducer. A silver image when bleached in a mixture of ferricyanide and a trace of hypo is converted to silver ferrocyanide, which in a finely divided condition is a powerful mordant for basic dyes. If, therefore, after bleaching, the image is only slightly washed the leuco base remains, and on bleaching in the Farmer's reducer is mordanted to the silver ferrocyanide image, and is oxidised to the dye. On prolonged washing the methylene blue is washed out of the high-lights, leaving a positive dye image.

Toning and Tinting.

Interesting effects are obtained by dyeing, bleaching, and washing, and, without removing the silver, immersing in a uranium toning bath or by dye toning the silver in the usual way. The result is that of a toned silver image with the high-lights tinted. This, of course, distinct from the usual toned and tinted effect, where the dye layer covers the entire film.

Line effects are produced by prolonging the bleaching in the acid hypo and subsequently toning the silver image as above. The effect is that of a toned silver image with line lighting and tinted high-lights.

Odd tinted effects are obtained by merely dyeing and bleaching and washing and prolonging the bleaching time a little above the normal.

Summary.

Reversed dye images can be obtained by first dyeing a gelatine silver image in a dye which is capable of being reduced to the leuco base, which is more readily washed out of gelatine than the dye, and after tinting, bleaching in an ordinary acid hypo bath, washing, and subsequently removing the silver image in a solvent of silver such as Farmer's reducer. The excellence of the results depends largely on the correct time of bleaching and on the thoroughness of washing after bleaching. If the washing is not thorough, on immersing in the Farmer's reducer the leuco base is mordanted to the silver ferrocyanide formed, so that on prolonged washing the dye washes out of the high-lights, leaving a positive mordanted dye image.

The author is indebted to Mr. D. S. Mungillo for assistance in carrying out the various experiments.

J. I. Crabtree.

Courses in Technical Optics.—The courses of lectures on technical optics at the Imperial College of Science and Technology during the spring session include a general series by Professor Cheshire, and lectures on optical designing and computing by Professor Conrady, on optical measuring instruments by Mr. L. C. Martin, and on the mechanical design of instruments by Professor Pollard. Laboratory or class work is arranged in conjunction with all these courses of lectures.

British Photographic Research Association.—In "Nature," of January 13, will be found a short article by Dr. T. Slater Price on the work and future programme of the British Photographic Research Association. Dr. Price writes of the immensely wide field of work which is presented by the investigation of the physical and chemical properties of the raw materials and products of the photographic emulsion maker. His notes include a list of the publications of the Association since the time of its formation.

THE ACTION OF SOLUBLE IODIDES ON PHOTOGRAPHIC PLATES.

[The following paper, recently read before the Royal Photographic Society and now published in the Society's journal, continues the very interesting observations by Mr. Renwick on the action of iodides on exposed, undeveloped plates, and presents in, perhaps, more readily assimilable form the process of development in full light of a plate which has been treated with iodide. It also contains the record of observations on the production of red-sensitiveness by mineral salts, which immediately following the reading of the paper, was found to have been noticed in different circumstances by two other investigators, Messrs. Capstaff and Bullock.—EDS. "B.J."]

THE modern dry plate consists of a sheet of glass bearing a film of gelatine in which are embedded countless minute grains of silver bromide. The silver bromide generally contains a small proportion, ranging from 2 to 10 per cent., of silver iodide, forming with it a homogeneous mixture, or, as it is sometimes called, a "solid solution."

Both salts are remarkable for their extremely small solubility in water, silver bromide requiring nearly ten million times, and silver iodide from 500-1,000 million times its weight of water to dissolve it. Silver iodide would probably be incapable of existence were it not for this extraordinary insolubility; it would spontaneously decompose into silver and iodine when dissolved, for the two elements are very weakly held together. Iodine, however, is an element having well-marked polyvalency, and readily unites with other substances containing iodine, as is shown by the ease with which silver iodide dissolves to form double salts AgI.KI and AgI.2KI in strong solutions of sodium or potassium iodide, and the obstinacy with which it retains these salts or even free iodine when brought into contact with their weak solutions. No amount of washing will remove the last traces.

From these remarks it will be evident why silver bromide when bathed in a soluble iodide is rapidly converted into the far less soluble silver iodide, and why, if the iodide solution be strong, the iodide of silver dissolves in it. 100 c.c. of a 30 per cent. solution of potassium iodide will dissolve about 3 grams of silver iodide and stronger solutions a still larger proportion of AgI to KI. Consequently it is not difficult to fix a dry plate in a potassium or sodium iodide solution of 20 per cent. strength.

Apart from its cost, however, such a fixing bath suffers from the serious drawback that it causes softening or even melting of the gelatine film, unless the latter has been well hardened first.

Even in very dilute solutions of soluble iodides the conversion of solid silver bromide to iodide is singularly rapid and complete, provided there is enough solution present. Precipitated silver bromide is completely changed to iodide by excess of a 1: 5,000 solution of potassium iodide, while a 1 per cent. solution will completely convert the silver bromide in a dry plate to iodide in a few minutes at normal temperatures, provided sufficient solution is used to cover the plate well and it is kept moving.

In a lecture delivered last March before the Liverpool Section of the Society of Chemical Industry ("Journ. Soc. Chem. Ind.," Vol. xxxix., No. 12, p. 156r, and "B.J.," lxvii., pp. 447, 463), I described and demonstrated certain experiments concerning the action of soluble iodides on the latent image. It was shown (1) that it is possible to fix an exposed plate in a strong iodide bath, and, after washing out the salts, to develop an image in silver by means of any of the well-known physical developers; and (2) that it is possible to develop an exposed plate in an alkaline amidol solution after the whole of the silver salts in the plate had been converted into iodide. A suitable bath for this purpose is:—

Sodium or potassium iodide	10 gms.
Cryst. sodium sulphite	20 ,,
Sodium or potassium sulphocyanide ...	30 ,,
Water up to	1,000 c.c.s.

With the assistance of my colleague, Mr. Olaf Bloch, the influence of numerous salts and other substances in various proportions was tested in order to discover the composition of a bath which would entail the least loss of image by the treatment. Certain hardening and anti-swelling agents, e.g., formaline sodium acetate, etc., were found useful for counteracting the softening action of the sulphocyanide on the gelatine. An addition of 1 to 2 per cent. of potassium bromide appeared to preserve the delicate half-tones to some extent, as did also 2 per cent. of gum arabic, 10 per cent. of alcohol, or the addition of a drop or two of weak silver nitrate, sufficient to yield a faintly turbid solution, but no great improvement on the simple formula given above was found, provided it is used quite cool (55 deg. to 60 deg. F.).

The sulphocyanide has a marked influence on the subsequent developing process, greater density and detail being obtained when it is used. It undoubtedly modifies the physical character of the silver iodide formed in the process, and its effect is probably related to this fact. The chief use of the other additions mentioned seems to be to slow the reaction; slower conversion to iodide invariably led to more complete preservation of the image. One of the interesting features about these iodised plates is that they are so insensitive to light that they can safely be developed in a strong white light without fogging, except when certain developing agents are employed. The most notable of these exceptions is hydroquinone, which has a well-marked sensitising action on silver iodide, and causes it to fog in a light in which alkaline amidol is a perfectly safe developer. Development of the iodised and well-rinsed plate in an alkaline amidol developer requires a long time to attain completion, but 10 minutes at 65 deg. F. is usually sufficient for a plate which, when used in the ordinary way, would give average density in about four minutes in a normal pyro-soda developer.

The formula we adopted was:—

Amidol	20 grs.
Soda carbonate, cryst.	1 oz.
Soda sulphite, cryst.	1 ,,
Water	10 ozs.

In the course of these experiments the remarkable fact was discovered that similar quantities of sodium thiosulphate (hypo) could be substituted for the sodium or potassium sulphocyanide in the iodising bath with at least equally good results, provided the iodised plate was not exposed to white light before development, but that if, while the iodising solution was still in the film, the plate was exposed to white light, the latent image was to a large extent destroyed. This led me to try the effect of exposing in the camera a plate which had been well exposed to diffused light and then iodised, with the result that it was found possible to obtain direct positives in the camera by this process, which was also described and shown at Liverpool last March. The reversing action of soluble iodides on latent images on AgI in collodion had been known since the time of Poitevin in 1859, but here we have a latent image, formed originally in silver bromide, then transferred to silver iodide and found capable of destruction by light in the presence of soluble iodides, with the additional interesting fact that the latent image is far more sensitive to light if thiosulphates are also present. The same effect is observable in a plain iodide, or iodide and sulphite, solution to a smaller degree, while sulphocyanides appreciably retard the reversing action.

A recent private communication from Dr. Lüppo-Cramer informs me he has since found that after destruction of the original latent image in this way, it is possible, by further very prolonged or intense exposure, to form a new latent

image, a result of considerable interest if not altogether unexpected.

I now come to the most recent outcome of these experiments, and one not hitherto published. Since Lainer's discovery in 1891 of the remarkable effects of minute additions of iodine to alkaline developers, von Hübl, Lüppo-Cramer, and other workers have made a fairly thorough qualitative study of them, both with iodine tincture and alkaline iodides; and Sheppard published a valuable quantitative investigation of the subject so recently as January of this year in our journal ("Phot. Journ.," 1920, p. 12). In that paper he describes and illustrates what he believed to be a fogging effect of very dilute solutions of potassium iodide when applied for a few seconds to the film of an ordinary dry plate. Moreover, he attributes the fog to a nucleus infection of the bromide particles, though of what kind is not very clear.

My observations led me to doubt his explanation, so I repeated his experiments, with the result that I find soluble iodides to have no fogging action whatever, *provided that the plate, both during and after bathing* in the weak iodide solution, *is not exposed to orange or red light.*

Further experiments soon conclusively proved that the effect of these extremely weak iodide solutions (which may be as dilute as 1 part in 50,000) is to render the plate markedly orange and red-sensitive. This may readily be demonstrated by exposing a treated plate, bathed for 15-60 seconds in 1: 20,000 potassium iodide and subsequently washed in water, to the spectrum. To assist in locating the regions of the spectrum an exposure on a panchromatic plate was interpolated between those of the untreated and treated ordinary plates, the lines crossing this spectrum being the green and two yellow lines of the mercury arc, the yellow sodium D line and the lithium line in the red.

So far as I know this is the first recorded instance of colour-sensitiveness being conferred by bathing a plate in a colourless solution. Naturally, the correct explanation of such a curious effect is much to be desired. For the present I prefer to leave this point without discussing its obviously important bearing on the latent image problem.

A fair number of salts have been tried in the hope of discovering others capable of doing the same thing. So far, only one other has been found—namely, a weak solution of sodium or potassium cyanide. In strengths ranging from 1 part in 2,000 and up to 1 :10,000 the effect is exactly similar in character to that obtained with iodides. It seems clear, however, from the similarity of the effects of two such different classes of salts as iodides and cyanides that the conferred red-sensitiveness must be due to a change within the silver bromide or bromide and iodide grains rather than to anything akin to ordinary sensitising by dyestuffs.

There is evidently an immense field still open to those photographers who do not possess the advantages of a well-equipped laboratory in the prosecution of such relatively simple experiments as those described in this paper, and I trust that many photographers may be induced to try for themselves to enlarge the boundaries of our knowledge concerning such remarkable phenomena.

F. F. Renwick, A.C.G.I., F.I.C.

The British Trade Review, in a special January issue, takes a wide survey of British industry in a large number of individual branches of production. Mr. F. G. Kellaway, P.C., M.P., head of the Department of Overseas Trade, contributes an article by way of diagnosis of the present phase of commercial depression, and calls for calculated and far-seeing courage as the remedy. Our contemporary covers a great number of trade fields, its first-hand information regarding which must be of the greatest interest and value to the overseas readers, for whom it specially caters. No doubt many of our foreign subscribers commercially concerned in importation of British goods will be glad to obtain a specimen copy, as they can do by application to 113, Cannon Street, London, E.C.

PRINTING APPARATUS.

From "Rajar Trade Notes."

"Any old box with a light in it will do for bromide printing" was the remark made some years ago by a well-known photographer who had scrapped his printing frames, and his remark is substantially true to-day. An exposing light-box is a *sine qua non* to all photographers, and we offer a few suggestions which may be useful to those who like to make their own printing apparatus.

In designing a printing box we have first to consider the essential points, viz. :—

1.—Sufficiently large to give perfectly even illumination to cover the largest negative likely to be used.

2.—Ample light to enable gaslight and studio development prints to be made, with a provision for screening the light when used for bromides.

3.—A vignette holder, or a diffusing platform, about one inch away from the negative for "faking," or equalising negatives.

4.—Exposing switch that can be worked with the foot.

5.—A pilot light of an amber colour for adjusting the sensitive paper when printing white margins.

The first point is the size of the box, and as a guide we may say that for covering negatives up to 12 ins. by 10 ins. the box should be 18 ins. square and 18 ins. deep, and in order to obtain perfectly even illumination the inside of the box should be white and contain a piece of white cardboard bent to U shape. The opening in the top of this box should be fitted with a piece of plate-glass 13 ins. square, so that 12 ins. x 10 ins. negatives can be printed either way. The necessary diffusion is obtained by the platform mentioned later.

As regards the second point, we think that the best illumination is obtained from three 100 c.p. metal filament lamps, fitted to the bottom of the U reflector, so that the filaments are 12 ins. from the underside of the plate-glass top. This arrangement will enable the printer to get fully exposed gaslight prints from an average negative in from two to eight seconds, and instead of removing some of the lamps when making bromides, we think it better to screen down the full light by using a light cardboard cut-out containing a sheet of thick white paper. This is slid along a small ledge fitted to the sides of the box, and just high enough to clear the tops of the lamps. The front of the box should be hinged about half-way down so that the screen can be inserted or broken lamps replaced.

The vignette can be placed upon a diffusing platform, which is easily made by covering a stout cut-out with grease-proof paper, or dry-mounting tissue. This platform is slid along two other ledges fitted inside the box at about one inch from the plate-glass top. The practical printer will at once see the great utility of this "faking" platform. Pieces of paper can be placed upon it in such a position that will shield dark shadows, or even-up negatives that are uneven in density. Several negatives can be printed at once after being equalised in density by placing pieces of tissue paper on the platform under the thin negatives.

The switch should be arranged so that both hands are free for pressing the paper upon the negative, and we find that a switch worked with the foot is most satisfactory.

The pilot light is useful and should be fitted so that (excepting when exposing) it is always alight. An 8 c.p. carbon filament lamp covered with two thicknesses of orange or amber fabric answers well. For adjusting vignettes, or for faking, it is best to switch on the white light.

The printing box is best fitted under the printing bench, and the plate-glass let in the top of the bench.

There are many excellent printing machines to be obtained which combine a light-box and all the necessary fitments for strip-printing, borders, &c. In choosing ready-made apparatus care must be taken to avoid all fitments that have projecting parts or metal clamps that drag the sensitive paper along and scratch the surface.

B

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Getting More Business by Advertising.

The writer once learned a lesson out in the Ægean Sea that echoes back to 1921 now that the good ship "Professional Portraiture" is passing through a somewhat trying time. Our ship was drifting helplessly toward Cape Matapan. The mate sang out: "We're going to strike. Every man for himself!"

And it was so. To-day almost every photographer in every town is wanting the trade of every portrait-wanting person in that town who now goes to some other studio! But all the professionals of all the towns want the custom of the people who, close-fistedly, are learning to do without photographs until some "better times." The only way to get more business is to "go after it." The only way to go after business is to seek it personally or advertise, circularise, use the magical power of multiplied suggestion, order-canvassing, and business announcement that is provided by the printing machines of the local Press, and those of printers when used to multiply your message in the form of circulars.

The best way to consider advertising is to ask yourself what it is for. Advertising is used to sell goods. Therefore it must be salesmanship on paper.

What is salesmanship? It is suggesting to the other fellow that he wants, needs, or should obtain, something that you have for sale. Suggestion is the moulding of another's mind to think in the way that your mind is thinking. If you are thinking that more people should order photographs from you, you have got to work so that they shall think so too.

To do so you must light them up with some enthusiastic form of opening suggestion. You must then present your business propoaition. You must back this by strong arguments, for that, too, is a science of moulding thought. You must clinch these arguments by proof of the value of your service or suggestions, or by convincing reasons why the prospective customer should think the same way as you do.

You should then effect your climax, which is to get the order, or at least some promise of an order. That is the whole and the end of advertising. It is suggestion, plus salesmanship.—H. E.

Spotting Bromides.—On page 14 there is a reference to the spotting of bromides with diluted "Indian ink"—an excellent medium, though I prefer artists' waterproof ink when any colouring is to be done over the spotting. The waterproof ink requires dilution, and the way to dilute "waterproof" ink is to add water with which a drop or two of liquid ammonia has been mixed. Water slightly ammoniated is an excellent diluent for "waterproof" drawing inks—a fact not generally known.—R. P.

Coins as Weights.—The inclusion of the "Coins as Weights" table in the current "Almanac" (p. 505) is evidence of the continued use of coins for weighing, and it may be of interest to point out that the rumour to the effect that the new and "diluted" silver coinage is lighter than the old minting is untrue. The new coins are exactly the weight of the old, and may be used with safety. The new coins, however, are a little more easily damaged by chemicals than the old, and it is advisable not to let any photographic chemicals or solutions act upon them for any length of time, or one may have some difficulty in passing them—even on the tops of 'buses at night-time.—R.P.

Portsmouth Camera Club.—The club will hold its annual exhibition on the South Parade Pier, Southsea, from April 13 to 23. There are four open classes, in which silver and bronze medals and certificates will be placed at the disposal of the judge, Mr. F. J. Mortimer. The last day for the receipt of entry forms is March 31; the exhibits must be delivered on or before April 9. Prospectus from the Secretary, Mr. C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

FORTHCOMING EXHIBITIONS.

January 22 to February 5.—Northern Photographic Exhibition, Walker Art Gallery, Liverpool. Particulars from the Hon. Secretary, Liverpool Amateur Photographic Association, 9 Eberle Street, Liverpool.

January 27 to 29.—Birmingham Photographic Society. Particulars from the Hon. Secretary, Philip Docker, Birmingham Medical Institute, Edmund Street, Birmingham.

February 14 and 19.—Leicester and Leicestershire Photographic Society. Latest date for entries, February 5. Particulars from the Hon. Secretary, W. Bailey, Cank Street, Leicester.

February 19 to March 5.—Edinburgh Photographic Society. Latest date for entries February 10. Particulars from the Hon Secretary, G. Massie, 10, Hart Street, Edinburgh.

February 19 to March 12.—Scottish Salon, Dundee. Latest date for entries, January 31. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

March 16 to 19.—Hackney Photographic Society. Latest date for entries, March 1. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications January 3 to 8:—

Colour Photography.—No. 383. Colour photography. Colour photography, Ltd., J. F. Shepherd and J. N. Thomson.

Printing Processes.—No. 1,090. Photographic printing processes. Graphische Kunstanstalten F. Bruckmann Akt.-Ges. and H. Kühn.

Shutter-Release.—No. 747. Automatic shutter-release for photographic cameras. V. Halla and W. Riehle.

Flash-Lamp.—No. 893. Flash-lamp for taking photographs. B. T. Hewson.

Washing Prints.—No. 100. Means for washing photographic prints or negatives. A. L. Price.

Shutters.—No. 1,068. Camera shutters and operating mechanism therefor. T. Wallace.

Aerial Mapping.—No. 1,110. Production of maps from overlapping oblique photographic views. Inag Internationale Aerogeodätische Ges.

Projection Apparatus.—Nos. 209 and 404. Automatically focusing projection apparatus. Kodak, Ltd.

X-Ray Photography.—No. 424. X-ray photography. N. E. Luboshey.

X-Ray Apparatus.—Nos. 489 and 679. Röntgen-ray apparatus. Reiniger, Gebbert and Schall Akt.-Ges.

Cinematographs.—No. 9. Cinematographs. H. Tallack.

Optical Projection. No. 783. Prismatic optical system for cinema projection. C. H. Frampton.

Colour Cinematography.—No. 396. Colour cinematography. C. H. Friese-Greene and R. O. P. Humphery.

Colour Cinematography.—No. 572. Method of producing coloured motion pictures. A. T. Saunders.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

STEREOSCOPIC CINEMATOGRAPHY. No. 152,367. (December 31, 1917). A cinematograph camera is fitted with two objectives set with their axes, say, 6.5 centimetres apart, and placed behind each at the proper distance is a reflecting prism. These prisms are directed towards one another, and between them is provided a second pair of oppositely directed prisms mounted one above the other in a slide placed in a plane at right angles to the plane through the axes of the objectives, the upper one, say, corresponding to the right hand objective and the lower one to the left hand objective. At a suitable distance behind these prisms a sensitive film is moved intermittently in the usual way, the period of registration of each consecutive film section with the exposure orifice corresponding approximately with the period during which each of the movable prisms is maintained in registration with its corresponding objective.

This may be effected in the following way:—A cam shaft is provided suitably geared to the usual mechanism. On this a cam having four projections is mounted. Below the cam is mounted on a pivot a centrally fulcrummed lever, one end of which engages the cam by a roller mounted on its end. A similar roller on the other end slidably engages a push piece mounted on the lower end of a guided rod whose upper end is rigidly attached to the slide carrying the pair of central prisms. A spring is preferably provided to maintain the parts of the moving system in contact and prevent vibration.

The lever may also have a control spring mounted on its axis.

The cam projections have each an arc of constant radius corresponding to the registration of the lower prism with its objective, and the recesses of the cam each have similarly an arc of constant radius corresponding to the registration of the upper prism with its objective.

The transition parts of the cam are so shaped as to give as smooth a motion as possible to the slide.

The film is carried, registered and driven as usual past an exposure orifice situated opposite the central prisms with its central transverse line in the plane of the objectives.

The camera is operated at a slightly greater speed than usual, say, twenty exposures per second.

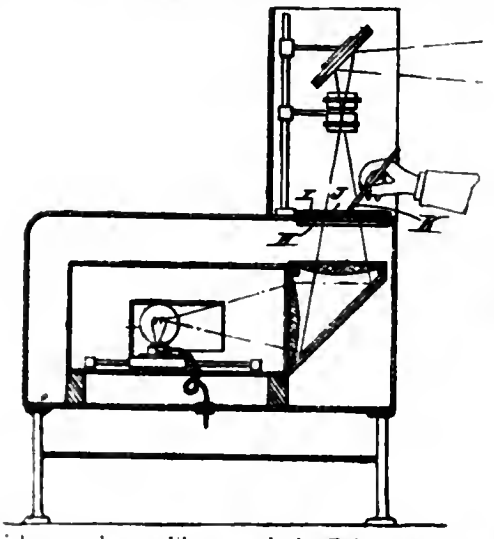
With this mechanism, films are produced which have two series of alternating pictures, one series taken through the one objective, the other series taken through the other of the stereoscopically disposed objectives.

Adjacent or consecutive pictures therefore belong each to a different series. More than two series may in some cases be employed.

When a film thus made is projected in an ordinary cinematograph projector, a stereoscopic result is obtained, as the two series of pictures on the one film thoroughly blend in the eyes of the observers.—Louis Lucien Ruffier, Villa Plaisance, St. Julien, Marseilles, France.

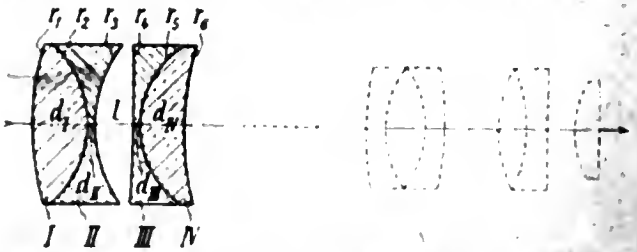
DRAWING BY PROJECTION.—No. 151,502 (November 22, 1919). The objection of the invention is to provide means whereby a person unskilled as an artist may produce a "slowly growing" picture in such fashion as to simulate the work of one highly skilled with the pencil or brush. Such object is accomplished by the placing in a suitable projecting apparatus between the source of light and the projecting lens, of a previously prepared drawing upon a transparent medium, and the super-position on this drawing of a plate covered with a coating which will transmit sufficient light to enable the operator to see the lines of the design or drawing, but yet be sufficiently opaque to prevent the projection of the design upon the screen. The operator then removes certain portions of the coating, for instance, the parts approximately above the lines of the drawing, and thus permits the light to be transmitted through the opaque coating and projected upon the screen, showing the drawing in the process of production. The removal of the coating at these parts is readily accomplished by means of a suitable stylus or other instrument.

In the diagram illustrating the optical arrangement, H, indicates a transparent plate on which has been drawn a picture or other delineation desired to be reproduced. I denotes a superimposed plate, also transparent, on which is coated a substantially opaque or translucent coating J, such as plaster of Paris or the



like, which may be readily scratched off by means of a steel stylus or other suitable tool K, adapted for the purpose, leaving the plate I clear and transparent for the passage of light wherever the "opaque" coating has been removed.—David John Williams and Tom Davies, 175 Palmer Avenue, Detroit, Michigan, United States.

LENSES FOR MINUTE IMAGES.—No. 145,023 (August 31, 1918). The invention relates to a constituent part of an optical device, which is designed for producing minutely reduced photographs, for instance of writings with a view to having these photographs of writings dispatched by carrier-pigeons. When, on employing such a device, an inconveniently great distance of the object to be taken is to be avoided, it will be found necessary to arrange for a small focal length of the device, but at the same time the aperture ratio must be large, so that the definition of the image does not get impaired by way of diffraction. These requirements are best complied with, in case the desired reduction is so great that a device of the type of a photographic objective is out of the question, by a device of the type of a compound microscope used in the reverse path of the rays, that is to say, in which that part which corresponds as to its construction to the objective of the microscope is turned towards the sensitised film, and that part which corresponds as to its construction to the ocular of the microscope faces the object to be taken. If, however, a microscope of the ordinary type is employed, that is to say, one in which the ocular has a collective effect as well,



larger objects cannot be imaged satisfactorily because the astigmatism of oblique pencils and the chromatic difference of the magnification being sufficiently removed, it will generally be found impossible also to correct the curvature of the image-field in a sufficient measure. The reason for this is, that, on employing a collective ocular of a microscope, it is not very well possible to let the image formed by this ocular have a curvature of that particular sense and amount that the objective of the microscope would just form a plane image of the said image.

According to the invention the last named problem may, however, be solved, if that group of lenses (corresponding to the ocular of a microscope) which is to be located in front of the collective group of lenses corresponding to the objective of a microscope (and generally consisting of a suitable microscope-objective) be so arranged as to be dispersive (which in oculars for microscopes has hitherto already been practised in certain cases), whereby, however, this group should consist of two dispersive members separated from one another, each of these being composed of at least two lenses.

As a matter of course the new group of lenses may also be used in a device acting in the reverse path of the rays, therefore, for producing greatly enlarged photographs, or for projecting under high magnification.

The drawing shows a section through a group of lenses corresponding to the invention in which each of the two members consists of two lenses cemented together.

In the following tables the radii of curvature, the lens-thicknesses, the distance apart of the two members, and the kinds of glass are enumerated.

Measurements in millimeteres.

$r_1 = +\ 24.106$	$d_{\mathrm{I}} = 4.5$
$r_2 = -\ 8.51$	$d_{\mathrm{II}} = 0.5$
$r_3 = +\ 11.29$	$l = 3.0$
$r_4 = -212.831$	$d_{\mathrm{III}} = 0.5$
$r_5 = +\ 7.913$	$d_{\mathrm{IV}} = 3.5$
$r_6 = +\ 24.917$	

Kinds of Glass.

	n_D	v
I and IV :	1.57240	41.7
II and III :	1.57088	57.5

The focal length of the whole group of lenses amounts to 20.16 mm. If, as indicated in the drawing, behind the group of lenses an apochromatic microscopic-objective having a focal length of 16 mm. be located, of which the focal point facing this group of lenses has a distance from the focal point of this group of lenses which faces the said focal point amounting to about 165 mm., the whole arrangement will allow, for instance, to form an image in a plane of a plane object, which is situated 750 mm. away in front of the dispersive group of lenses, reduced six hundred times without, on an angle of the field of view facing the object amounting to almost 30 deg. being involved, a disturbing lack of definition becoming evident.—Carl Zeiss, Jena, Germany.

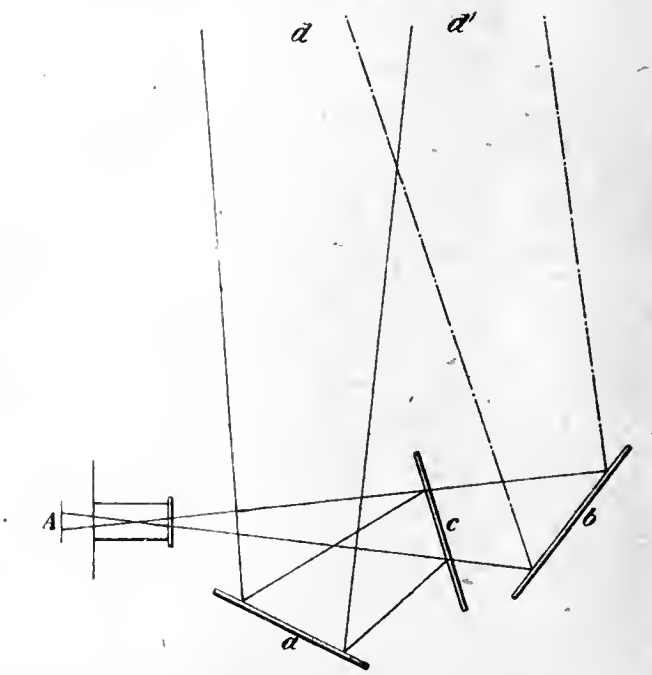
Lantern Screens. No. 154,459. (December 12, 1919).—Butter cloth, composed of an opaque or semi opaque material, is loosely woven in such a manner that the fabric shall form a multiplicity of apertures of uniform shape and dimensions. Preferably the major proportion of the filaments composing such fabric run diagonally across the screen from one or both sides thereof. Screens are produced in the following manner:—The reinforcing fabric is prepared by coating the same with melted wax, celluloid or other translucent substance after it is stretched upon a frame. Should the coating thus applied prove rough or lumpy, in order to render such surface uniform, the screen is suspended in a chamber and the temperature raised until the wax becomes sufficiently fluid to run into and completely fill the interstices in the fabric, each of which forms a small panel of translucent wax or the like.

The coating process up to this stage is one hitherto employed with fabrics having rectangular apertures. In carrying out the invention, however, as soon as the interstices or apertures in the fabric are evenly filled and while they still retain a sufficient degree of fluidity, the screen is supported in a horizontal position so that each panel of wax or the like sags and becomes convex on its under surface, thus imparting to the screen a surface composed of a multiplicity of nodules or projections which are convex, pyramidal, conoidal, or paraboloidal in form according to the weaving of the fabric.

In this condition the heat having been withdrawn and the chamber cooled the wax is allowed to set, and the screen coated, if desired, with a suitable transparent varnish.—William James Marks, 1b, Ripon Street, Greenheys, Manchester.

Duplex Cinematograph Projection.—No. 149,649 (August 11, 1919.) The invention relates to a method of producing two cinematographic representations simultaneously on different parts of a projection screen by means of a single cinematograph.

In the drawing A indicates a cinematograph apparatus at the side of the theatre, whilst *a* and *b* denote two mirrors arranged at an angle in relation to the optical axis of the objective, as shown. A transparent mirror disc c is so arranged between the mirrors *a* and *b* that two projections result, the image being reflected once by means of the transparent glass pane c on to the mirror



a and also passing through the glass disc on to the mirror *b*. The image is projected from *a* on to the lower half *d* of the screen, which half is made opaque, whilst the image is projected from *b* on to the upper transparent half *d* of the same screen. The arrangement is such that a laterally correct representation of the picture or image is obtained on the screen viewed from either side thereof. If so desired two separate screens or projection surfaces may be used instead of a single screen.—Messter-Film G.M.B.H., 27/28, Oberlandstrasse, Berlin-Tempelhof, Germany.

New Apparatus.

Pentac Anastigmat Cinematograph Lenses, Series XIX. f/2.9. Made by J. H. Dallmeyer, Ltd., 11, Regent Street, London, S.W.1.

This new series of lenses for cinematograph cameras, recently designed by Mr. L. B. Booth, represents a further development in the production of a lens of ultra speed, and at the same time of critical quality of definition, both elements of great importance to the user of a cinematograph camera. The lenses are issued of the aperture of *f*/2.9, that is to say half as rapid again as one of *f*/3.5, and in some of the focal lengths it has been found possible to exceed even this speed, and to provide an aperture of *f*/2.8. The lenses yield extremely fine definition and we have no doubt will be widely appreciated by cinematographers. Equally they form most valuable objectives for direct photo-micrography without a microscope on the lines which were recently the subject of a paper and demonstration by Mr. Martin Duncan at the Royal Photographic Society. Messrs. Dallmeyer issue four focal lengths of 1½, 2, 2½, and 3 inches. The price of the first two is £8 15s.; of the 2½ inches, £9 15s., and of the 3 inch, £10 10s. The objectives are also supplied in focussing mounts at somewhat higher prices.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, JANUARY 24.

Bradford Photographic Society. "Nature Poets and Nature Pictures." P. Lund.
Cleveland Camera Club. Paget Colour Slides.
Cripplegate Photographic Society. Members' Print Competition.
Dewsbury Photographic Society. "Development by Time and Tank." A. Dordan-Pyke.
Dundee and East of Scotland Phot. Soc. "Mounting the Print." W. B. U. Patterson.
South London Photographic Soc. "Photographing Wild Flowers"
Stalybridge Phot. Soc. Annual General Meeting.
Walthamstow and District Phot. Soc. "A Further Chat on Pictorial Composition." S. Bridgen.
Willesden Photographic Society. "Some Notes on the English School of Painters." J. Vacy Lyle.

TUESDAY, JANUARY 25.

Royal Photographic Society. "Serbia and Jugo-Slavia before the War and After." Dr. F. May Dickinson Berry.
Bournemouth C.C. Bromide Enlarging and Combination Printing.
Dennistoun Amateur Photographic Association. Whist Drive.
Doncaster C.C. "After-Treatment of Negatives." A. Dordan-Pyke.
Exeter Camera Club. "With Allenby through Palestine." Messrs. Butcher, Ltd.
Hackney Phot. Soc. Developing Demonstration. G. H. Capper, H. W. Fitch, and W. Selfe.
Leeds Photographic Society. Autochrome Evening.
Leith Amateur Photographic Association. "Preparing Prints for Exhibition." Mr. Robb.
Manchester Amateur Phot. Soc. Annual Meeting.
Portsmouth Camera Club. "Some Country Rambles with a Reflex Camera." Dr. B. Stone.
Sheffield Photographic Society. "Bromoil." F. A. Tinker
Welfare Camera Club, Linthouse. Bromide and Gaslight Printing

WEDNESDAY, JANUARY 26.

Accrington Camera Club. "Enlarging." Langstaffe.
Croydon Camera Club. Annual General Meeting.
Dennistoun Amateur Photographic Association. "An Elementary Talk on Lenses." G. E. Burrell.
Ilford Photographic Society "Some Continental Recollections." F. C Newmarch
Leicester Phot. Soc. "As I was Going to St. Ives." E. S. Maples
Partick Camera Club. "A Tour in Germany." K. M. Alexander
Photo-micrographic Society. Members' Evening.
Rochdale Phot. Soc. Members' Ideas of Good Negatives

THURSDAY, JANUARY 27.

Brighouse Photographic Society. "Old Brighouse." G. Hepworth.
Camera Club, The. "Psychology in the Studio." C. P. Crowther.
Everton and District Photographic Society. "Cathedrals I have Visited." The President.
Hammeramith (Hampshire House) Photographic Society "Retouching on the Negative." A. J. Lyddon.
Hull Phot. Soc. Lecturette: "Haddon Hall." J. T. Dyson
North Middlesex Phot. Soc. Annual General Meeting.

FRIDAY, JANUARY 28.

Bedford Camera Club. R. W. L. Phillips.
Dennistoun Amateur Phot. Association. Trimming and Mounting

SATURDAY, JANUARY 29.

Woodford Phot. Soc. Annual Dinner of the Affiliation.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, January 18, the president, Dr. C. H. Bothman, in the chair.

Capt. C. W. R. Knight, M.C., F.R.P.S., delivered a lecture on "Falconry," illustrated by a number of lantern slides, many from negatives taken under difficult conditions, yet serving to illustrate this branch of nature study to which Capt. Knight has devoted himself, and more particularly in relation to the cinematograph.

On the proposition of the Chairman a very hearty vote of thanks was accorded the lecturer.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Meeting held at 116, Hanover Street, Edinburgh, on Monday, January 10, 1921, at 8 p.m. Present: Miss Bertram, Messrs. F. D. Young, George Balmain, J. B. Johnston, Norman Thomson, Laird, Aikman, Campbell Harper, and Moffat. Apologies for absence were received from Miss Grey, Miss Grace D'Arcy, and Messrs. Drummond Shiels, Fergusson and Coltart.

The secretary read the report of the third annual dinner, held on December 6 last, which was approved. The secretary submitted the accounts in connection therewith.

The secretary read a letter from Miss Grey offering to contribute £1 towards the cost of providing a half-watt installation for the lighting and posing composition class at the College of Art, and Mr. Moffat intimated that he would also contribute £1 for that object. The meeting thanked these members, and also Mr. E. D. Young, for their donations.

The secretary read a letter received from the secretary of P.P.A., London with reference to the Society's communication anent the question of "free sittings." The secretary of the P.P.A. stated that the matter had been seriously, lengthily, and sympathetically discussed by his Council, and the following resolution had been passed:—

> "That this Council, having considered the letter from the Edinburgh Professional Photographers' Association, have come to the conclusion that, while deprecating the giving of free sittings as a business system, they do not feel that they are in a position at the present moment to take effective action in the matter."

The secretary also read an excerpt from the editorial notes and the minutes of the Council in the "P.P.A. Circular" condemning this reprehensible practice.

The meeting, while regretting that the P.P.A. could not co-operate with them in making some official pronouncement, felt that the airing of the grievance might have some beneficial effect. One of the members stated that a few days ago a customer who was being married shortly had received a letter offering "free sittings," and in which it was stated that the copyright would belong to the sitter, and that they would not publish the photograph without her consent. This apparently was the result of the Society's advertisement re "free sittings" in June of last year, and was considered an interesting feature.

The question of the reproduction charges, which was adjourned from last meeting, was further considered, but it was resolved, after some discussion, to let the matter lie over in the meantime.

The members thereafter considered what arrangements should be made for the holiday season 1921. The meeting recommended closing for the second fortnight of August, and Mr. Moffat, Messrs. W. and F. Drummond Young, and Miss Bertram indicated they would close during that period. It was proposed to delay for a month, so that any other members may desire to join in the scheme. It was agreed to insert a joint advertisement in "The Scotsman" some time in July and August notifying to the public the businesses which would be closed.

Mr. F. D. Young reported that the half-watt installation had been obtained and placed in the lighting and posing composition class at the College of Art, and was a great improvement.

CROYDON CAMERA CLUB.

Mr. B. T. Rose gave a highly interesting demonstration, entitled "What Can be Done in a Photographer's Workroom." Assuming a note of interrogation, the answer is "A lot of things." The many useful tips and contrivances brought forward, the majority impossible or difficult to describe without drawings, clearly illustrated that the lecturer must have occupied a front seat when the gods distributed gifts of ingenuity, and grabbed far more than his share.

Several of the tips were, however, admittedly not original. Selecting one of these to start with, quite a nice finish can be given to a photograph mounted on card without margin. A strip of No. 1 glasspaper is glued on to a slip of wood and run along the edges. A strut on the back enables the photograph to be placed upright, and to furnish yet another knick-knack for the collection of dust.

Carriers of strawboard answer well and cost practically nothing. The difficulty is to get these to fit turn-buttons in cases where they are required. Drive a pin through the back in correct position; slightly bend over to judge length required; snip off superfluous bit, insert a sheet of glass in carrier, and further bend the end of

the reduced pin until it comes in contact. These simple turn-buttons answer excellently.

In the construction of strawboard or cardboard boxes, etc., it is usual to half-cut through to allow the card to be bent round at right-angles. This has obvious disadvantages, and the lecturer showed a far better way. A piece of wood, longer than the card, has a groove made along its length with a tenon-saw, and opened slightly V-shaped with glasspaper. A groove about 1-16 in. deep and a trifle wider is sufficient. A strip of hard wood is taken and the end fashioned to a point with curvature running up to it similar in contour, though more acute, to a spoon bow (convexity outwards) of a boat. A pencil line is drawn along the card where the bend is required, and the extremities laid in line with the groove; heavy pressure is then applied along the line, with a gliding motion, by the pointed piece, and the trick is done. He showed many useful cases and a nest-of-drawers made out of card, one case fitting a limp canvas camera case and converting it into a stiff one, a division being thoughtfully allowed for a flask.

A capital strop, or hone, for sharpening knives (great, it was said, for carving-knives) consists of a strip of wood on which linoleum is glued. It is oiled, and fine carborundum, No. 1 or No. 2, applied. An attempted appropriation by the secretary of a sample strop, kindly presented by Mr. Rose to the "office boy," at this juncture brought the proceedings to a fine edge.

Quite neat was a method of grinding a ground-glass patch on a bottle. Procure carborundum powder as aforesaid and a strip of glass about 5 ins. long by ¾ in. broad. Tie a piece of thin card round the bottle, its upper part finishing where the lower edge of the patch is to stop. Using this as a guide, and water as a lubricant for the powder, and keeping a finger over the point where pressure is applied, a patch is quickly ground, which can be written on with pencil, or better, red chalk. Round and flat bottles can be treated: with the latter any depressions may require persuasion with the tip of the glass. Water acting perfectly as a lubricant, various alternatives, such as camphor in turpentine, were, of course, suggested.

It should be mentioned that the proceedings were uplifted at the start by Mr. Rose reading in clerical style a discursive but extremely elevating article. At the close was some lofty moralising on the nobility of work. He cannot help these vagaries, for they are inbred, and even extends his generous, loving sympathy to the jobbing workman, who usually deserves hard labour, and unfortunately fails to secure it. The moral contagion spreading, Mr. Harpur sorrowfully declaimed against society for preferring the man who works with his brains to the one who works with his hands. In his opinion, the man who counts is he "who works with his brains in front of his hands," pickpockets, presumably, excepted. After a brisk encounter between Mr. Sellors and Mr. Jobling on the respective merits of crocus and rouge, in which such weighty arguments as "What rot!" and "Nonsense" were freely applied, a most hearty vote of thanks was accorded Mr. Rose for an evening full of practical suggestions.

News and Notes.

Portraits by Mr. Marcus Adams and Mr. Bertram Park form a small collection, which is being shown by the Hammersmith Photographic Society at Hampshire House, Hog Lane, W.6, during the next few weeks.

Messrs. Bassano are vacating their studios and premises at 25, Old Bond Street, which they have occupied for no less a period than 45 years. In consequence of termination of the lease, they have had to seek a new home, and are establishing themselves at 38, Dover Street, at the end of the present month.

Bargains in Apparatus.—Messrs. Wallace Heaton, Ltd., 17 to 27, Change Alley, Sheffield, send us their January list of second-hand cameras, enlargers, lenses and other apparatus, a compilation running to 52 pages, and including a very great variety of goods at all prices. The list is obtainable free on application.

Commercial & Legal Intelligence.

Legal Notices.—Notice of intended dividend is given in the case of Bertie Owen Emms, picture frame maker, 18, Norwich Road, and trading at 11, Arcade, Lowestoft. Proofs must be lodged on or before January 25 with A. Granville White, 14, Old Jewry Chambers, E.C.2.

NEW COMPANIES.

C. and A. G. Lewis, Ltd.—This private company was registered on January 10 with a capital of £3,000 in £1 shares (2,500 ordinary and 500 10 per cent. preference). Objects: To take over the photographic, printing and other business carried on by C. Lewis as C. and A. G. Lewis at 97 and 99, Sherwood Street, Nottingham. The first directors are: C. Lewis (permanent managing director and chairman), Dunelm, Mapperley Plains Road, Nottingham; Mrs. A. G. Lewis, Dunelm, Mapperley Plains Road, Nottingham; C. R. Harrison, 24, Gill Street, Nottingham; J. S. Harrison, 24, Gill Street, Nottingham. Secretary: C. R. Harrison. Registered office: 97 and 99, Sherwood Street, Nottingham.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

WARMING THE STUDIO.

To the Editors.

Gentlemen,—In a recent number of the "B.J." a correspondent spoke with approval of a new invention for heating rooms, and strongly recommended it for studios. I have never heard of it myself, and while it may be very good for ordinary rooms, I do not think it could possibly succeed for warming a studio of the usual size, as I understand it is heated by either gas or electricity. The latter would be horribly expensive and quite inadequate for the purpose. Gas, at the present time, is bad and dear. In our enlightened district we pay 4s. 10d. per 1,000 feet, and to warm a large studio would be very costly, and it would be advisable to have a flue to carry away the fumes. I know there are gas radiators which are said to condense all the products of combustion, but I know also that none of them do it. Some of them do condense some of the fumes, as well as a good deal of water, but enough fumes escape to play havoc with curtains, curtain rods, lens mounts, and all metal work in the place. I have had a good curtain reduced to tinder in a couple of years, and brass work corroded a beautiful green in less time.

The studio must be warm; one cannot get good portraits of sitters when they are shivering with cold. I have seen ladies come into the studio in winter in evening dress looking ten years older than they should through cold. In a few minutes in a warm room they begin to look younger, and their faces plump up like a shrivelled apple in an air pump. Then one must be prepared at almost any time to photograph a baby without any clothes, a silly idea, but fond mothers will have it that way. Only a week or two ago when the supply of anthracite was short and we had to depend on a gas radiator, I had great difficulty in persuading a young mother not to strip a poor baby naked in the cold studio.

I suppose the ideal method of heating would be a system of hot-water pipes all over the establishment, dark rooms included, supplemented in offices and artists' room by an open fire for ventilation. In some large blocks of offices the landlord has installed a heating apparatus for the whole building, and the photographer who has his studio in such a building is fortunate. But even when the studio is heated by such means it is advisable to have some form of stove or fireplace to increase the warmth when necessary.

I have tried several patterns of stoves; the old-fashioned "Tor-

"Ideal" slow combustion is good, but liable to be dusty and dirty, especially as the fire has to be lighted every morning. The best of all, in my experience is the kind specially designed for burning anthracite; the fuel is clean to handle and quite smokeless, and gives out intense heat. The rate of combustion can be regulated to the greatest nicety, and the stove, if attended to once a day, can be kept alight from October to April. But in studios it may be necessary to re-light it on Monday morning.

These stoves are not easy to light, and I have found it saves a great deal of trouble if a handful of ordinary soft coal is used to start it burning. With such a stove properly handled there should be no dust, except when the stove is cleaned out for re-lighting, and very little even then. All the rest of the week the ashes are shaken into a shut-up drawer, which can be carried out of the room. I find one such stove will keep a large studio comfortably warm, except in the very coldest weather, when a gas radiator is used if necessary. Unfortunately anthracite is not easy to get nowadays, especially if storage room is small. I have sometimes had to wait a month for a supply owing to shortage of trucks. Nuttine, or small coke, may be used in an emergency, but it gives only a fourth of the heat of anthracite, and burns away so quickly that it is useless to try to keep the fire on all night. With anthracite the stove is filled at night and the draught regulated to keep the fire just alight till morning, when the draught is increased and the ashes well shaken out, and in a short time the stove is throwing out an intense heat. The all-night fire is useful in winter, as it keeps the studio slightly warm and melts any snow as it falls. Unless the studio has a fireplace it is necessary, of course, to have a stove pipe, not a beautiful object, I admit, but I do not find it very unsightly; in fact, I do not think any one notices it, as it is in a shadowy part of the room. The ordinary galvanised iron pipe should not be used, as the fumes, presumably sulphurous, soon corrode it away; a strong cast iron pipe, such as used for sprouts is best and looks, perhaps, less unsightly than galvanised iron.

After several winters' experience I am quite satisfied that anthracite is the best and cheapest for the ordinary studio. I would not go back to gas or coal and coke stoves. The pattern of stove can be used for workrooms, and even dark-rooms, but in the latter would be too hot unless they were large, and it would be necessary to screen it from splashes of water and chemicals. But when I become wealthy (*when!*) and build my ideal establishment, the whole place will be heated with hot-water pipes, with open fireplaces wherever possible, for, after all, nothing looks so comfortable and cosy as an open fire. One hears a good deal of central heating for houses in these days, with radiators instead of fireplaces, but I cannot imagine a family sitting round a radiator on Christmas night.

It may be as well to add that the anthracite should be selected for the kind of stove used; for the ordinary size of stove the fuel should not be larger than "walnuts."—Yours faithfully,

CONTROY.

FACTORIAL DEVELOPMENT.

To the Editors.

Gentlemen,—The difference of opinion between Mr. Alfred Watkins and myself as to the value of the factorial method of development for negatives exposed upon outdoor subjects, or under other variable light conditions, can be narrowed down to a very simple issue. We are agreed that a variation in exposure gives rise to a variation in the time of appearance of the image and a corresponding variation in the calculated total time of development. We disagree, however, as to the amount of this variation in exposure which is probable in ordinary outdoor negative work. Mr. Watkins considers that accuracy in exposure to within an error of 50 per cent. can be accomplished with the aid of an exposure meter. If that be so, then I admit at once that the accuracy of factorial development in outdoor negative work is comparable with its accuracy in the development of bromide prints and lantern plates, the correct exposures for which have been ascertained beforehand by trial. I am of the opinion, however, that the errors in exposure in the outdoor negative work are frequently at least as 1 to 4, and are fairly illustrated by my two experimental plates, one of which was given 1/10th second and the other 1/45th second exposure, and which upon development yielded very different times of first appearance of the image. It is well known that the plate speed number upon the plate box does not necessarily indicate the true speed of the plates enclosed within. Plates may vary in speed from box to box (batch to batch) by 50 per cent. Two plates within the same box have been known to give different true-speed readings. It is also notorious that photographic shutters are not only wrongly marked, but also frequently fail to repeat exposures at any one setting to an extent which makes it futile to get them tested and re-marked. I have known a shutter give 1/20th second upon one occasion, and upon a subsequent occasion at the same setting it gave 1/30th second. The records of the National Physical Laboratory are rich in similar examples. Without taking any account of other pitfalls in exposure, it is obvious that if we attempt to give a meter-calculated exposure of 1/10th second with a plate whose marked speed is 200 H and D, and set the shutter accordingly, and if the real speed of the plate is 150 H and D, and the shutter, working quickly, gives 1/15th second, then we have upon that plate an effective exposure which is *unwittingly* only half what was intended. In a like manner errors in the opposite direction give rise to an exposure of double the one intended. This is precisely the range of error provided in my experiment to which Mr. Watkins takes exception. If it be admitted that this degree of error is common—and I submit that it is not only common, but frequently exceeded—then Mr. Watkins is wrong and I am right and the factorial method is less suited to the development of outdoor negatives, because of the possible exposure error, than it is for the development of accurately exposed materials.

I agree with Mr. Watkins that, if the correct exposure for a piece of bromide paper were 1 second, and either 2 or 4 seconds were given instead (an error in exposure comparable with my plate experiment), then the factorial method applied to bromide paper would be found to be equally inaccurate. I am glad that Mr. Watkins does go so far as to admit that such a degree of error in exposure seriously handicaps factorial development. But it is precisely because we can eliminate the possibility of such errors of exposure in bromide paper by making trial exposures first that bromide prints and outdoor negatives are not comparable. The ordinary photographer can be sure of the exposure for bromide paper and lantern slides by means of an experimental trial; he cannot be sure of his exposures in outdoor negative work, because he has no means of making a trial, hence the applicability of factorial development to the former, and its inaccuracy in the case of the latter class of work.

I am glad that some of the sources of error associated with development by time alone were pointed out. They are insufficiently known and appreciated. The list could be extended with advantage. The calculated time of development must also make proper allowance for the relationship between the total range of light-intensities in the subject and the exposure scale of the printing process contemplated. Mr. Watkins himself ignored this variable when he departed from factorial development in 1910 and adopted "thermo-time" development in tanks, in order to develop more than one plate at a time and avoid a red dark-room lamp. It does not in the least surprise me, therefore, that he was more satisfied with the "factorial" results compared with his "thermo-time" results. The inaccuracy of the time method so practised was greater than the inaccuracy of the factorial method. Unless *all* the factors which govern the time of development are taken into consideration, it is reasonably certain that the result will be imperfect. The factorial development of outdoor negatives is a method more trustworthy than development by inspection. Time development properly conducted is more trustworthy than either. Time development is *not* properly conducted when a group of exposures are developed in a dish or a tank for the *same* time. I did not use the word "standardised" in respect of exposures given to bromide papers, so that the remarks made in criticism thereof do not apply. On the other hand, I did recommend trial and error in the manner which Mr. Watkins describes as the only way of getting a correctly exposed print.

The subject is of considerable interest, and the issue is a simple one. Can ordinary photographers estimate outdoor exposures to within an accuracy of 50 per cent. with reasonable frequency with

out the aid of a check upon the actual speed of the plate in use which Mr. Watkins himself is able to accomplish, or is a range of inaccuracy of 400 per cent. quite common?—Yours faithfully,

B. T. J. GLOVER.

Sunnymere, Birkenhead Road, Meols, Cheshire.
January 16.

To the Editors.

Gentlemen,—I have read Dr. Glover's articles on factorial development with much interest, and consider that they are a valuable addition to the literature on the subject of systematic development, but I am afraid that I cannot agree with some of his conclusions, and, now that Mr. Watkins has taken up the cudgels in defence of factorial development for negatives, I beg leave to give some of my own experiences on the same subject.

I have made very considerable use of both therme time and factorial development for the past 25 years, and my conclusions are that both methods have their good points, but for critical work I should always use the factorial system. Like Mr. Watkins I have been let down by tank development when the chemicals or the emulsion have not been what I expected, but I do not recall a single instance of being let down by the factorial system.

My usual practice, when developing a number of exposures, is to make a test with two or more plates in one dish, taking note of the average time of appearance and the total time of development. These plates are fixed and examined, and, if found satisfactory, the rest of the batch developed for the same total time, but the time is first indicated by the factorial system. The only variation I make is to develop interior subjects for two-thirds of the time given to exteriors. Needless to say that the exposures are carefully calculated by an actinometer or other means, and except in the case of a sheer fluke, I find my negatives very even.

I can well believe that where the exposures are haphazard the factorial system would fail, and that thermo-time would be far preferable, and, strange to say, I have not found the factorial system satisfactory for process negatives all exposed by artificial light. There are good reasons for this, which would take up too much space to explain here.

There is one peculiarity of factorial development which I have not seen mentioned, and that is in connection with the dilution of the developer. I recently made some experiments with the object of testing the advantages of surface development as opposed to depth development; my tests were made solely with the object of noting the effect upon halation. I failed to get halation under any conditions, but I found that the negatives produced with dilute developer were of a totally different character from those produced with a normal developer.

My subject was an interior facing a long row of windows, but the day was dull and damp, and there was a fair amount of haze in the room. Three exposures were made, and identical exposures were given; Imperial pyro-metol was the developer, and the first negative was developed with half-normal strength; time of appearance, 20 secs.; factor, 6; total time, 2 minutes. The developer was diluted to one-eighth normal strength for the second negative, the time of appearance being 90 secs.; total time, 9 minutes. The negatives when fixed differed very considerably in contract. No. 1 was a fair average negative for the existing conditions, but No. 2 was very much thinner in the high-lights, and the shadows contained a much higher proportion of fog, and not a particle more detail than No. 1. No. 3 was then developed with full strength developer, the time of appearance being 20 secs., the same as No. 1, but at the end of 1½ minutes, the high-lights being well through at the back, and it being quite obvious that to continue would be to over-develop, it was taken out and fixed; the result being that it is the best negative of the three. The high-lights are denser than No. 1, and the shadows are clearer than either No. 1 or No. 2, and the shadow detail is brighter and stronger; so everything points to strong developer with a low factor being better than a dilute developer with a high factor as far as quality is concerned. But another point which stands out is that the same factor will not do for different degrees of dilution.

As regards bromide printing, I agree that the factorial system is the best, but I cannot agree that so high a factor is necessary, or it may be that different developers or different formulæ require widely different factors. Anyway with amidol used with anything from 1½ to 6 grs. per oz., I find a factor of 6 to be ample for either black and white or sepia prints.

To sum up, my conclusions are that both systems of development are very good servants, but not equally good masters, and that a judicious blend of the two, as suggested above, will be found useful for plates or papers.—Yours faithfully,

E. A. BIERMAN, F.R.P.S.

Birmingham, January 15.

To the Editors.

Gentlemen,—Dr. Glover has earned our thanks for bringing Mr. Watkins out of his shell and causing him to pen the interesting article appearing on p. 15 of your last issue. I have for more than twenty years been a great believer in and a user of the factorial system of development, and I never fail to recommend it to those who meet with difficulties in development.

I could never understand why such an ideal system of developing correctly-exposed negatives has been allowed to fall into the background, one hearing very little of it to-day, and meeting very few who know anything about it.

It has been a great mistake not to keep the table of factor numbers up-to-date. All the tables I know of—even the latest, i.e., that in the current "Almanac"—are rather antiquated and incomplete. Mr. Watkins is, I know, a busy man, but if he could see his way—makers of plates, films and developers perhaps helping him—to send you for publication a corrected, up-to-date and complete list, it would be of great assistance to all of us. Other workers with more spare time than Mr. Watkins might perhaps do it, but "Watkins numbers" from Mr. Watkins himself would carry greater weight and be more acceptable to most of us.

Plate and developer makers have been very behindhand in ascertaining and giving us the factor numbers of their formulæ and products, and requests for them have often brought confessions of ignorance of the figures or suggestions for "approximate" numbers.—Yours faithfully,

GODFREY WILSON.

January 15.

THE POSITION OF PHOTOGRAPHIC SOCIETIES.

To the Editors.

Gentlemen,—The letter from the hon. secretary of the Catford Camera Club, published on page 27 of last week's "B.J.," comes as a sort of tonic after the depressing effect of "Fuller Hope's" lachrymose screed, though I must confess that I look a little askance upon the communication from Mr. Coleman. The latter, I think, is much too sanguine, whereas the originator of the correspondence is far too pessimistic.

The Catford secretary, to my mind, pictures the position of only one society, and this, of course, his own. I am given to understand that the founder, president, and moving spirit of the Catford Club is a well-known teacher of photography at the L.C.C.'s local evening classes, and that the club was at first made up mainly of the president's photographic pupils. Other beginners, I am told, have been admitted to the membership, but the fact of its origin remains. If this be true, how can we compare the club with others? Before we can fathom the reasons of this new club's extraordinary success we should know the number of the president's past and present pupils in the club, and the parts they play in it.

No other society has, I believe, been founded and run under such favourable conditions, and, having a fairly large percentage of real beginners—and, obviously, enthusiastic workers—as a strong foundation, the club ought of necessity to be a huge success—for a time at any rate. But what will happen when most, if not all, of these beginners become expert workmen, as they must do very soon under the rulership and instruction of such a capable experimentalist and teacher as their president? I venture to predict that the members will make rapid progress in the art of photography, and that they will very soon be tired of instruction evenings, and yearn either for what Mr. Coleman calls "a long series of lantern and other evenings of the usual sort," or drop photographic club life, and perhaps photography altogether.

I have a great admiration for Mr. Coleman's enthusiasm (I wish there were more like him), but it would be very interesting to have

another report from him, say a year or two hence, when his unique collection of beginners will have become "old hands" and really good workers. Catford, if my information is correct, has not an unlimited supply of persons who require photographic instruction.

It should also be remembered that the Catford Club is not an oasis in a desert, and that for many years photographers in the district have been well catered for by two other societies within a short walk of the new club's headquarters.—Yours faithfully,

L. T. W.

TWO OR THREE DIMENSIONS: IDEALS IN PORTRAITURE.

To the Editors.

Gentlemen,—Mr. Edward Drummond Young seems to be annoyed. I'm sorry. I maintain that it is pernicious to encourage photographers to adopt the two-dimensional, or any other "stunt" of modern painting as opposed to the spirit and letter of photography, scientific and artistic.

I could readily reply to all the points in Mr. Edward Drummond Young's letter, but cannot see that any useful purpose would be served by doing so.—Yours faithfully, F. C. Tilney.

Walden, Cheam, Surrey.

January 17.

RAILWAY PHOTOGRAPHERS.

To the Editors.

Gentlemen,—I was interested in reading Mr. T. A. Scotton's letter in your issue of the 7th inst. In that communication he asks for information as to the first railway photographer, and, in reply, I would like to record the following facts. Shortly before his death, Mr. F. A. Bridge and I compared notes, and I learnt from him that he had photographed in the Bow works of the North London Railway. It so happened that—due to my father's influence—as a youngster, I was allowed the privilege of entry into these works in 1869-70, and remembered having seen a photographer at work there. That man, I afterwards learned, was the late Mr. Bridge, as related by himself.

I do not know whether he was the official photographer to the railway in the same sense that Mr. Scotton and his father were attached to the Midland Railway, or merely called in as occasion required.

Trusting that this is of sufficient interest to appear in the "B.J."—I am, gentlemen, yours faithfully, G. W. Atkins.

Elstree, Herts.

January 17.

THE PETZVAL ORTHOSCOPIC LENS AND THE TELEPHOTO

To the Editors.

Gentlemen,—It is agreeable to note in the lecture by Professor Conrady the appreciation awarded to the genius of Petzval. I do not think that photographers have duly recognised what they owe to the work of this distinguished mathematician, whose portrait lens, Professor Conrady remarks, is made practically in its original form at the present day. It was this lens, combining as it does large aperture, and consequent rapidity with exquisite definition, that enabled photographers to build up such a large and successful business in portraiture before the arrival of emulsion rapidity.

Petzval's second lens, known as the orthographic or orthoscopic, also merits attention as the forerunner of the telephoto lenses. Some three or four years after its introduction, a proposition was introduced at the Photographic Society of Great Britain—I think by Mr. Malone—to have a mark engraved on the lens tube, indicating the place from which the focal distance could be measured, and I then pointed out that with the orthographic lens it could not be done, as the nodal point was outside the lens. This, of course, indicates a longer focus, and consequent larger image than would be inferred from distance between the lens and the image. The magnification was not great, but it existed, and the principle, that of placing a negative lens behind the positive, is that adopted in telephoto lenses.

To Mr. T. R. Dallmeyer belongs the credit of recognising how an extension of the principle illustrated in the orthographic lens might be utilised in the production of a telephoto lens, with a useful degree of magnification resulting in the production of the well-known telephoto lens.—Yours faithfully, W. E. Debenham.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

R. H. I.—Apart from the Röntgen Society, the only association we know is the Society of Radiographers, the secretary of which is Mr. George F. Westlake, Electrical Department, Cancer Hospital, Fulham Road, London, S.W.6.

H. T.—It has been definitely stated by the Home Office, on application of the Professional Photographers' Association, that the taking of portraits by appointment at a studio on the half-day weekly holiday is not contrary to the Shops Act.

M. F. S.—Your lighting arrangement would necessitate a very long exposure, the lamp at 12 feet distance giving very little light. Why not use all reflected light? Marion and Co. made an apparatus on the principle, and it answered very well. The arcs were 6 or 7 ft. from sitter.

J. D.—We are sorry we do not know the maker using the monogram J. X. S. At the request of one of the leading dealers in secondhand lenses, we tried to identify this mark some time ago but without success. Probably it is one of the French makers, or more likely dealers, who were in business 20 or 30 years ago.

P. M.—Plaster figures (busts) are sold by Messrs. D. Brucciani & Co., 254, Goswell Road, London, E.C.1. There is no journal which deals specially with portraiture, although the subject is treated among general art matters in the "Studio," 44, Leicester Square, London, W.C.2, price 2s. monthly; and in "Drawing," 34, Paternoster Row, London, E.C.1, price 1s. monthly.

F. G.—We have found the ordinary dry-mounting, using a flat iron instead of a press, to answer very well with *stout* satin, the shellac might come through the silk; the best way would be to try a waste piece. We have also used Seccotine spread *upon the mount* and allowed to get tacky before laying down the silk to be quite satisfactory. You must not apply any mountant direct to the silk.

A. W.—What you want is optically impossible unless you stop down the lens to a very small aperture. In order to get constant focus with alteration of the distance of the lens from the sitter you would have to stop down probably to f/64, or smaller in the case of a lens of, say, 12 inches focal length, which would mean that you would have to give about 250 times the exposure, compared with the full aperture of, say, f/4.

A. B.—The cinematograph trade is at present not in a very organised state as regards purchasing films of local subjects. At present one market, and perhaps the chief one, is the cinemas in the district, but the proprietors of these require educating in order to convince them that there is a demand on the part of the public for local films. You will find some hints on this subject in an article in the "B.J." of October 8 last.

J. A.—The Series V. Cooke lens is of f/8 aperture, and for a lens of the focal length (18 ins.) for a 15 × 12 plate that is quite as large an aperture as is required. In almost every case you cannot do with a larger aperture, otherwise you will not get sufficient depth of focus. The lens is an excellent one for all-round outdoor work, such as architecture, machinery, and landscape, and for 15 × 12 plates you cannot have a better instrument.

S. W. H.—Dark blue or green are the best colours for studio blinds. If these are of the roller-blind form you must use blue holland, but if festoon curtains, sateen, or, better still, a casement cloth, is suitable. If you do not object to the extra cost Bolton sheeting, which is made for long window curtains, is more durable and stops out the light more effectually. Any

furnishing draper will supply all these materials. In London Thomas Wallis and Co., of Holborn, keep a good stock.

P. B. J.—The speckled appearance of the face is due to dust which has settled on the medium while it was tacky. Clean off the retouching and try again. The flatness of the enlargement may be due to slight over-exposure, or perhaps to diffused light escaping from the enlarging lantern. As far as our experience goes there is nothing to choose between glass negatives and films for enlarging. Films are more likely to be scratched and the scratches will show. Your prints are of a good colour, and we do not think you would gain anything by changing the developer.

W. M.—If the young lady were employed in premises into which your customers come, we think she would be a shop assistant according to the Shops Act, and would, of course, also come under the National Insurance Act. As regards remuneration, there is no usual custom, but from what we gather during the last year of two, at any rate, it is unusual to take a pupil, even without premium, unless some weekly payment is made to him or her. That is certainly so in London, where it is recognised that a youth or girl does a certain amount of useful work, even from the beginning.

J. W.—(1) Paper sensitised with a formula such as you mention keeps in good condition only for a few days, say a week or ten days at the outside. (2) The results are of quite a good degree of permanence; you may take it that they would last for ten or twenty years with scarcely any alteration. (3) We do not think the formula is any better than that in the "Almanac"; we know copper sulphate is sometimes included in such formulæ, but we do not think it is of the slightest advantage. (4) Yes, your formula ought to suit salted paper, but in that case we would sooner leave out the copper sulphate.

O. B.—The most permanent method of toning transparencies to a brown colour is by the ordinary sulphide method. Some lantern plates will tone excellently by this method, whilst others will not; you will have to try one or two plates. But every lantern plate that we have tried tones satisfactorily by the copper method, and the results of this latter are reasonably permanent. Certainly the transparencies should be varnished, preferably with a cold celluloid varnish, which itself gives a high degree of protection, and the binding strips should also be varnished. The celluloid varnish can be used also for this. An important point is to have the plates thoroughly dry before varnishing or binding by leaving them exposed for a few hours at a quite perceptible degree of heat.

A. W.—You do not give us sufficiently clear particulars to enable us to answer your questions. For a studio of such a short length as 13 ft. you are very much limited as regards the focal length of lens. For a full-length post-card portrait you could not use a longer focus than 7 inches, so that if you wish such a lens to cover a whole-plate, it would have to be stopped down to something like $f/22$ or $f/32$, and even then there are comparatively few lenses of this focus which would cover a whole-plate to the edges. In the circumstances, the best thing we can do is to refer you to the table in the "Almanac," showing the focal length of lens permissible for different classes of work. For your purpose it would be sufficient, we think, to base your calculations on a studio of 14 ft. length.

W. B.—Removal of ink stains is rather a hopeless business, and, unfortunately, you do not tell us what kind of print the photograph is. If it is any kind of silver print (bromide, etc.), almost anything which will remove the ink stain will also bleach the image. You had better try a little solution of oxalic acid, or the so-called salts of lemon. If this has no effect, you may be able to remove the stain with a decoction of bleaching powder, but you must go very carefully, otherwise you will destroy the image of the photograph. Usually the only thing which can be done is to make a copy of the photograph through a light-filter and on an orthochromatic plate, according to a method for which you will find full instructions in a little manual on the use of panchromatic plates issued by the Wratten Division of Kodak, Ltd.

A. C.—We suppose the plate-holder is of the single pattern with a metal shutter, in which case it is somewhat difficult to account for the occasional band of insensitiveness across the plate. It does sometimes happen that the varnish on the holder shutter causes insensitiveness, though we cannot recollect ever having had that in the case of a single metal plate-holder. It is possible that the shutter of the holder is bent, and in certain circumstances causes abrasion of the emulsion surface. Such abrasion is very erratic in its effects, but it may at times cause a certain degree of insensitiveness, and the greater or lesser time during which the plate is in the holder may perhaps account for the spasmodic appearance of the defect. We are afraid this is not a very good diagnosis of your difficulty, but it is the best we can do from the particulars you give us.

P. E. B.—(1) The Wothlytype is an old and now obsolete process of printing by means of a sensitising solution consisting of uranium nitrate and platinum chloride (or silver nitrate) dissolved in alcohol or in collodion. Working details are too long for quotation here, but you will find them fully set forth in "Photographic Reproduction Processes," by P. C. Duchochois, published by Hampton and Co., Cursitor Street, London, E.C. We do not know that this process has been used for printing on wood blocks, although it is of a kind suitable for that purpose. But is is more complicated and no better than the formulæ for printing on wood given in the article which appeared in the "B.J." of August 8, 1919. (2) This question also involves a lengthy answer; you should get the text-book, "Photographic Enamels," by R. d'Heliocourt, on processes of making photographic enamels, published by Messrs. Iliffe, 20, Tudor Street, London, E.C., price 2s. (3) You should be able to obtain all the chemicals for this process from Messrs. Johnson and Sons, 23, Cross Street, Finsbury, London, E.C.

W. B.—Metol-hydroquinone has been little used for the Antochrome process, and, so far as we know, has never been officially recommended by MM. Lumière. But the following is a formula for the first developer strongly recommended some six or seven years ago by Mr. A. B. Hitchins, now chief chemist of the Ansco Company, in America:—

For the first development, Solution A.

Water	1,000 c.c.s.
Metol	6.5 gms.
Soda sulphite (anhydrous)	40 gms.
Hydroquinone	2.10 gms.
Potassium bromide	2.5 gms.
Hyposulphite of soda	0.10 gms.
Ammonia, 0.880	20 c.c.s.

For use, one part developer, one part water. We have never used it, and we should rather fight shy of introducing even the small quatity of hypo into the MQ developer; although we know that hypo can be added in a very small dose without ill effects.

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Contents.

SUMMARY.

Mr. W. E. A. Drinkwater, in a contributed article, describes the results of practice in the design of a box printer capable of dealing with extreme conditions in respect to density of the negative and sensitiveness of the printing paper; also as regards meeting the practical conditions which arise through the necessity of giving different degrees of exposure to parts of the same negative. (P. 49.)

In a leading article the process recently published by Mr. J. I. Crabtree for the production of reversed dye images by the action of an acid fixing bath is reviewed in reference to the provisional trial of it which has been possible. Emphasis is laid on the need of a vigorous negative or positive, and on the avoidance of any treatment which adds a mordanting material to the image. (P. 46.)

The Northern exhibition, now on view at the Walker Art Gallery, Liverpool, contains in the pictorial section a large collection of work excellently representative of the present achievement in this branch of photography. (P. 47.)

The lectures to be delivered during the remaining period of the exhibition are announced on page 51.

Monday next, the 31st inst., is the latest day for the receipt of entry forms for the Scottish Salon, which opens at Dundee on February 19. (P. 45.)

Although photographs are rarely accepted as legal evidence in this country, prominent use was made of them recently in an appeal case turning on the navigation of two vessels which collided. (P. 57.)

In the United States schools of various kinds provide business for the photographer upon a much larger and creditable scale than is common in this country. (P. 46.)

British Chambers of Commerce in China are pressing upon the Chinese Government the need of adequate copyright protection in that country. (P. 45.)

Nominations of officers for the Council of the Professional Photographers' Association will be found in the report on page 56.

Mr. Alfred Watkins, in a further letter on factorial development, says that he would like to see other experimenters, and particularly the plate and developer makers, making measurements of the factors of developers. (P. 58.)

We regret to record the death of Dr. E. J. Spitta, well known for his writings on microscopy and photo-micrography. (P. 21.)

The construction of a vertical enlarging and copying apparatus is the subject of detailed description in a recent patent specification. (P. 52.)

A new invention in telegraphy is announced by which, so it is stated, drawings and photographs may be telegraphed. (P. 57.)

EX CATHEDRA.

The Scottish Salon. After the Northern, the Scottish Salon, which opens at the Victoria Art Galleries, Dundee, on Saturday, February 19. We would remind intending exhibitors that Monday next, the 31st inst., is the latest day for the receipt of entry forms by the hon. secretary of the Salon, Mr. James Slater, Rosemount, Camphill Road, Broughty Ferry. The exhibits themselves are given a further week's grace; they are required to be delivered at the Victoria Art Galleries on Tuesday, February 8. Unlike some current exhibition organisers, those of the Scottish Salon ask that exhibits should be both mounted and framed, but the framing may be in the passe-partout style. The glazing of prints is optional, but if they are not glazed, pictures and any multiple mounts must be wholly, not partially, attached to the back board. We understand that the forces within the Scottish Photographic Federation are being concentrated upon the Salon, and that the board of selection, which consists of Messrs. J. M. Whitehead, Dan Dunlop and W. C. S. Fergusson, is already assured of having to deal with a large entry, comprising much notable work.

* * *

Copyright in China. A recent conference of associated British Chambers of Commerce in China recently passed a resolution supporting further representations to the Chinese Government with a view to securing the latter's adhesion to the International Copyright Union. At present authors of literary or artistic works, including photographs, obtain no protection in China. It is true that China has some kind of Act whereby her own nationals may register their copyrights with the Minister of the Interior, but apparently no protection is afforded under this "Act" to foreign owners of copyrights. Although both England and the United States have entered into treaties with China for the establishment of reciprocal copyright protection, it appears that so far as China was concerned the regulations proved to be vague and unsatisfactory and quickly fell into disuse. It is pointed out that by the Shanghai treaty of 1902 China specifically undertook to provide protection for trade marks and copyrights by enacting laws to that end, but as the result of a sublime indifference to steps giving practical shape to that provision of the treaty, there is still no effective means of protection of literary and artistic works as regards copyright within Chinese dominions. The Chambers of Commerce are evidently right in their view that the addition of China to the countries subscribing to the Berne Convention is the only step which can be expected to place the copyright question on a sound basis. That would define owners' rights in artistic and literary works clearly; the genius of the Celestial official for circuitous legislative methods would be defeated, and foreigners' rights of reproduction should be more easily enforced.

Prints for Reproduction. There are still many photographers, both in portraiture and commercial work, who are under the impression that a brilliant, somewhat hard print is necessary to obtain the best results in half-tone work, and as they never come into direct communication with the process operator they have no means of learning that they are in error. The modern process man will tell you that for high-class blocks he prefers a soft print full of gradation, but free from flatness. In the making of the screen negative and in the various stages of etching he can introduce high-lights into a rather soft subject, but he cannot produce detail in harsh lights and shadows. If the original negatives are on the hard side, full exposure and the use of a diluted developer will give the most useful prints. For reproduction, the colour of the developed image is of little account. A rusty black, due to short or weakened development, will often reproduce as well as a pure black tone. Sepia-toned prints should never be submitted for reproduction, as the shadow detail can hardly be preserved in the block. Purple-toned P.O.P. was at one time considered as the only suitable medium, but glossy or carbon surface bromides now seem to be preferred.

* * *

School Work. In this country school photography generally consists in taking groups of children at the elementary schools and the sale of post-cards at a very cheap rate. In America it is regarded in quite a different light and good class studios make a special feature of it. There, it is the custom to cater for the students at the various grades of colleges, boarding schools, and what would correspond to the high schools and county schools of this country. It appears to be quite a custom for students to exchange portraits at the termination of their term and sometimes on other occasions. Special styles and sizes at moderate but fair prices are reserved for school work, and these are not shown to ordinary sitters. In some instances the mounts are specially printed with the name of the school and the year of production, college emblems or colours being used, if desired. There is quite keen competition for this work, the orders being placed by a committee of students after inspecting specimens submitted by rival firms. Groups, sports pictures, and the like, as well as views of the school buildings, also come in the way of the official school photographer. Something of the sort should be possible here in towns near large schools.

* * *

Old Lenses and Spherical Aberration. In these days of high prices we hear of many photographers who are tempted to purchase an old-fashioned long focus R.R. lens, using only the centre of its field in preference to paying the higher price for a first-class anastigmat. Quite apart from the wisdom or unwisdom of this, there is, however, one caution that should be given to the user of one of the older R.R. lenses, if he would avoid unsharp negatives, by reason of the lens being uncorrected for spherical aberration; that is to say, the peculiarity of some of these instruments often being of different focus at different stops. The older photographer used to lenses of pre-anastigmat days, will doubtless be fully aware of this, but the warning is necessary to those whose experience has been limited to the more modern, well-corrected instrument. When using an untried R.R. lens, particularly if of an old pattern, the image upon the ground glass should be carefully examined with the stop that is to be used when making the exposure in position, since the alteration of the stop may have the effect of making a previously sharp image decidedly unsharp. Nor is lack of correction for spherical aberration entirely confined to the older R.R. instruments, for we have found it present in a lesser degree with some cheap instruments of more recent manufacture. Modern workers are so unused to looking at the effect of stopping down, in affecting the sharpness of the image adversely, that a caution in the matter is not out of place.

REVERSED DYE IMAGES.

The obvious importance of the method of producing reversed dye images, outlined in the communication by J. I. Crabtree which appeared in our last issue, justifies a further reference to the subject. Whilst it cannot be denied that the process, if it can be successfully applied on the large scale, will be of intrinsic value in colour cinematography, it is as well to realise that the production of perfect results is not at present an easy matter. The details given in the text of the communication are sufficiently explicit to encourage experimentation on the part of others, but there are several minor pitfalls in the process which should be brought to the notice of those interested. Some of the difficulties are called attention to in the text, and it will be found that success can only be attained by strict adherence to the stipulated conditions of manipulation. For reasons which will appear later, it is not sufficient to compound the solutions in the all too frequent rough and ready manner adopted by the average photographer, and the plate or film which it is sought to convert into a reversed dye picture must be the product of straight, clean work. The following conclusions have been arrived at as the result of experiments made under various conditions with different types of negatives and dyes representative of the different classes used industrially.

The negative (or positive) should be of the decidedly vigorous order, developed well through the body of the emulsion, and if on film, the "anti-curling" gelatine should be stripped from the back before commencing operations. The use of a combined hardening-fixing bath is to be deprecated, and the image must not have been toned or intensified by any process which adds a mordanting material thereto, *e.g.*, the chromium or copper intensification processes. It is not stated in the communication whether operations were commenced on a dry or previously wetted film, a point which was found to be of some importance, as was also that of the age of the film. Given a freshly-prepared negative of the very plucky type, which has been thoroughly fixed in a *plain* hypo bath, the so-called "separate" process in which the staining and the reduction (or bleaching) of the dye are effected in separate baths, may be made to give presentable reversed dye images; if, on the other hand, the previous history of the negative is unknown, only the super-optimist will expect perfect results.

The dyes recommended in the communication are of the basic type and such as readily reduce to the leuco state. These dyes are difficult to handle, even when using distilled water, and if only a "hard" alkaline water is available, the alkalinity of such water causes a precipitation of the dye, and then the bath can only be got into the correct condition by the very cautious addition of acetic acid. Again, if the water employed for the washing after the "bleaching" contains much dissolved air, the so-called leuco reduction product is only partly removed, a proportion of it being re-oxidised to the dye. In fact, this re-oxidation of the leuco derivative to the dye constitutes, in the writer's opinion, the weakest feature of the process—even taking into consideration the finesse which must be exercised in the bleaching opera-

tion. In the hope of making the destruction of the dye more permanent, experiments were made with dyes, the reduction products of which are perfectly stable against atmospheric oxidation, with most promising results. Whether in this work the nature of the gelatine or of the image gave material assistance which was lacking in the experiments with basic dyes it is difficult to say, but the results obtained were superior to those obtained with the latter class of dyes.

If it may be taken as a fact that dyes other than those which form leuco derivatives can be employed in the process, it may be concluded that the reducing power of the mixed acid hypo bath is of a very much higher order than was previously imagined—it is comparable, in fact, with that of a solution of sodium hydrosulphite, and this latter substance is one of the most powerful reducing agents known to chemists. It is very difficult to understand how the bleaching action can arise from nascent sulphur, for if that substance were the active agent, one would expect a sulphide toning effect with any and every acid fixing bath; in fact, the undeveloped silver bromide of every negative and print put into such a fixing bath would be immediately "toned." Fortunately, such an undesirable impasse does not occur.

If, however, the chemical elements present in hypo, when its aqueous solution is faintly acid, can re-arrange themselves in such a way that they form a new compound analogous to or identical with sodium hydrosulphite, marked bleaching propensities would be characteristic of such faintly acid solutions. As is pointed out in the communication, there is a general reducing action throughout the solution, and the function of the silver image appears to consist solely in catalysing the reaction and so hastening it in the local areas contiguous to the image. A very simple experiment will show the bleaching power of an acid fixing bath on methylene blue:—

If about half an ounce of a 1:1,000 aqueous solution of the dye be divided into two equal portions in test-tubes, and to one portion be added a crystal or two of hypo and then a few drops of "acid hardener," the contents of the other tube being diluted with water to keep the volumes approximately equal, it will be found, on slightly warming (avoiding shaking) and allowing to stand, that the colour of the solution is discharged in the one case, whilst the plain aqueous solution remains unaltered. The results of this experiment clearly rule out of court any necessity for specific chemical action on the part of silver, and it is difficult to account for Mr. Crabtree's statement that the dye is only reduced by an acid fixing bath in the presence of silver. It may be admitted at once that the presence of finely divided silver very considerably hastens the bleaching action, but in so doing it affords unmistakable evidence that its action is not strictly chemical; the silver in this case is merely a catalyst, and is itself unaltered by the reaction.

We are thus thrown back for an explanation of the reduction process to the similarity between hypo and sodium hydrosulphite, and one regrets that the subject, although of absorbing interest to chemists, is not one which comes within the scope of such notes as these. Beyond mentioning the fact that some authorities hold the view that hypo is a decomposition product of sodium hydrosulphite we must leave the matter for chemists to decide. Sufficient has been said to indicate that such communications as Mr. Crabtree's open up a wide field of research, the cultivation of which will lead to a harvest of facts, valuable alike for the practical service they will render in our branch of industry and for the better understanding they will give us of the intricate workings of those substances which we at present employ all too empirically.

R. E. C.

THE NORTHERN EXHIBITION.

With civic honours the eighth Northern exhibition opened on Saturday last at the Walker Art Gallery, Liverpool. The occasion was a notable one, for it marks the revival of the courageous policy of bringing together a great photographic collection which was inaugurated in 1901 by the late C. F. Inston, to whose enterprise and assiduous labours a deserved tribute is paid in a prefatory note to the catalogue. The war naturally disturbed the aims of our friends in Liverpool and Manchester to make a northern exhibition an annual event, but Liverpool has now again taken the initiative, and has placed upon the walls of the Walker Art Gallery a collection which admirably represents the current achievement in pictorial photography, and, moreover, does not overlook some of the fields in which the technical and scientific photographer is doing notable work. Also, the trade and manufacturing side of photography is brought to the notice of visitors by the inclusion of a number of commercial exhibits. Photographers in the north have, therefore, every reason to visit Liverpool during the period of the exhibition, that is to say, until February 5 next.

The hanging committee have made good use of the spacious and well lighted walls at their disposal, and, as far as possible, have arranged the work of each notable exhibitor in a group by itself, with the result of facilitating the study of present tendencies among the pictorial workers in a way which is impossible when exigencies of space impose the necessity of a closer scheme of hanging.

In the scientific sections a valuable contribution is that by members of the Photomicrographic Society, whilst X-ray technique and industrial usefulness obtains its representation by the exhibits of Mr. N. E. Luboshez and Messrs. W. Watson & Sons (Electro-Medical), Ltd. Mr. Banfield's remarkable photographically recorded curves obtained by the "Ratiograph" appear also, after having been shown at the last Royal exhibition, and at Liverpool fortunately are correctly catalogued. When it is added that there is a large collection of colour transparencies, mostly Autochromes, of which we hope to speak in a subsequent issue, it will be seen that the Northern approaches photography from a comprehensive number of standpoints.

In the pictorial section the awards were as follows:—

Plaques.—H. G. Allen, "The Mackerel Net" (No. 29); Arthur W. Burgess, "Romantique" (No. 266); Robert Chalmers, "Margery" (No. 222); C. Kendall, "Dockers" (No. 365); Herbert Lambert, "Madeleine" (No. 121); J. Harold Leighton, "The Old Church" (No. 101); John MacSymon, "September Morning" (No. 42); G. F. Prior, "April Sunshine, Pump Court" (No. 213); Rabinovitch, "In the Spirit of Old Granada" (No. 94); James Rowaft, "High Tide" (No. 168); Hugo Van Wadenoyen, Junr., "Early Closing Day" (No. 158).

Honourable Mention. Charles A. Allen, "The Sentinel" (No. 5); Paul L. Anderson, "Early Morning in the Hills" (No. 50); Arthur W. Burgess, "At Chester" (No. 273); F. G. Curson, "Frank Forbes-Robertson" (No. 294); Louis Fleckenstein, "Amazon" (No. 306); Rev. J. V. Haswell, "Arabesque" (No. 225); Herbert Lambert, "Frank Forbes-Robertson" (No. 124); J. Arthur Lomax, "Sunlit" (No. 135);

N. E. Luboshez. "Study" (No. 337); F. Marx. "Rapids" (No. 350); Eng.-Com. Mowlam, R.N., "The Suspect" (No. 248); Newton C. Owen, "Egypt" (No. 82); Rabinovitch, "Girl in Black" (No. 95); R. Shepherd, "The Windlass" (No. 12); Louis J. Steele, "A Venetian Study" (No. 236); Hugo Van Wadenoyen, Junr., "Mark Stanley, Esq." (No. 159); Lionel Wood, "Liliane Gilbert" (No. 282).

The following were the awards for colour transparencies and lantern slides:—

Colour Transparencies.—Plaque: Henry Irving (No. 325).

Honourable Mention.—Henry Irving (No. 377); N. E. Luboshez (No. 322); F. R. Newens (No. 279); Louis J. Steele (Nos. 372 and 375); J. C. Warburg (No. 339).

Lantern Slides.—Plaque: James Shaw (No. 117).

Honourable Mention.—Herbert Felton (No. 36); Robert Chalmers (No. 44).

These general notes will, we hope, suffice to give an adequate impression of the importance and wide scope of the exhibition. Naturally, chief interest ranged round the pictorial section, a series of critical notes on which, by a Liverpool correspondent, appears below.

THE PICTORIAL SECTION.

Among the works which receive prominent display in panels on the walls are those of Arthur F. Burgess, Nos, 266 to 273. Though rather small in size, they are of exquisite delicacy. Mr. Burgess deservedly receives a plaque for his "Romantique" and an honourable mention for "At Chester" (No. 273). His well-known "Shambles, York" (No. 269), is one of this outstanding series.

In a group by Van Wadenoyen, Nos. 157 and 158 are conspicuous; the latter, "Early Closing Day," has the true touch of genius. His portrait work is not better than is expected from him.

"The Spirit of the Hills" (No. 4), by Charles A. Allen, is rich in quality and a fine composition. In "The Night Catch" (No. 9), W. L. G. Bennett has a dramatic note well conveyed. In No. 10 W. H. Marquis has a successful rendering of a peaceful scene. No. 12, "The Windlass," is the best of the exhibit by R. Shepherd, and is a bold, well-handled piece. His portrait of the Rev. J. Oldham (No. 13) is the best of his studio work.

"The Shipyard" (No. 20), by George Good, is modern in feeling and skilfully handled. The sky gradation is particularly pleasing. In No. 21 Rev. J. W. Isherwood has an unusually good study of an old subject, which he calls "Greeting the Dawn." Of the group by H. G. Allen, No. 31, "The White Tower," is outstanding and a notable work in transfer. No. 30 is an ordinary scene transformed by a flood of beautiful light. The composition, however, is not entirely satisfactory. "The Mackerel Net," No. 29, by the same worker, is well composed and pleasing in value; it receives a plaque. No. 36 is a pleasing study of water plants by T. Sweatman. The work of John MacSymon, Nos. 38 to 43, makes a good display, Nos. 41 and 42 being the best. the latter of painter-like breadth.

No. 38, "A Humber Squall," is a fine cloud piece with a low horizon. Nos. 47/8, by H. J. Summons, show a strong decorative sense. Four works by F. O. Libby are shown, No. 52, "The Spirit of the Winds," being a well handled study of the nude, and No. 53 a frieze-like design. Three gum prints, Nos. 57/8 and 76, by Herbert Bairstow, are of beautiful texture. No. 50, by Paul L. Anderson, has a delicate beauty and thorough artistry. A nude study, No. 56, by Arthur C. Miller, is of a high order of merit. Of Arthur C. Banfield's work. No. 68, "Portrait of T. H. B. Scott, Esq.," is perhaps the best.

Of four works by William Gordon Shields, No. 70 is the best; in No. 73 the strong colour is unwelcome. No. 79A is by a South African worker, J. C. Stick, and is a good study of a boy's head. No. 82, by Newton C. Owen, is a beautifully textured print; in No. 81, by the same worker, the sky might, with advantage, be toned down. A. Benson Ray shows an unusually successful still life in No 87.

In No. 90 John P. Oakes has an excellent transcription of a pleasing scene. "A Liverpool Dock," No. 89, by W. H. Gleave, is well seen, but suffers from lack of quality in the print. Nos. 93 to 95, by Rabinovitch, are prints of remarkable merit; No. 95, "Girl in Black," rises far above the average of portrait work. "Coal Barges on the Thames," No. 96, by C. Upton Cooke, is a magnificent piece of work and a fine composition. Six prints by J. Harold Leighton are of unequal merit; Nos. 101 and 105 are the best, the former receiving a plaque. No. 108, a small study of a steam-crane, by H. E. Johnson, is very well handled. Of J. C. Warburg's four prints No. 109, an old favourite, "Saltburn Sands," is still the best. No. 114. "Ann." by Ethel Eadon, is an engaging child study and rich in quality.

Of seven fine prints by Herbert Lambert, Nos. 119/25, the best is probably "Dierdre," which scores by its simplicity and arrangement. "A Sylvan Glade," No. 132, by T. Shovelton, is beautifully soft and luminous. A beautiful set by J. Arthur Lomax, Nos. 135-140, contains some of the most striking work in the Exhibition; of these Nos. 137 and 139, "July, 1920," and "Sun Splash," show the most perfect artistry." "The Confession," No. 144, by Walter Lee, is very pleasing and restrained. In "Doves' Place," No. 146, M. O. Dell has a striking work, highly original in conception. It is not, however quite successful, being too harsh and generally it is too cold. "A Southdown Mill," No. 150, by A. Hanson, is pleasing, and "In the Evening Sunlight," No. 152, by the same worker, is luminous and warm. Of four prints by E. Howard Burnett, "Le Chapeau Neuf," No. 164, is the best; No. 165 is of rich quality. "High Tide," No. 168, by James Rowatt, is well composed and has a pleasing texture. In No. 172, "Nude Study," Mrs. Florence Wild has a child study of the popular type but quite good. Robert M. Blackburn's "Riverside, Worcester," No. 178, is of pleasing luminosity, with the composition rather too central. "Industry and Grime," No. 180, is by J. J. Phelps, and is a broadly and well handled rendering of an old subject; the same remark applies to No. 181, by the same worker. No. 167, "Portrait of Hugo Van Wadenoyen," by M. Rodway Leeming, is a forceful presentation

"The Shadow," No. 189, by T. J. Lewis, is well seen and well handled, but No. 188, "The Eternal Triangle," by the same worker, is childish and only redeemed by the clever lighting. "Waterloo Place," No. 192, by A. C. Banfield, has all the qualities of a steel engraving. Dignity and reserve characterise No. 196, "A Portrait," by Mrs. C. A. F. Gash. Nos. 205/6, by E. M. Borrenbergen, are good landscapes but printed in an entirely unsuitable colour. "Loaded," No. 207, by A. G. Lever, is a well considered dock study but lacking in strength. "The Granite Stairway," No. 210, by E. Tinker, is a striking composition, but the subject is presented too candidly.

A very fine group is furnished by G. F. Prior, Nos. 213 to 217, of which No. 213, "April Sunshine, Pump Court," is the best, with No. 217 following closely. Of six studio prints by Robert Chalmers, the best is the Greuze-like "Helen," No. 223. No. 227, "Lunch for Six," by Rev. J. V. Haswell, would be a suitable design for a nursery frieze, the sense of repetition being very pleasing. Nos. 278 and 282, by Lionel Wood, are of high merit, the latter, "Liliane Gilbert," receives an honourable mention. No. 233, "Evening, After the Storm," by Justin McCarthy, is a strong picture of good quality and composition. No. 239, by Louis J. Steele, lacks quality, and his three other prints, Nos. 236 to 238, are not notable. Basil Schon has a charming design in No. 245, "The Cedar Branch," and an old favourite in No. 244, "Midnight." No. 247, E. J. Mowlam, is an unhappy composition, and No. 248, "The Suspect," by the same worker, relies upon its title for

interest; however, it receives honourable mention. In No. 249, "Snow on the Upland," H. B. Bradley shows a print well worth close inspection; it is strikingly designed and well handled. No. 251, "The Bathing Pool," by S. Grimshaw, is of the Barbizon type, and very good. In No. 252 Herbert Felton gives us a very interesting picture, "Into the Light," in which curious reflections play a prominent part. Nos. 255 and 256, by Bertram Cox, are particularly luminous. No. 258, "Evening After Rain," being of fine quality. No. 259, "From Behind the Scenes," by R. Caudwell, is of the snapshot type, but is unusually happy; probably this subject has never been better done. C. R. Dixon, in No. 265, "Three Fishers Went Sailing," has a pleasing arrangement of values. No. 275, by Captain Ashbee, is a forceful presentation of the Taj-Mahal, and is good work. No. 286, "To the Station," by Gladys Openshaw, is an exceedingly clever picture made from very ordinary material. In No. 287, "A Farm Road, Anglesey," by Jas. Shaw, the open air feeling is good, but the composition is too central. No. 289, "The Sands of Pleasure," by the same worker, is a happy exercise in the nude, but not too well executed. In the group by F. G. Curson, No. 292, "Portrait of Matheson Lang," is easily the best, and, of course, owes a good deal to the sitter. In Nos. 297 to 299, Alex. Keighley displays his accustomed artistry and sense of romantic feeling. Of five powerful prints by Aage Remfeldt, Nos. 300 to 304, No. 300, "Miss Holm," is the best. Louis Fleckenstein's "Amazon," No. 306, is a beautiful work; but his two other prints in this section suffer from lack of concentration. No. 309, by Thos. A. Sheckell, is a good picture of the silhouette type; and No. 310, by the same worker, is extremely pleasing. No. 312 is a fine head study by Angus Basil. No. 314, "Sheep," by S. de Janieski, is notably sunny; while No. 315, "The Summer Time of Life," by A. H. Green, does not suggest summer time in the least. "The Dreamer," No. 316, by Arthur C. Miller, is good, but the two nude studies by the same worker are not at all convincing. "Outward Bound," No. 319, by Don Fitts, is highly imaginative. Nos. 322 to 324 are three fine prints by Sophie L. Lauffer, characterised by originality in outlook and quality in execution. Nos. 326 and 327, two portraits by Mrs. Whitaker, are good examples of her work. W. F. T. Pinkney's "My Lady of the Manor," No. 329, has an old-fashioned and sun-flecked charm. "Winter Landscape," No. 331, by E. Wragg, is simple and convincing. Six powerful portraits by N. E. Luboshez are grouped, Nos. 332 to 337, of which Drs. Kenneth Mees and Thurstan Holland are particularly well rendered. Two striking night photographs, Nos. 338 and 340, are by Wm. A. Alcock; No. 351, by the same worker, is rich in quality. In No. 342 the Rev. J. Oldham shows dexterity in handling. No. 344, "Silhouettes," by T. D. Ralli, is unconventional and quite successful. In No. 358, "A Winter Morning," the same worker reduces the incident to the minimum, but the print is thoroughly artistic. "Karsavina," No. 346, by Arthur C. Banfield, is a clever study. No. 357, "A Summer's Day," by John Chapman, is very sunny, but the figure is awkward. Six large transfers by C. Kendall, Nos. 361 to 366, are boldly handled. Nos. 364 and 366 are the most original, but No. 365, "Dockers," receives the plaque.

Colour bromoils and gum prints by Louis Fleckenstein, George Hickerley and J. West Lang make up a screen panel, Nos. 377 to 383.

The best of Fred Judge's colour transfers is No. 371, and is an extraordinarily beautiful piece of work. No. 372, perhaps, is too ambitious, and fails through lack of concentration. No. 375, a colour gum print, by Max Albert, is a well rendered head of an old man.

As a contrast to the modern work displayed on the walls, the work of D. O. Hill is shown on screens. Though, no doubt, wonderful work in its period, it undoubtedly suffers in the comparison. The originals of "Photograms of the Year" occupy considerable wall space, and though as a whole a fine collection there are serious lapses—chiefly in the foreign work.

AN IMPROVED BOX PRINTER.

The transition from print-out papers, dependent upon daylight, to the now almost universal development papers, exposed by artificial light, has carried us, naturally, from the old-fashioned pressure frame to the printing box. The writer has always been a great advocate of the more modern labour-saving contrivance; in fact, he believes he was the first to use a box-enclosed light with which the act of applying pressure automatically made the exposure. About 1903 he was using a great quantity of Velox paper, and he had made for him a box containing a Nernst lamp screened by a shutter of yellow fabric. In this early device the negative was laid on the glass top of the printing box, and the sensitive paper adjusted by the yellow light so obtained. Exposure was made by closing the hinged lid of the box, which simultaneously brought about contact between paper and negative and removed the yellow fabric shutter; exposure continued so long as the lid remained closed, whilst lifting the lid restored the yellow fabric shutter to its original position, thus terminating the exposure. It was very soon realised that with the quicker bromide paper an ordinary electric glow-lamp was quite adequate for exposure. The Nernst lamp, whilst giving a very strong white light, needed to be kept burning when once alight—hence the yellow shutter. The glow-lamp, on the contrary, could be switched on and off with ease; and so one did away with the yellow shutter, substituting a simple push-switch, which caused the lamp to glow by the pressure of the lid of the printing box.

This latter-mentioned device is the basis upon which all modern printing cabinets have been designed. Thinking the matter over carefully, it cannot be said that any great advance has since been made upon that principle. True, we have, additionally, strip-printer attachments, but these were the inevitable sequence once the idea of quick exposure and quick changing were mastered. Strip printers certainly make the printing box an even greater blessing than before; but they cannot be said to improve upon the principle of a box-enclosed illuminant actuated by the same operation which produces pressure contact. Actually, it is hard to see just where improvement could be made upon this idea, which combines speed with efficiency in so marked a degree.

Great as are the advantages of a box printer, still it has its drawbacks. It seems as if there were no powers of control over the exposure other than shortening or lengthening the period of contact. There are no means of locally intensifying or reducing the power of the light to overcome inequalities in opacity in various parts of the same negative, and this is a control that is at times very urgently needed. The limitation to altering the period of contact means that, whilst a thin negative may need only an exposure of 1 second, a very thick one may need a minute, or even more. Elaborate modern printing cabinets are now furnished with a battery of lamps for the purpose of reducing the exposure period when using slow-contact papers. With these there certainly is a power of local control over the light, but it is of a negative character; by removing one or more of the lamps from their sockets the thinner portions of a negative may be "kept back" because of the locally reduced light-action.

With these ideas in mind, it is suggested that a box printer

be constructed which, by altering the position of the single exposing lamp, will largely overcome both these difficulties.

Anyone who, like the writer, has to print from negatives from all sorts of sources, will welcome a means by which they may be reduced to a common level of exposure. It is the boast of one advertised strip printer that by means of it 1,000 prints per hour may be turned out. Now there are only 3,600 seconds in an hour, and if we calculate the time for shifting the strip from step to step as 5 seconds per strip (1 second between each exposure), and add 10 seconds for changing from one strip to another, we find that we have not much more than 1,000 seconds left for the actual exposures; it is evident, therefore, that to comply with the claims of the advertisement the negative and light in combination must be such as will require an exposure not exceeding a maximum of 1 second. The same lamp at the same distance would be fatal to speed with a thick negative and, with a thin negative, would be ungovernable, as it is almost impossible to calculate fractions of a second mentally, or to translate such mental calculations into deft movements of the hand. The suggestion here put forward is that a box be constructed so that a very powerful light may be used quite close enough to the printing bed to "get through" the thickest negative in 1 second, and which at the same time, by removing the source of light to the appropriate distance, will still allow a thin negative to receive the same actual period of contact (1 second) whilst the effective exposure is reduced to quite a small fraction. If we thus provide for our extreme negatives, it only remains to compute the intermediate distances for any negative lying within this range of opacities.

It is presumed that one second is the least period which can be mentally measured with ease and which at the same time does not impede speed; we therefore take it as our standard exposure. In computing the distances at which the lamp may be placed, we first of all have to consider how much at a time we should increase or decrease. A recent writer in this journal has suggested that an increase of 25 per cent. in exposure is the least that shows perceptible difference after development. Perhaps so; and yet it seems to the writer that with a somewhat smaller increase there is actually a slight increase in the depths of the shadows, even though there be no appreciable penetration in the high-lights. We propose, therefore, to consider an increase of about 20 per cent. To increase the period of exposure from 1 second to 1.2 seconds is not practicable, but to remove the lamp to the appropriate distance and still make a contact of 1 second presents no insuperable difficulty. The calculation is not so simple as seems at first sight. If we decrease the distance of the lamp by 20 per cent. we shall overstep our requirements, because the rule is that we must alter the distance in proportion to the square of the numbers, rather than in the proportion of the numbers themselves. The following table is worked out on the assumption that occasions will arise when, for special purposes (considered later), it will be useful to have the lamp so close to the negative as 2 in. The figures given in the table are not claimed to be mathematically correct, but it will be found that the table is so near to exactitude as to give all the necessary grades of differences in the resultant prints.

It will be seen from an examination of the table that an actual contact of 1 second at 2 in. distance will give an effective exposure equal to 128 seconds, as compared to an actual and effective exposure of 1 second at 23.5 in.; this range should provide for the varying opacities of most negatives. The writer's experience leads him to the conclusion that if the lamp used be a 100-c.p. half-watt lamp, then a contact of 1 second at 23.5 in. will meet the requirements of the thinnest negative that will give a print at all. An average portrait negative will probably be printed at about 11.3 in., resulting in an effective exposure of 4 seconds, whilst most landscape negatives will come within the range of distances 4 to 8 in., resulting in effective exposures of from 8 to 32 times our standard minimum.

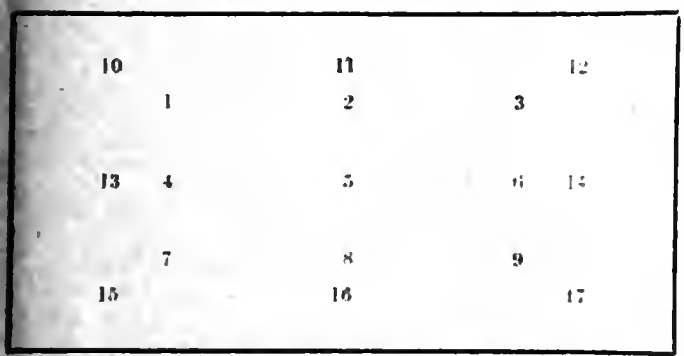
Distance of lamp from negative in inches.	Equivalent exposures in seconds.		
	100 c.p.	40 c.p.	16 c.p.
2.	128.	51.	23.
2.2	107.5	43.	19.4
2.4	90.	36.2	16.2
2.6	76.	30.4	13.6
2.8	64.	25.5	11.5
3.1	53.75	21.5	9.7
3.4	45.1	18.1	8.1
3.7	38.	15.2	6.8
4.	32.	12.75	5.75
4.4	26.9	10.75	4.75
4.8	22.6	9.	4.
5.2	19.	7.6	3 4
5.6	16.	6.4	2.8
6.2	13.4	5.4	2.4
6.7	11.3	4.5	2.
7.4	9.5	3.8	1.7
8.	8.	3.2	1.4
8.8	6.7	2.7	1.2
9.5	5.6	2.25	1.
10.4	4.75	1.9	—
11.3	4.	1.6	—
12.3	3.4	1.3	—
13.4	2.8	1.1	—
14.7	2.4	95	—
16.	2.	—	—
17.4	1.7	—	—
19.	1.4	—	—
20.75	1.2	—	—
23.5	1.	—	—

It is a not infrequent occurrence to find a negative which from varying causes is unevenly illuminated. It may be that some very bright object in the centre is surrounded by darker objects, *e.g.*, a street scene with a dense vista in the centre and heavy buildings close at hand on either side. Such a negative seems to cry aloud for some means of concentrating the light on the centre and at the same time lowering the efficiency of the light at the edges. Now it is a well-known fact that if a lamp be placed at any less distance than 4 in. from a half-plate negative the illumination is feebler at the edges than in the middle, and so we utilise what would otherwise be regarded as a faulty lighting system to remedy a defect in such a negative as this by bringing the lamp quite close to the plate, even so close as 2 in. in some cases. But such a negative will rarely, if ever, need so great an exposure as 128 times the minimum; we shall be compelled, therefore, to lower the power of the lamp. The substitution of a 40-c.p. lamp (metal filament) for our 100-c.p. half-watt will make the effective exposures equal to 51, 43, 36.2, 30.4, 25.5, and 21.5 times the standard minimum at the six nearest positions, whilst the further exchange to a 16-c.p. carbon filament lamp makes the effective exposures equal to 23, 19.4, 16.2, 13.6, 11.5, and 9.7 times respectively at the same six distances. An alternative method of reducing the power of the light is to place in series with the lamp a variable resistance, by which means the 100-c.p. lamp is used all the time, and the power of the illuminant is reduced in steps as more resistance is brought into circuit. This is the ideal method, because of the simplicity of working; it is much quicker and easier to move the handle of the resistance a place or two as required than to open the box and exchange lamps.

But the patches of excessive opacity do not always occur in the centre of the plate—a street scene frequently has one side of the street in sunlight and the other in shadow, or overhanging trees may shade one side, in which case it becomes necessary to move the lamp to a fresh holder opposite the thicker side of the negative; a distant view with near foreground, or a plate with good clouds which will not "print up" will always be improved by removing the lamp to a fresh holder which is even beyond the edge of the negative, but still opposite the more opaque portion of it. Many road scenes taken in mid-summer give negatives in which the roadway is

abnormally dense, printing almost white, and rendering it practically impossible for a title to show against it: for such a plate the exact reverse proceeding to that adopted with the distant view is indicated.

With a lamp-holding board such as is shown in the diagram it is judged from actual commercial experience that every type of negative can be made the most of. Position 5, of course, represents the normal position for the lamp for normal negatives; positions 1, 2, 3, 4, 6, 7, 8 and 9 will then represent the relative positions for lampholders used when printing



with a lamp at either of the first three distances (2, 2.2, or 2.4 inches) in order to alter the illumination locally; and positions 10 to 17 represent the suggested relative positions when it is used at either of the next three distances (2.6, 2.8, or 3.1 inches). When printing postcards, the rectangle 1-3-7-9 is conveniently made about 7 x 5 inches, and the rectangle 10-12-15-17 can be 9 x 7 inches. The wiring for so many lampholders presents no real difficulties, although involving a little bit of labour. The respective sockets are wired in parallel, not in series; a convenient length of the flex or workshop cable is bared down to the wires, and a connection is made from the positive cable to one side of each socket, followed by a similar procedure with the negative cable to the other side of each socket; the two cables are then insulated from each other and strongly bound up with insulating tape. An alternative method is to have marked out positions 1 to 17 on the board that carries the lamp, which is then used always in the same lampholder but moved to the desired position before exposing.

It now remains to make an arrangement by which the different distances can be readily adjusted. If the lamp-holding board is regarded as a shelf with a sufficient play of flex it would be possible to arrange cleats on the inner walls of the printing box at those suitable distances which would bring the nearest portion of the glowing wire of the lamp to the required distances from the negative. This is scarcely practicable, however, unless the shelf is very thin indeed, because at the nearest distances the steps are but one-fifth of an inch apart. A better arrangement is the pulley and counterpoise method, which will allow of movement through quite small fractions of an inch; a tell-tale needle attached to one of the pulley ropes will at all times register against a carefully marked out scale placed within vision somewhere on the printing bench.

It is hoped that these suggestions, all of which are the result of commercial practice, may tend to enhance the utility of the bromide printing box. W. E. A. Drinkwater.

DEATH OF DR. E. J. SPITTA.

We regret to see the announcement of the death, at the age of 68, of Dr. E. J. Spitta, a former president of the Royal Microscopical Society and of the Quekett Club. Dr. Spitta, who at one time practised as a doctor, had made his home for many years at Hove, and had largely interested himself in local scientific and archæological pursuits. He was the author of several publications, but will perhaps be chiefly commemorated by his comprehensive works on the microscope and on photo micrography

NORTHERN PHOTOGRAPHIC EXHIBITION.

The following are the lectures to be given at 8 o'clock p.m. at the Walker Art Gallery, Liverpool, during the remaining period of the exhibition:—

January 28. "In Pursuit of a Shadow in the Tonga Islands," by the Rev. A. L. Cortie, S.J., F.R.A.S., F.Inst.P., Director of Stonyhurst College Observatory.

January 29. "The Natural History of Central Africa, with special reference to the Tsetse Flies and Sleeping Sickness," by Prof. Robert Newstead, F.R.S., etc.

January 31. "An Evening in Lakeland," being a reading of Wordsworth's "An Evening Walk," by Alexander Keighley, F.R.P.S.

February 1. "Wild Life in the Treetops," by Capt. C. W. R. Knight, M.C., F.R.P.S.

February 2. "The Open Road," by C. W. Budden, M.D.

February 3. "The Malay Archipelago," by Somers H. Ellis, M.I.C.E., F.R.G.S.

February 4. "Twixt Alp and Apennine," by J. Dudley Johnston.

February 5. "The Charm of the Hills," by W. W. F. Pullen, H.M.I.

FORTHCOMING EXHIBITIONS.

January 22 to February 5.—Northern Photographic Exhibition, Walker Art Gallery, Liverpool. Particulars from the Hon. Secretary, Liverpool Amateur Photographic Association, 9, Eberle Street, Liverpool.

January 27 to 29.—Birmingham Photographic Society. Particulars from the Hon. Secretary, Philip Docker, Birmingham Medical Institute, Edmund Street, Birmingham.

February 14 and 19.—Leicester and Leicestershire Photographic Society. Latest date for entries, February 5. Particulars from the Hon. Secretary, W. Bailey, Cank Street, Leicester.

February 19 to March 5.—Edinburgh Photographic Society. Latest date for entries February 10. Particulars from the Hon. Secretary, G. Massie, 10, Hart Street, Edinburgh.

February 19 to March 12.—Scottish Salon, Dundee. Latest date for entries, January 31. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

March 16 to 19.—Hackney Photographic Society. Latest date for entries, March 1. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

Manchester Amateur Photographic Society.—The annual report for the year 1920 shows the full series of weekly meetings maintained almost without intermission throughout the year. The Society has now 430 members, a net increase of 46 during the year. It is a sign of the great changes taking place in the membership of photographic societies that only this increase was obtained, although 110 new members were elected during the period. With the raising of the subscription from 7s. 6d. to £1 1s. the Society hopes to retain its increased membership by providing greater facilities than it has hitherto done, despite the much greater cost of almost every item of its expenditure.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, January 10 to 15 :

COLOUR PHOTOGRAPHY.—No. 1,879. Three-colour photography. S. M. Procoudine-Gorsky.

COLOUR PRINTS. No. 1,533. Multicolour prints secure against photographic imitation. C. W. Lacher.

STEREOSCOPY No. 1,482. Imparting stereoscopic effect to photographic prints and positives. F. G. and J. L. McKim and H. Newbold.

CINEMATOGRAPHY.—No. 1,150. Cinematograph projection. E. Belin.

CINEMATOGRAPH-PHONOGRAPH.—Nos. 1,360 and 1,361. Apparatus for synchronous recording and reproduction of optical acoustic operations for cinematography. J. Engl, J. Masolle, and H. Vogt.

CINEMATOGRAPH-PHONOGRAPH.—No. 1,363. Arrangement for distortion, free intensification of sounds, etc., for acoustic cinematography. J. Engl, J. Masolle, and H. Vogt.

CINEMATOGRAPH-PHONOGRAPH.—Nos. 1,367 and 1,370. Production of photo-phonograms for acoustic cinematography. J. Engl, J. Masolle, and H. Vogt.

RECORDING SOUND WAVES.—No 1,372. Arrangement for recording sound waves for optional acoustical operations. J. Engl, J. Masolle, and H. Vogt.

RECORDING SOUND WAVES.—No. 1,373. Means for recording sound waves by light rays. J. Engl, J. Masolle, and H. Vogt.

PHONO-CINEMATOGRAPHY.—No. 1,398. Apparatus for transmission and reproduction of sound vibrations for phono-cinematography, etc. J. Engl, J. Masolle, and H. Vogt

CINEMATOGRAPHY.—No. 1,476. Cinematographs. J. Engl, J. Masolle, and H. Vogt.

CINEMATOGRAPHY.—No. 2,173. Cinematograph appartus. R. Goldschmied, A. Schey, and L. Zupnik.

POCKET CINEMATOGRAPH.—No. 2,173. Pocket cinematographs. R. Goldschmied, A. Schey, and L. Zupnik.

CINEMATOGRAPHY.—No. 2,062. Shutter for cinematograph projectors. W. E. Lewis.

MOTION STEREOSCOPY.—No. 1,541. Stereotopometric apparatus. J. Predhumeau

CINEMATOGRAPH-PHONOGRAPH.—No. 1,904. Process for recording and reproducing optical images and sound vibrations simultaneously. E. Reisz.

CINEMATOGRAPHY.—No. 572. Cinematograph films. H. Rieger.

CINEMATOGRAPHY.—No. 1,905. Cinematographic apparatus. R. Rigby.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

VERTICAL ENLARGING AND COPYING APPARATUS.—No. 135,484 (November 15, 1918). The apparatus consists of a vertical stand (figs. 1 and 2) with horizontal base 2, on which is placed the printing apparatus and above this the camera. The stand consists of two upright posts 1, 1. Parallel with the posts 1, a rack rod 3 with teeth 4 co-operating with a pawl 5—which may be springy—is provided on the frame 6, which is displacable on the stand in a vertical direction. The frame can thereby be held fast at any height desired above the base 2, and, by a ribbon 8, the length of which by means of a tightening apparatus 9 is adjustable, it is possible that the frame, after having been lowered, can be raised again to exactly the same height.

The frame 6 encloses a glass plate 11 and a hinged back, which forms a lid that may be in two parts, its weight keeping in position the sensitive paper which is placed on the glass plate; the lower side of the lid may be covered with white cardboard or the like in order to serve as focussing plate.

The printing and enlarging apparatus consists of a box 13 enclosing a source of light 12, with reflecting mirrors 14, and of an extension frame or insertion 16 placed on the box and on the former a camera 25 with lens 29.

In the box 13, besides the ordinary incandescent lamps, a red lamp 15 can be fitted in the current circuit in such way that by the same switch the red light can be switched off and the white lamps switched on, the red lamp being used when placing the sensitive paper.

One or more of the plates 17, 18 and 19 can be a ground-glass or an opal-glass, in order to diffuse the light and secure a uniform lighting of the negative. For contact printing, the negative is placed on a plate glass 39 in the upper part 16, and for enlargements normally in the same place. The insertion 16 contains another glass plate 20, resting

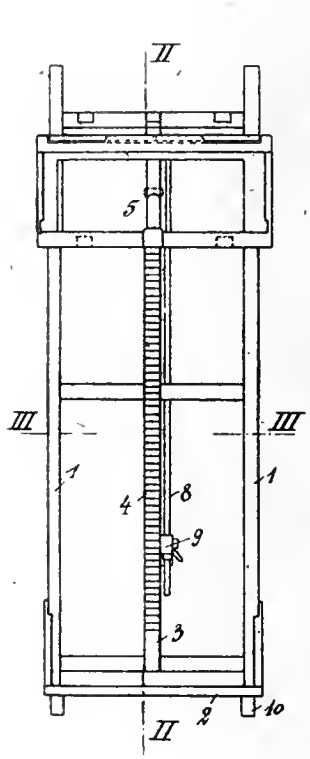


Fig. 1.

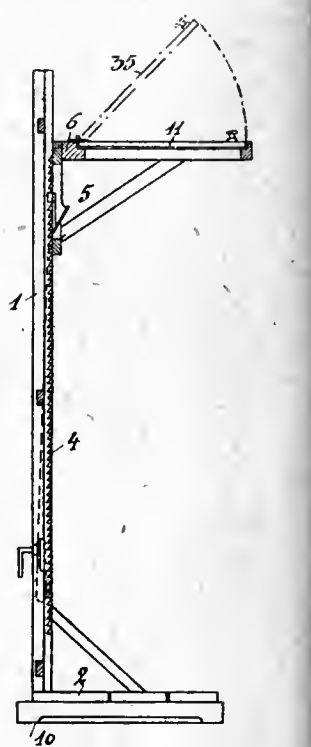


Fig. 2.

on two pairs of crank arms 22 and 23, connected by a couple of parallel slides 21, the pair 23 revolving on a common shaft 24 with finger grip and clamping-screws 40 so that the plate 20 can be raised and lowered and secured to the height desired. This glass plate, as well as the adjustment of it, serve the object, in contact printing as well as in enlarging, of enabling a vignette to be placed on the plate at a greater or smaller distance from the negative, so that the vignetting becomes softer or sharper respectively.

On the top of the insertion 16 the camera is placed, consisting of a frame 25, which is joined by a hinge at the top to a top plate 26 having a hole 27. On the plate 26 the lens board 28 is placed, so that it can be easily adjusted laterally in either direction. Its displacement is confined by a frame beading 41 along the edges of the plate 26.

In order to adjust the lens 29 vertically, the plate 26 is connected with the sides of the frame 25 by long wooden or metallic lists 30 hinged together, and by a folded cloth or bellows 31.

The adjustment is made by a screw spindle 32 with handle 33. When the spindle is turned one way or the other, the plate 26 will either be raised or lowered, and on account of the long

guiding lists 30, the movement of the plate will always be parallel with itself.

The apparatus acts as follows :—

When doing ordinary printing work the camera 25 with fittings is removed, and the negative is placed on the glass plate 39; if the picture is desired to be vignetted, the vignette is placed on the plate 20, which is adjusted to the height desired. Thereupon, while the red lamp is alight the sensitive paper is placed on the negative, a double-hinged lid 42 hinged to the insertion 16—which lid on the fig. 5 is shown turned aside—is

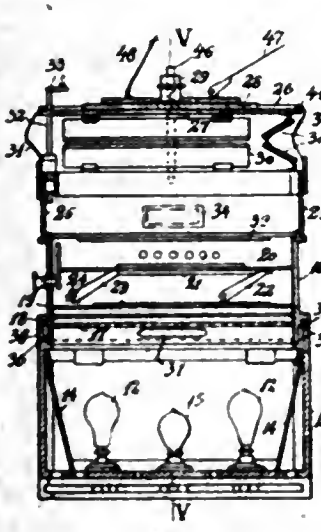


Fig. 4.

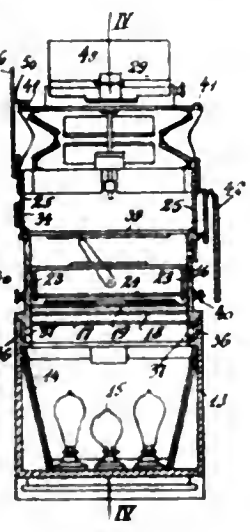


Fig. 5.

shut down and pressed against the paper during a suitable period of time, white light being switched on in the light-box 13. The paper is then removed and developed.

When negatives are enlarged or reduced, the whole apparatus is used, the printing apparatus, the lid 42 of which is turned aside, being placed on the base 2.

The negative is placed on the plate 39, the white light is turned on in the light-box 13, and the height of the frame 6 above the apparatus is determined according to the size desired of the positive. Thereupon the lens is adjusted by means of the handle 33, until the picture stands out sharply on the white cardboard in the frame 6, and the lens panel 28 is adjusted, until the picture is seen to be in its proper place in the frame.

The focussing of the picture from any desired part of the negative can also be obtained by displacing the whole apparatus laterally.

When the picture is finally focussed, the band or ribbon 8 is introduced in the tightening apparatus 9, tightened and secured. Then the pawl 5 is loosened, the frame 6 is lowered to table level, the lids 35 are opened and the sensitive paper intro-

Fig. 3.

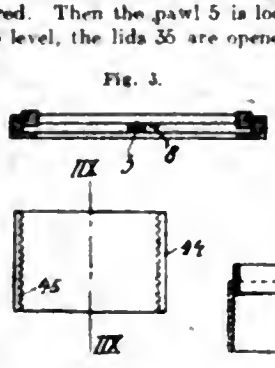


Fig. 7.

Fig. 8.

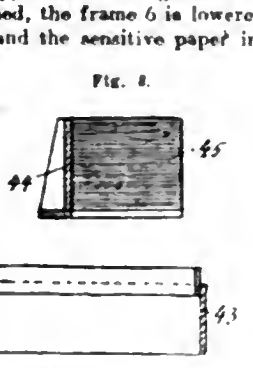


Fig. 6.

duced, the light being red. The lids 35 are shut down, and the frame 6 is raised, until it stops by the band 8 being tightened, the pawl is then in the same tooth as previously, and the frame 6 in the same height as after the focussing. The exposure is now made by turning on the white light, which is again changed to red light, the frame 6 lowered, and the paper removed and developed.

In order to be able to enlarge from large negatives it is often necessary to use longer focal lengths than usual, and a larger total extension is then required. This is obtained by inserting an insertion frame 43 of suitable height (fig. 6) between the insertion 16 and the frame 25. This extension can also be obtained by placing a frame between the plate 26 and the lens panel 28.

Reductions are made in the same manner as enlargements, with the exception that the distance from the negative to the lens must be greater than the distance from the latter to the paper, and that the position of the frame 6, after the focussing, will often be so low that it will be unnecessary to move this in order to insert the paper.

If the picture is desired to be vignetted, this can be done in two ways. Either the negative is placed on the plate 39, and the vignette below it on the plate 20, or the negative is placed on one of these two plates, and the three-sided box 44, shown in fig. 8, is placed on the same glass with the vignette inserted in one of the notches 45, so that the vignette is at a proper height above the negative. In the former case, the finished positive will show a weak tone outside the vignetted picture; in the latter case the positive will be quite white outside the vignetting.—Jens Peter Hansen, 10, Jacobys Alle, Copenhagen, V.

X-Ray Tubes.—No. 155,345. (September 10, 1919.) The invention consists of an X-ray tube capable of substantially silent operation, that is, without the hissing and crackling noises which accompanied the operation of X-ray tubes as formerly constructed.

It has been found that when the thickness of the glass wall of an X-ray tube is materially increased that the crackling noises are substantially eliminated.

It has been customary to make X-ray tubes about 0.02 inch in thickness, that is, as thin as permissible without collapse of the bulb under the influence of the external atmospheric pressure. In accordance with the invention, the walls of the entire tube, or at least the part of the tube directly surrounding the cathode and the anode head, are made of glass, having a thickness greater than about ¼ inch, and preferably a thickness of about ½ inch. Preferably the tube consists in part of lead glass, and is provided with a thin window consisting of material transparent to X rays, such as lime glass.—The British Thomson-Houston Co., Ltd. 83, Cannon Street, London, E.C.4, for the General Electric Co., Schenectady, New York, U.S.A.

The following complete specifications are open to public inspection before acceptance :—

Packing Plates.—No. 156,564. Lightproof packing for photographic plates. M. Lesjak.

Cinematography.—No. 156,575. Focussing-apparatus for cinematographs. Etablissements Continsouza (Soc. Anon.).

Projection Apparatus.—No. 156,515. Automatically focussing projection apparatus. Kodak, Ltd.

X ray Apparatus.—Nos. 156,554 and 156,678 Rontgen-ray apparatus. Reiniger, Gebbert, and Schall Akt. Ges.

Colour Cinematography.—No. 156,612. Method of producing coloured motion-pictures. A. T. Saunders.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Chat tone Series (Design).—No. 409,389. Pictorial postcards, photographs and drawings. Frederick James Saxton Chatterton, 34, Elm Park Road, Finchley, London, N.3., artist and journalist. November 3, 1920.

New Materials.

Imperial Impex X-ray Plates. Made by the Imperial Dry Plate Co., Ltd., Cricklewood, London, N.W.2.

THESE new plates mark a most important development in X-ray technique. They are the outcome of the practice which has gained ground during the last few years of employing an "intensifying" screen, usually of calcium tungstate, for shortening exposures in X-ray work. The intensifying screen, however, is not without its drawbacks, notably in the matter of definition, and when all is said and done the employment of such a screen reduces the normal exposure to, say, one-third or one-fifth. It has remained for the Imperial Company to cut at the root of this question by applying the material of the intensifying screen as an additional coating upon the emulsion film itself. By so doing it is found that, owing to the optical contact between the two surfaces, the action of the screen is very greatly enhanced so far as shortening of exposure is concerned, and at the same time the definition is comparable with that obtained on a plate employed without an intensifying screen. These are great advantages to radiographers, who, like photographers, can never have exposures too short, and will surely eagerly embrace a new method which places such great powers in this direction in their hands without corresponding disadvantages.

Thus by the introduction of the Impex plate the radiographer is placed in the position of giving 1-20th or 1-25th of the exposure which he would give to an ordinary X-ray plate used without a screen. It if is objected that the comparison between a screen-coated emulsion and one not so provided is scarcely a fair one, still, even when allowance is made for the intensifying action of a separate screen, there remains a large balance—a shortening of exposure of one-fifth to one-seventh—in favour of the new plate. On the other side of the account there is only the one additional operation in the manipulation of the plates after exposure, that is to say, the removal of the tungstate coating in warm water. The film of the Impex plate is specially hardened so that the plates can be soaked, before development, in water at about 100 deg. F. The tungstate coating is rendered soluble by this treatment, and after two or three minutes can be rinsed off under the tap. The hardened nature of the emulsion film facilitates the rapid drying of the negatives, itself a point of practical advantage in the circumstances in which the work of many radiographers is done

A practical test which we recently had the opportunity of seeing carried out was quite enough to prove to us the very remarkable properties of the new screen-coated plate. Two exposures were made in rapid succession, one of 20 seconds on an ordinary X-ray plate, which we had procured as the most rapid obtainable, and the other on the Impex plate of one second. On development the two negatives were, for practical purposes, identical, and in handling the plates we had the opportunity of observing the readiness with which the tungstate coating is removed before development.

Although the increased power of X-ray tubes and their electrical appurtenances has done a great deal to shorten exposures, the radiographer, like the immortal Oliver Twist, still asks for more, and it is doubtful whether the electricians for a long time will be able to provide him with the means of reducing exposure to such a degree as is afforded by the new plate. The demand for still greater speed is made not so much in respect to reducing exposures for thick parts of the body (already exposures have been got down to quite short periods), but in allowing of a much greater distance of the tube, and thus obtaining radiograms which are of a higher order of excellence in their rendering of bone and tissue structure. Moreover, in some of the scientific applications of X-rays exposures now run to as great a length as 24 hours: it is hardly necessary to say what an immensely wider field is opened by reducing them to one hour. Photographers will, therefore, look with envy upon these great improvements for the radiographer, and may perhaps be inclined to wonder whether a process of somewhat similar kind may not be devised to confer similar benefits, as regards sensitiveness, for ordinary photography. That, however, is another matter: it is sufficient to congratulate radiographers and the Imperial Dry Plate Company upon this very great advance in X-ray technique.

GUILLEMINOT PLATES.—The English representative, M. Jules de Gottal, 17, Cecil Mansions, Marius Road, London, S.W.17, of the old-established French firm of R. Guilleminot Boespflug and Co., kindly sends us some sample packets of the firm's dry-plates, the three chief varieties of which are the "Studio-Brom," "Radio-Eclair," and the "Radio-Brom," all plates of good rapidity, but the first-named, the most rapid of the series, and specially recommended for studio portraiture. These plates, we find, yield negatives of very good gradation and freedom from veil, and are evidently the production of a manufacturer of long experience in dry-plate emulsion making. They are issued in the English sizes from $2\frac{1}{2} \times 2\frac{1}{2}$ inches to 20 × 16, and in certain of the sizes above $3\frac{1}{2} \times 2\frac{1}{2}$ inches are obtainable in half-dozen as well as in dozen boxes. A catalogue, obtainable from M. de Gottal at the above address gives further particulars of them and of the orthochromatic variety which is also obtainable.

New Books.

Bromoil and Oil Prints. Edited by James A. Sinclair, F.R.P.S. London: James A. Sinclair and Co., Ltd. 2s. net.

THIS is the sixth edition of the compendium of papers by different writers on variations of oil pigment printing with which they have been respectively concerned. Mr. Sinclair provides the general introduction to the technique of the Bromoil process, a further chapter on which, by the late C. H. Hewitt, deals very exhaustively with the successive stages of bleaching and pigmenting. This paper was revised by Mr. Hewitt shortly before his death in 1918. It is further supplemented by Mr. F. T. Usher, one of our most expert professional exponents of Bromoil, who writes particularly on the treatment of Bromoil portraits. Mr. Fred Judge, in an article on Bromoil transfer, is explicit on technical matters, and those who have seen his enchantingly beautiful work will respect everything that he has to say. The technique of Bromoil is rounded off by a series of notes on pigmenting in colour by J. L. Tucker. The oil process is treated by M. Robert Demachy, and by Mr. Sinclair, who appends a few hints to the very clear exposition of M. Demachy. These series of chapters thus form a comprehensive miscellany of instruction in oil-pigment printing; there is, in fact, no better book to which the student of these methods can go for guidance.

THE 1921 RED BOOK.—The familiar pocket manual issued by the Affiliation of Photographic Societies has made its prompt appearance for the present year under the editorship of Mr. George Hawkings. It contains the by-laws of the Affiliation, lists of available lectures and lecturers, and a directory of affiliated societies. A feature which has been revived is a list of the places where photography is allowed only under permit, with particulars of the authorities or officers to whom application must be made, and in some cases the charges which are required. The list, of course, is a very partial one. It can only be made reasonably complete by the help of photographers public spirited enough to ferret out and send for publication particulars of these kinds of places in their own districts. It is their failure to do so which perhaps is the cause of Mr. Hawkings's lament in the preface of a lack of co-operation. If only secretaries of affiliated societies throughout the country knew this debonair youth, and his herculean work for the Affiliation, we are sure they would not hold aloof, but would contribute to a sprightlier carriage of the inevitable orchid, and an even more seraphic smile of its wearer. Mr. Wastell contributes some "Odds and Ends" to the Red Book—intricate data on exposure with diverse light-sources, postal information and notes of a practical kind. The relevance of one of these altogether escapes us. Says Mr. Wastell: "Keep hypo as a stock solution; do not dissolve it before it is required." If we are to keep hypo as a stock solution, it seems to us best to dissolve it previously, in view of the well-known drawbacks of dissolving it afterwards. In the humble desire to put the advice in o practice, the only alternative we can imagine

is to dissolve it at the very instant of use, a feat of which perhaps Mr. Wastell is capable, but in regard to which we mistrust our own dexterity.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, JANUARY 31.

Bradford Phot. Soc. "Intensification and Reduction." A. S. Dean.
Cleveland C.C. "Oil and Bromoil." G. E. H. Rawlins.
Dewsbury Photographic Society. Y.P.U. Shield Portfolio.
South London Photographic Society. "Practical Pinhole Photography for Ordinary and Stereoscopic Work." B. J. Rose.
Walthamstow and Dist. Phot. Soc. "Control." W. H. Reece.
Willesden Photographic Society. Lecturettes by the Members.

TUESDAY, FEBRUARY 1.

Royal Photographic Society. "The Cinematograph Camera—Various Models and General Description." P. King.
Bournemouth Camera Club. Print Competition.
Exeter Camera Club. "Pictorial Studies." A. W. Walburn.
Hackney Phot. Soc. Competition. "Landscape" (prints and slides).
Leeds Phot. Soc. "Photography at the Zoo." J. Manby.
Manchester Amateur Phot. Soc. "Factorial Development as Applied to Bromide Prints." Dr. B. T. J. Glover.
Portsmouth C.C. Paget Prize Colour Slides. Paget Plate Co.
Rotherham Photographic Society. "Bird Life Round Loch in Southern Scotland." R. Chislett.
Sheffield Photographic Society. "The Broad Highway—Ups and Downs of Caravanning." T. G. Askew.
Stalybridge Phot. Soc. "Bromide Enlarging." J. Taylor.
Walthamstow and Dist. Phot. Soc. Members' Lantern Evening.
Woodford Phot. Soc. "After-Treatment of Negatives." A. Dordan-Pyke.

WEDNESDAY, FEBRUARY 2.

Accrington Camera Club. "Lantern Slide Making." T. Wood.
Borough Polytechnic Phot. Soc. "How and Why I Make My Pictures." H. Felton.
Croydon Camera Club. "Pictorial Lantern-slide Making—including Double Printing." Bertram C. Wickison, F.R.P.S.
Dennistoun Amateur Photographic Association. Lecturette: Garelock Outing. J. J. Reid.
Edinburgh Photographic Society. "The Camera in Research Work." A. Eddington.
Ilford Photographic Society. "Transferrotype." W. F. Slater.
Leicester Phot. Soc. Exhibition by Messrs. Ward, Croydon, and Bailey.
Partick Camera Club. Lecturettes. C. McKenna and R. Park.
Rochdale Phot. Soc. "Bromoil Process." F. Greenwood.

THURSDAY, FEBRUARY 3.

Birmingham Photographic Society. Bromide Enlarging.
Brighouse Photographic Society. Annual meeting.
Camera Club, The. "Telephoto Lenses." L. B. Booth, M.A.
Dundee and East of Scotland Phot. Soc. "Cinematography." C. F. Partoon.
Everton and District Phot. Soc. "Reduction." G. J. Drysdale.
Gateshead and District Camera Club. "With Allenby Through Palestine with a Watch Pocket Carbine."
Hammersmith (Hampshire House) Photographic Society. "Stick and Leaf Insects." Dr. G. H. Rodman, M.D.
Hull Phot. Soc. "Psychic Photography." W. G. Mitchell.
North Middlesex Phot. Soc. Competition Prints and Slides. Members' Queries.

FRIDAY, FEBRUARY 4.

Bedford Camera Club. "Pictorial Photography in Great Cities."
Birmingham Phot. Art Club. "Autochromes." Mr. Partridge.

ROYAL PHOTOGRAPHIC SOCIETY

Meeting held Tuesday, January 25, the President, D. C. H. Rodman, in the chair.

Mrs. F. May Dickinson Berry delivered a lantern lecture on "Serbia and Jugo-Slavia before the War and After," in which she gave an interesting account of her experiences in these countries of the Balkan Peninsula. Her discourse provided many vivid sidelights upon the condition of the countries during the war, and she had some interesting things to say on the new conditions which have been created by the Treaty of Peace. On the proposition of the Chairman a very hearty vote of thanks was accorded to the lecturer.

CROYDON CAMERA CLUB.

According to the syllabus, Mr. H. P. C. Harpur was down for last week to do "Something Different," a title which did not arouse any particular curiosity, as it is not unusual for him to do something different from the rest of the world. Whether he, or it, is to be congratulated on this fact naturally depends upon the point of view.

The evening resolved itself into a gramophone recital, the hospitable demonstrator insisted that all should partake of choice refreshments supplied and brought by him. Whilst not essential to an appreciation of the concert, yet they undoubtedly helped by establishing that atmosphere of content which ever accompanies the acquirement of free drinks. As a precedent it is not to be followed, but Harpur is "Special" (ex-sergeant).

It soon became evident that he is a most enthusiastic admirer of gramophone records, and they form a large part of his life, including presumably the lives of his neighbours, who may be, or may not be, equally keen. Anyway, they have got to have it. Rumour even whispers that one-half of his waking hours is devoted to the instrument, the other half to pictorial photography, and the remainder to a strict attention to business.

Two superb instruments, richly upholstered and decorated, were operated in turn, one being made by the demonstrator. This, he said, cost him nearly £8 for materials, *plus* 500 hours' work at, say, "a bob an hour," not an extravgant estimate of the value of his spare time.

The principle of the gramophone and practical working details were clearly explained, and also some novel sound-boxes designed and made by him. One diaphragm was fashioned out of mica, on which Chinese pictures on thin paper were cemented. The Celestial tone was very apparent. Another diaphragm, constructed of cork taken from an old top-hat, also reproduced in highly correct fashion. Such excerpts as "Coronation Bells" and "Silver Trumpets" illustrated that Mr. Harpur's musical taste is not stifled by the classics; indeed, he honestly expressed a preference for brass bands.

It having transpired incidentally that he had ordered his motor to arrive at midnight, at half-time the heartiest vote of thanks was accorded him for a really enjoyable and mellow evening. Musical honours followed, Mr. Cavendish Morton's voice rising majestically above the general din. At half-past eleven, when the reporter left, Mr. Harpur, the gramophones, and a select audience were still enjoying themselves. Unfortunately the proceedings were marred by a Jazz record causing the premature death of the caretaker's cat, who, the secretary announced, had expired in agony.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held at 35, Russell Square, W.C., on Friday, January 14, 1921. Present: Messrs. Marcus Adams, V. B. Basil, Alex. Corbett, C. F. Dickinson, Alfred Ellis, W. E. Gray, R. Hanos, G. Hana, H. St. George, R. N. Speaight, F. G. Wakefield, and Lang Sims, secretary (London members), and Frank Brown (Leicester), W. Illingworth (Northampton), H. Lambert (Bath), A. Swan Watson (Edinburgh), W. H. Wedlake (Forest Gate), Hallsworth Wheeler (Folkestone), T. Chidley (Chester), and Theodore Chase (Bromley). Letters of apology for non-attendance were read from Messrs. Chapman, Fry, and Read.

The minutes of the last meeting were read and confirmed.

Mr. Frank Brown reported that he and the Secretary had visited the firm of trade enlargers whose methods had been called in question at the last meeting, and that the views of the Council had been placed before the management. They had been assured by the management of the firm that their sympathies were with professional photographers, that the terms quoted by the firm for the enlargements in question were not as cheap as those quoted by some other trade houses, and that they did no great volume of business for amateurs, that the principal business was with big commercial firms, such as engineers, who employed a photographer on their own staff, and whose negatives, of course, were their own property. The firm was prepared to consider sympathetically any proposition for the advantage of professional photographers provided its competitors came into line.

The Secretary bore out Mr. Brown's account of the interview, and said that the whole crux of the question was that the firm did its main business with commercial houses.

The Chairman suggested that a small committee of those most interested in this subject shou'd be appointed to discuss the matter further and report whether a better discount could not be obtained for professional photographers as distinct from the general public.

It was agreed that the following should form this committee :—Messrs. Wakefield (convener), Gray, Haines, and St. George.

The Secretary said that in a bound volume containing numbers of the Handbook, No. 1 of the Handbook was missing. If anyone possessed that number and would hand it to him it would be of considerable value for completing the record.

The report of the Finance Committee, recommending that accounts amounting to £18 be paid, was adopted.

Mr. Speaight, as chairman of the Congress Committee, reported the provisional arrangements for the Congress. Invitations for outings had been received from three trade houses. It was recommended that one of these should be accepted. The Committee considered that members were principally concerned about receiving the latest instruction rather than a series of hospitalities; that was the reason they felt that only one trade outing would be accepted this year. There would also be an outing to the Houses of Parliament, and possibly to a firm of cinematograph-picture producers, the arrangements for which were in the hands of Mr. Marcus Adams. Lectures were promised from Mr. Luboshez, Mr. H. W. Bennett, and Madame Yvonne, possibly also an eminent photographer from abroad might lecture.

Mr. Frank Brown commended the Congress Committee on the exceedingly good work it had done.

It was proposed from the chair that the invitation from Messrs. Kodak, Limited, to visit their works during Congress week should be accepted, and this was agreed to.

The Committee considered that the installation of the new president, which had usually taken place at the close of the Friday's proceedings, had not always had the attention which was its due. It had been decided, therefore, that the Congress dinner should take place on the Friday night instead of on the Thursday night, and the formal introduction of the new president take place subsequent to the dinner, thereby ensuring it a proper place in the Congress proceedings. The arrangements for the exhibition were proceeding, and it was hoped to arrange a technical side, for which purpose Mr. Corbett had kindly consented to act on the Committee.

Mr. Speaight, as chairman of the Copyright Committee, said that he had reported at the last meeting that the representatives of the illustrated weekly newspapers, periodicals, and magazines, had been met by the Committee, and the fees for reproduction as already given in the minutes and printed on the special cards were agreed to. Since then it had been learned that one large publishing house would not fall into line. On December 30 a further meeting took place, and some pressure was brought to bear upon his Committee to alter its decision. He had replied as spokesman for the Committee that he had no authority from his Council to go back upon what had already been decided. Moreover, the journals generally were already paying on the higher scale laid down.

Mr. Illingworth and other members stated that they were securing from various periodicals the fees for reproduction as set out in the new scale.

Mr. Corbett suggested that the Secretary should be instructed to send a note to all those photographers who had signed the undertaking, telling them to continue to charge the fees as agreed.

Mr. St. George proposed, and Mr. Haines seconded, that the Copyright Committee be given full power to instruct the Secretary as to the form of communication to be sent to the signatories, and this was agreed to.

In accordance with Rule XII. nominations (in writing) for president were called for. The only nomination received was from Mr. Speaight, who nominated Mr. A. Swan Watson, of Edinburgh as president for 1921-2. Mr. Speaight said that he was sure this proposition would be unanimously agreed to.

Mr. Adams seconded, saying that Mr. Watson's presidency would form an additional link between the Edinburgh branch and the Council in London.

The nomination was agreed to unanimously and with applause.

Mr. Watson accepted the nomination, while confessing his feeling of unworthiness for the position. He would do his best, and he thanked them for the honour done him.

Mr. Frank Brown offered his congratulations to Mr. Watson, and said that he was looking forward to a very successful Congress.

The nominations for the new Council was agreed as follows :—

President A. Swan Watson.

Past President : Frank Brown.

Treasurer : Richard N. Speaight.

London.	*Country.*
Adams, Marcus.	Chaplin, W. B. (Windsor).
Basil, A. B.	Chapman, A. H. Ll. (Swansea).
Bennett, Arthur.	Chase, Gordon (Bromley).
Corbett, Alexander.	Chidley, R. (Chester).
Dickinson, C. F	Fry, S. H.
Ellis, Alfred.	Illingworth, W. (Northampton).
Gray, W. E., F.R.P.S.	Lambert, Herbert (Bath).
Haines, Reginald	Read, F. (Southport).
Hana, George.	Spink, H. C. (Brighton).
St. George, H. A.	Turner, T. C. (Hull).
Speaight, Richard N.	Wedlake, W. H. O. (Forest Gate).
Wakefield, F. G.	Wheeler, Halksworth (Folkestone).

The following new members were accepted :—Fred Hardie (Aberdeen), A. V. Eckersley (Chatham), C. M. Lee (Kuching, Sarawak).

The Secretary read a letter from Messrs. Bassano relating to the cost of electric light for studio work, and suggesting combined action to secure preferential rates.

Several members of the Council said that they got power rate.

Mr. Corbett thought that if some proposition were put forward to the Electric Lighting Committee of the Westminster City Council there would be no difficulty in getting power rates generally. He suggested that a letter be signed by the photographers of the West End of London and handed to the Secretary with a view to his approaching the chairman of the committee concerned.

It was agreed to leave the matter to be discussed between Mr. Corbett and the Secretary.

Next Council meeting, Friday, February 11.

Commercial & Legal Intelligence.

Terms of Engagement.—At the Northampton Assizes, last week, W. D. Gordon, photographer, brought an action against John Mills, photographer, St. Giles' Street, Northampton, for damages for wrongful dismissal. Plaintiff claimed 13 weeks' wages at £5 per week.

Plaintiff stated that he came on trial to Mr. Mills' studio at a salary of £5 per week. Later he entered into a twelve months' agreement to stay with Mr. Mills. Before the year expired Mr. Mills asked him to agree to stay for a further twelve months. He agreed to stay for an additional nine months. In May last year Mr. Mills gave him a week's notice, which he declined to accept, and presented himself for work the following Monday, and Mr. Mills would not employ him. Plaintiff denied that there had been any serious complaints about his work.

The defendant, John Mills, stated that in the first month plaintiff did his work indifferently. Plaintiff's work improved afterwards. When the question of a year's agreement was discussed, plaintiff refused to sign one because he wished to be able to leave at a week's notice. No agreement was signed, and a week's notice was usual in the business in the absence of an agreement.

His Lordship said that as plaintiff's claim did not exceed £65, the proper tribunal for the action to have gone to was the County Court. It was wrong to bring it to the Assizes. His Lordship accepted the evidence of defendant that no agreement was made, and he therefore found a verdict for defendant.

News and Notes.

THE HOUGHTON PROFESSIONAL BULLETIN for January contains particulars of a new style in folder mounts for miniature prints, as well as of other quite new introductions, some of which we have already noticed in these pages.

THE INSTITUTE OF PHYSICS has been incorporated for the purpose of promoting the professional status of the physicist broadly upon the lines which have been followed by the Institute of Chemistry for professional chemists. The Institute has its headquarters at 10, Essex Street, London, W.C.2.

BURY Y.M.C.A. PHOTOGRAPHIC SOCIETY.—At the second annual exhibition, to be held in the Municipal Art Gallery, Bury, from April 27 to May 25, there is one open class in which a plaque will be offered for any class of print by an amateur. Prospectus and entry form from the hon. sec., Mr. A. Benson Ray, 8, Augur Street, Bury, Lancs.

SALES MANAGEMENT.—A new monthly magazine has been issued under this title by the Louis Cassier Co., 34, Bedford Street, London, W.C.2. It is devoted to the profession or science of salesmanship, and its first number shows that it is embarking upon its programme with a full sense of the varied interests, wholesale, retail, etc., which come within the scope of its subject. "Sales Management" is issued on the 15th of each month, price 1s. 6d.

THE KAPPA WORKS, LTD., manufacturers of photographic papers, Hounslow, Middlesex, has issued a monthly calendar for the present year, and also sends us a folding set of cards arranged in alphabetical sequence for hanging on a wall and providing spaces for a register of the names of firms having telephone numbers which are in frequent request. This piece of stationery has real office utility, and no doubt any photographic dealer or wholesaler may obtain one on application to Messrs. Kappa Works, Ltd.

THE MOUNTS.—Messrs. Butcher send us a catalogue of nearly 150 pages describing, by the aid of profuse illustration, their many styles and patterns of mounts, both those for the professional portraitist and other series, chiefly slip-in, for the amateur photographer. The list likewise describes a large series of albums, and also Messrs. Butcher's novelties in the way of ready-made passepartout frames, book-post wrappers and wallets and other stationery such as a portrait establishment requires. Moreover, a book-marker makes the welcome announcement of an increase of discounts.

ATTRACTIVE LISTS in a series of six, each with a coloured cover design, are part of Messrs. Butchers' advertising programme for the coming season. Experience has convinced them that this is a form of publicity particularly advantageous to their dealer customers, by whom a supply of a catalogue may be obtained at a price which the dealer could not possibly secure independently. The lists are supplied in editions of 100, 250, or 500 at £1 15s., £4 7s. 6d., and £7 10s. respectively, inclusive of a dealer's name and address on the cover. Without this last printing they may be purchased at 5s. 6d. per dozen.

THE ENSIGN HANDBOOK of Messrs. Houghtons, which, as dealers know, is a stimulating little text book as well as a catalogue in miniature, is in course of preparation for the 1921 season, and is being offered by Messrs. Houghtons at the rate of 50s. per hundred, inclusive of the printing of a dealer's name and address on the cover. Another piece of advertising literature, specially for dealers, is a print wallet, a double envelope for carrying prints or film negatives in the pocket. These are obtainable by dealers in three sizes at prices from 32s. 6d. to 47s. 6d. per thousand, again including the insertion of a dealer's name and address.

CAMERA HOUSE JOURNAL.—In sending us the first 1921 issue of their monthly publication for dealers, Messrs. Butcher place it within a binding case which serves for the orderly assemblage of the twelve issues to appear within the year. The January number gives prominence to the British Industries Fair to be held at the White City, Shepherd's Bush, London, W., from February 21 to March 4 next, at which Messrs. Butcher will exhibit in both the photographic and toy sections. Some stocktaking bargains are itemised in this number, and there is the description of a lead lined wooden tank for the quantity development of amateurs' films.

BUTCHER 1921 CAMERAS.—The 64-page advance list, just issued by Messrs. Butcher, Camera House, Farringdon Avenue, London, E.C.4, describes the models of hand-cameras for the coming season, and shows that Messrs. Butcher have a full range, particularly of the Cameo, Klimax, and Carbine series of folding cameras. In one or two instances prices are reduced, for example, the No. 0 Watch-Pocket Carbine by 2s. 6d. and the No. 6 by 10s. The popular Pressman reflex is £1 less in price in the quarter-plate size, and dark-slides are uniformly 6d. cheaper, and film-pack adapters 2s. The list includes particulars of a roll-film tank for day-light developing of films up to 3¼ × 2¼, a simplified pattern without apron or changing box. The list is obtainable free on application to Messrs. Butcher.

THE NORTHERN PHOTOGRAPHER, in its issue of February, which appears on the eve of the opening of the Northern exhibition, gives its readers a 4-page supplement of reproductions of work there shown. Its technical contents include a paper by Dr. B. T. J. Glover on diagnosis of errors in exposure and development which, like all Dr. Glover's writings, is admirable in its precise expression. Mr. J. B. Atherton has some hints to give on high-speed photography of athletic events and similar subjects, and the æsthetic side of photography is well represented by papers on landscape photography and on the pictorial work of D. O. Hill. Our Liverpool friends, we are glad to see, take a broad view of photographic interests and are steadily making a firm place for their publication, which is published by the Liverpool Amateur Photographic Association, 9, Eberle Street, Liverpool, price 3d.

BOLT COURT LECTURES.—Lectures are given at the L.C.C. School of Photo-Engraving, 9, Bolt Court, Fleet Street, E.C., on Thursdays, from 7 to 8 p.m., by the Principal, Mr. A. J. Bull, M.Sc., who is dealing with the "Fundamental Properties of Lenses," with special reference to their application to process and colour work on January 20 and 27 and February 3, followed on February 10, 17, 24, March 3, 10, 17, by "An Introduction to Colour-work, the Composition of White Light, the Production and Scaling of Spectra, Selective Absorption, Principles of Orthochromatic Photography and Three- and Four-colour work." The lectures on colour should prove of special interest to art students, colour printers, and those interested in the photographic reproduction of colour. Mr. Bull is one of the authorities on the subjects he purposes dealing with; the numerous experiments shown will be unique and instructive. These lectures are open free to workers in the photographic, printing, and allied trades.

PHOTOGRAPHS BY WIRE.—The Christiania correspondent of "The Times" describes a demonstration, given at Sandefjord last week, of an improvement in telegraphy invented by M. Hermod Petersen, chief manager of the Radio Department of the Telegraph Service. This invention, in the opinion of experts, will revolutionise telegraphy. It is the result of four years' work, and it consists of a new system based on alternating current, instead of the continuous current system hitherto used. One of the many benefits which this invention is expected to bring is a big reduction in the number of operators needed. It is estimated that work which now requires 117 of the best operators in Norway could be done by 16. The new system eliminates errors of any kind, and reproduces with photographic accuracy, at practically unlimited distances, all sorts of handwriting, type, drawings, and photographs. One expert says that by using M. Petersen's system the "New York Times" would be able to reproduce a column from the London "Times" within 10 minutes.

PHOTOGRAPHS IN COURT.—Photographs have recently figured prominently in a legal argument which has been presenting some difficulty to the Law Lords sitting in the House of Lords. A collision occurred off the Irish coast in October, 1917, between H.M.S. "Drake," a cruiser of 14,000 tons, and the ss. "Mendip Range," a vessel of 4,9[illegible] tons gross register. Mr. Justice Roche found that there was no negligence in the navigation of either vessel, and that consequently neither was to blame for the collision. The Court of Appeal affirmed this view, and Lords Haldane, Finlay, Atkinson, Wrenbury, and Phillimore have been occupied the whole week in hearing arguments on the question whether or not there was any negligence on the part of the "Drake." Enlargements of photographic pictures which were taken at the time

by Mr. Cyril B. Potts, an apprentice on board the "Mendip Range," were produced. When some members of the crew of his vessel shouted, "Look out, she is turning, there is going to be a collision," Mr. Potts immediately ran and got his camera and took photographs of the vessel. The enlargements of these have been continually before and frequently referred to by their Lordships during the course of the week.—"Westminster Gazette."

THE PLEASURES OF MOVING.—The troubles of Messrs. Bassano in moving into their Dover Street premises were the subject of an application for an injunction in the Chancery Court last week.

Mr. Peel, for Messrs. Bassano, the plaintiffs, asked for an injunction to restrain a tenant from obstructing them in the free use of the premises, No. 38, Dover Street, where plaintiffs had leased the second, third, and fourth floors, defendant being the lessee of the ground floor.

It was stated that the upper floors were approached by a lift and by a staircase which the defendant used to the first floor, the lift being for the exclusive use of the tenants of the upper stories.

Mr. Sheldon, for defendant, argued that no one but defendant had a right to use the staircase and passage outside his rooms.

His Lordship asked what was the use of the staircase leading to plaintiff's rooms if they were not allowed to go along the passage to it? It seemed to him that the situation was Gilbertian.

Mr. Sheldon said the staircase was not the only means of entrance.

His Lordship: No, they can take off the roof and get to the place by aeroplane.

Mr. Sheldon said there was entrance to plaintiff's premises from Berkeley Street.

Mr. Peel said this entrance had been bricked up.

His Lordship observed that defendant seemed to be an obstructive person who would not let the plaintiff get to his premises.

Replying to his Lordship, Mr. Sheldon said the defendant carried on a business which he did not want to have disturbed by continual use of the passage by his rooms.

His Lordship suggested that plaintiff, if allowed to take his furniture up the staircase, should undertake not to use the staircase further pending the trial.

Mr. Peel, for plaintiff, gave this undertaking, and his Lordship also directed that plaintiff should only use the staircase for furniture which was too heavy or too large to go in the lift, and should finish the removal at the earliest possible moment. On these undertakings there would be no order.

Mr. Sheldon remarked that the staircase was smaller than the lift.

His Lordship: I have no doubt plaintiffs will undertake not to take anything through the passage that won't go through.

Correspondence.

****Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

TWO OR THREE DIMENSIONS: IDEALS IN PORTRAITURE.

To the Editors.

Gentlemen,—As a keen student of art and photography for the past forty years (exhibiting at the Royal Academy since my seventeenth year, 1879) I have been interested in your correspondence concerning ideals in portraiture, initiated by E. D. Young in his lecture upon the subject, "B.J.P." December 10, 1920.

I consider that much of real art criticism came to an end with the unfortunate lawsuit of Ruskin and Whistler, consequently the pretenders in art have gradually gained power and influence during recent years, with truly decadent results to present-day painting, which some photographers have unwisely imitated. Had I the leisure, or you the space to spare, I could give you some interesting facts concerning this retrogressive movement.

But one pen has been used with just discernment and knowledge during the past few years of chaotic art criticism, and I am pleased to read, in your issue of January 27, this pen has not degenerated to vulgar personalities, whatever differences of opinion may exist. I allude to the writings of F. C. Tilney, which have been published at various times in the "B.J.P." This gentleman is a complete stranger to me, but I value all his criticisms as accurate conclusions of present-day art and photography, which all interested people should "read, mark, learn, and inwardly digest."—Yours faithfully,

E. G. HANDEL LUCAS.

169, Gleneagle Road, Streatham, S.W.16.

January 25.

FACTORIAL DEVELOPMENT.

To the Editors.

Gentlemen,—Your readers have now fully before them Dr. Glover's reasons why he regards this method as unsuitable for out-door subjects, and also my reasons, verified by long practical use of the method, why, when an actinometer is used, the method is not only suitable, but a great help for such work. As my experience and opinion is verified and supported by the letters of Mr. Bierman and Mr. Godfrey Wilson, there is no need for me to labour the point. Here are three experienced users of the method who find that the inevitable variations in exposure in out-door negative work are not so serious as Dr. Glover claims. In a number of graphic diagrams I made years ago of times of appearance of high lights, I found that a variation of 100 per cent. between the exposures of two high lights caused a variation of their time of appearance of only 7 to 9 per cent.

Dr. Glover, however, makes a new and an incorrect surmise when he attributes my slight preference for "factorial" over "thermo-time" methods to a supposed incorrect attitude by me in the relative time for different subjects. Whether my attitude in this is right or wrong, it is a fact that I have advised and followed the same attitude in my instructions and practice for both development methods alike. I specifically stated that the point where "thermo-time" methods had occasionally failed in my hands was where either plate or developer unexpectedly proved to be different from what was anticipated. A tankful of plates either over or under developed from this reason had the same fault in all the subjects in the tank. It is significant that Mr. Bierman states that he also has been "let down" in the same way with a "thermo-time" method.

To touch upon Mr. Bierman's interesting experiences with pyro-metol developer, I point out in the Manual that all pyro and amidol developers vary in the factor required if the developer dilution is varied. And this applies to the compound developer pyro-metol. In trials years ago I found this developer rather unsatisfactory for exact work. It has such extraordinary vigour that it is always dangerously near the fogging point, and small alterations in its composition, proportion of bromide, or dilution, make quite large changes in the factor required. Almost all other developers keep to the same factor when used diluted.

I feel some difficulty in replying to the very heavy personal request which Mr. Godfrey Wilson makes to me, and if I do so, bluntly or even rudely, the facts must excuse me. Those of us who do gratuitous public work know how frequently a request is made for what is really a very heavy service under the assumption that only a small favour is asked. For example, "Oh, Mr. Watkins, I heard that at a lantern lecture you gave the other day your own lantern was used. We have a missionary meeting next week, and I feel sure that you won't mind lending us your lantern. And perhaps you won't mind coming down to work it—you do it all so nicely—we have a cup of tea going at five o'clock, etc., etc." There are invariably three characteristics of such requests: First, a slight touch of patronage; second, plenty of buttered words; third, an assumption that the favour asked is no trouble at all, but might just as well come in your day's work.

Mr. Wilson's proposal that I "send you for publication a corrected, up-to-date, and complete list of Watkins factors of developers partakes, I am afraid, of the third characteristic.

Years ago I gave some of the best years of my life to continuous and strenuous experimental work in dark-room and at the photometer. This occupied most evenings of the week, and I kept at

I was able to give (and it always was a free gift) the method with a fairly extended list of factors for most of commercial developers. I did this in hopes that users of the (and, as a fact, many hundreds took to use it) would their experience of factors, and that plate-makers and -sellers would from their trials also give factors for what sold. Neither sellers nor users have, in fact, given such I struck some years ago, and have reluctantly declined to my time in testing every new or old commercial formula which some advertiser to attach a fancy name to, ending in -ol. I have given full lists of all factors I know.

When Mr. Wilson hopes that I will send you a new and -date list of factors, he is really asking me to devote the six or twelve months to strenuous dark-room trials. My is, no. I have other work to do, and both health and sight make it undesirable.

I suggest that Mr. Wilson himself, who has used method so long, might do a little in helping his fellow workers sending to you the factors which he has found right for speci- developers, and that other factorial workers (such as Mr.) who read this should do the same. If a dozen workers this (I would gladly make the result available) quite a useful could be made to the existing information. But let all also put pressure on plate and developer makers.—Yours faithfully,

ALFRED WATKINS.

Hereford, January 22.

To the Editors.

Gentlemen,—With reference to the correspondence on factorial , there is one point which does not appear to have mentioned, and which I think has some importance, the of percentage error in the total time of development. My may be peculiar to myself, but I find it far from easy determine accurately the time of first appearance of the image, any error in timing is of course multiplied by the factor for particular developer employed. Assuming that an error of , either way is possible (I must admit to believing that I a bigger error at times), and assuming also that the fault may of anticipating the first appearance as well as of being late, will give one or two examples.

I imagine that it will be argued that it is not possible to antici- the appearance of the image, but I am afraid I do at times, and at any rate the argument is not affected. Take first a developer with a factor of 12, and a development time at 60 deg. F of 5 minutes, an error of 5 secs. means one minute in the time of development, or 20 per cent. To take the extreme case of metol with a factor of 30, and a total time of development of 10 minutes, the error becomes 25 per cent. So much for plates. When we come to bromide paper the total time of development is much less. The factor given by Dr. Glover for amidol was 12, and assuming that the paper is fully developed in two minutes the error becomes one minute, which is serious enough.

It is not necessary to push the argument further, but from this of view the developer with the smallest factor is the best.

In most cases I am of opinion, as far as I am concerned, that by inspection will not in general lead me into bigger than these.

Where factorial development is specially valuable is where it necessary to develop an unknown exposure under conditions in the temperature is unavoidably low. In such cases there always a tendency to develop for too short a period, and an error timing is a small percentage of the time of appearance.—Yours faithfully,

A. H. HALL.

1, Eliot Vale, Blackheath, S.E.3.

January 22, 1921.

WARMING THE STUDIO.

To the Editors.

Gentlemen,—I should like to put your correspondent "Comfort" right on one or two points. He states he does not think the apparatus mentioned in a previous letter to the "B.J." could possibly be used in warming a studio, as it would be "horribly expensive" and "quite inadequate for the purpose."

The Ventiheta consumes only 5 cubic feet of gas per hour, as against the average consumption of 30 cubic feet for an ordinary gas stove, so that notwithstanding the high price of gas, the cost would only be about 4d. per day of 12 hours, and a temperature of 63 degrees is obtained. The cost, therefore, is amazingly low.

It is also quite unnecessary to have a flue to carry away the fumes, for the simple reason that for every 5 cubic feet of gas consumed, 2,000 cubic feet of pure fresh air are warmed and circulated through the room or studio. An even, warm temperature can be maintained in a studio, without any dust or damage to apparatus, furniture, or decorations. It is impossible for accidents to happen through carelessness, as no naked light is exposed.

The Ventiheta lends itself to any style of artistic decoration, as it can be supplied in any design to harmonise with the furnishing of a studio.

But why take my word for it? A visit to the Ventiheta showrooms in Argyle Street, Oxford Circus, would immediately convince "Comfort," and he would then see a perfect studio heater at last.—Yours faithfully.

FREDK. E. JONES.

Wembley, January 24.

[Our correspondent's eulogies invite comment. If 5 cubic feet of gas warm a room as well as 30 cubic feet, it can only be through improved efficiency of combustion. We greatly doubt a six-fold improvement in this respect, particularly when we are told that at the same time the gas draws in 400 times its volume of air, all of which has to be warmed. The temperature obtained will depend on the volume and temperature of this air admitted from the outside, and, therefore, it would surprise us if an installation suitable for regular use were equal to the emergency of bitter weather. —EDS. "B.J."]

CONDENSATION ON LENSES.

To the Editors.

Gentlemen,—It is so very rare to find the slightest inexactitude in your editorial notes that it seems a pity to allow even a little slip to remain uncorrected. On page 14 (January 14), you attribute the condensation of moisture on the front glasses of the lens to the fact that the warm lens is suddenly exposed to the cold atmosphere, but really the reverse is the case, as it is impossible to get a film of moisture to condense on a glass surface unless the glass is *colder* than the air.

This condensation is very liable to occur when the outfit gets thoroughly chilled on a journey, whose end is inside some building, or it may readily happen if the lens is taken out of its case on a mild day after a spell of cold weather. In the case of small pocket cameras I have found condensation occur if the warm hand is kept close to the lens for a second or two while adjusting the shutter or stop, and this may be the trouble in the case you mention, and though the effect goes off very quickly, it is possible that every negative might be fogged if the procedure was the same in every case, and the exposure made immediately.—Yours faithfully,

W. B. HISLOP.

9, Albany Street, Edinburgh.

January 19.

[We must thank our correspondent for his correction, which was occasioned by the omission of a dozen words with consequent reversal of the meaning of the second sentence in the paragraph. It should have been shown that the dewing occurs on putting a chilled camera into the warm pocket for a short time, and using it immediately after withdrawing it therefrom.—EDS. "B. J."]

KEY INDUSTRIES.

To the Editors.

Gentlemen,—Among the matters immediately to be dealt with by our legislators is the kind and measure of protection to be secured to our manufacturers from foreign competition in what are called "key industries." Although the term, in the abstract, is sufficiently explicit, it is almost inevitable that attempts will be made to include as such industries that, in the logic of words, may appear to be eligible for inclusion, but, from the particular circumstances or from the nature of the employment of the product, more beneficially could be left a free market.

Before the war the manufacture of photographic material, plates and paper in particular, was a fairly flourishing industry. The

competition was not too severe and the selling price was reasonable. Foreign competition was not entirely absent, but it was almost negligible, and, on the other hand, our exports greatly exceeded our imports. It was a healthy trade. The war had a double effect in raising prices. Acting together, shortage of the raw material and of labour and the requirements of the Air Force created almost a famine. During that time photographers were abnormally busy and could afford the enhanced price. That time is now over, and we have now to face a period of slackness, but prices are still maintained at the war scale, and are likely to remain so while the present absence of competition endures.

The manufacturers of plates and paper in this country of any account number less than 20. It is thus easy for them to form a society, a combination, or a ring to promote their own interests, and it is quite clear that they would consider any competition from abroad against their interests. They tell us there is no such society, combination, or ring, and we must necessarily believe them, but their price-lists and their terms disclose that there exists a "unanimity" which serves the same purpose; and it is quite likely that the "unanimity" on their behalf may think it comes within its province to represent their desires for protection when the matter comes before Parliament. Unfortunately, photographers have no such potent advocate of their interests. Possibly the P.P.A. may have made preparations to act, but I have seen no announcement to that effect.—I am, etc.,

C. L. SMITH.

FLUE PIPES OF ANTHRACITE STOVES.

To the Editors.

Gentlemen,—Your correspondent, "Comfort," on stoves incidentally mentions that the pipe should not be galvanised. May I recommend painting the plain iron with aluminium paint. I noticed this in use on hot-water heating pipes in Dundee some years ago, and have used it since on the anthracite stove pipes quite satisfactorily.—Yours faithfully, E. H. ATKINSON.

20, Elers Road, Ealing, London, W.13.
January 21

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

E. F.—We think the effect in the outline is gained by ordinary pencil work on the negative, possibly on the glass side. We should imagine that the darker outline of the profile is due solely to skilful lighting.

H. G.—There is no standard installation for portraiture by acetylene light on the market, but installations are occasionally being made to photographers' requirements. About the best firm for this purpose is Messrs. R. J. Moss and Sons, 98, Snow Hill, Birmingham.

F. H.—We have no reliable data of the number of plates or sheets of bromide paper which can be fixed with safety in a given quantity of the fixing-hardening bath, since the use of any fixing bath depends not only upon the quantity of silver in commercial plates and papers, but also on the way in which it is used and the temperature.

G. Y.—For the general questions as to construction of studio blinds, etc., we must refer you to "The Portrait Studio," which our publishers will send you price 1s. 2d. post free. This contains diagrams and fuller details than we can give here. With regard to your special requirements, as to interception of light by the school-house and aspect of studio, it is difficult to speak without knowing the height of the building. If a line drawn from the centre of the floor of the studio at an angle of 45 deg. clears the roof of the school you will have no trouble. Otherwise, you may have to use reflectors as described in the above-mentioned book. It might be desirable to have glass on both sides of the studio, as then you could work from the south-east when there was no direct sunlight upon it.

G. B. I.—Although we are sorry to say it, we are afraid that old photographs have practically no value as antiques. Apparently what you have are Daguerreotoypes. A very good specimen of this process, particularly a coloured specimen, is perhaps worth 10s. 6d. or £1 1s., if you can find a purchaser, but many of them are bought and sold among other miscellaneous goods at the photographic sales for a few pence each. We had a very fine lot of Daguerreotpyes, the property of a deceased friend, which we have sold during the last few years at good prices for his widow, and although we were able to hold for good prices, we don't suppose they have so far realised more than £3 or £4. The address of the new secretary, Mr. Lang Sims, of the Professional Photographers' Association, is 437, Brixton Road, London, S.W.9.

F. D.—We can quite imagine that the use of accumulators is a very unsatisfactory means of lighting a printing box. In using almost any light, other than electric, it is best to employ a box in which the negative is held vertically; for example, the "Hana" printing machine, formerly made by Houghtons and now obtainable fairly readily secondhand. It is one of the best printers, and can be worked with incandescent gas or acetylene. If you use a flat-bed printer, such as we expect you have at present, then you must fit up a mirror to reflect the light, and in that case you can use either incandescent gas or acetylene, although the exposures will be somewhat longer when employing, say, the extra slow gaslight papers. About the best firm for acetylene burners and generators is R. J. Moss and Sons, 98, Snow Hill, Birmingham.

G. H. C.—(1) Purchasers of figure studies are rather a large and varied class, and are rather outside our province. The "Fine Art Trade Journal," 13, Buckingham Street, Adelphi, London, W.C.2, would give you a better idea of the firms who are possible purchasers of such originals, but it may be of some service to you to go through a list of names of publishing firms who were exhibitors of goods, such as calendars, box tops and fancy articles at the British Industries Fair. (2) The price paid averages, we should say, from about 15s. to £1 1s. per subject; more perhaps for exceptional subjects. (3) The postcard people almost always buy in sets of 6 or 12; firms purchasing for other purposes are no doubt agreeable to buying odd lots. (4) In most cases firms wish to purchase entire rights of reproduction, which means, therefore, transfer of the negative, although plenty of transactions take place in which a limited right is assigned, and, therefore, the negative remains in the possession of the seller.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3170. Vol. LXVIII. FRIDAY, FEBRUARY 4, 1921. Price Fourpence.

Contents.

SUMMARY.

Mr. Thomas Bolas, in a contributed article, gives practical directions for the making of a backing (with ox-gall basis) which is always ready for use, and is found to be highly effective. (P. 63.)

Mr. W. Ermen has carried out tests showing the relative degrees of exhaustion experienced by various developers as regards the colour of prints. (P. 64.)

The utility of employing a stereoscopic camera for the purpose of duplicating exposures, preferably on different plates, when undertaking particularly difficult subjects, is discussed in a series of notes by P. R. S. (P. 65.)

In a leading article we refer to some of the text books dealing with the first and second decades of photography, which, with many others to be referred to later, are listed in the comprehensive catalogue of scientific works recently issued by Messrs Sotheran. (P. 62.)

A correspondent questions the necessity of variation in the lamps contained in a printing box, as suggested last week by Mr. Drinkwater, when other means, such as the use of matt transparent screens or local shading devices, allow of the result being much more simply and economically obtained. (P. 71.)

The secretary of the Professional Photographers' Association announces that Mr. Marcus Adams is acting as honorary secretary of the exhibition of professional photographic work, to be held in connection with the forthcoming P.P.A. Congress at the Photographic Fair. Technical work, as well as portraiture, will be admitted to the exhibition. (P. 71.)

At the Royal Photographic Society, on Tuesday evening last, Mr. P. King read a paper on cinematograph cameras, and makers and designers of these instruments demonstrated their movements. (P. 68.)

At the annual dinner of the Affiliation, Mr. G. C. Weston briefly sketched a scheme of decentralisation which, it seems to us, has certain distinct merits. (P. 61.)

A single counterbalanced electric lamp has its special utility in studio portraiture. (P. 61.)

Details of construction of an anastigmat objective, consisting of three single glasses, are given in a recent patent specification. (P. 66.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

In a contributed article Mr. R. M. Fanstone gives a number of hints on the spotting and other retouching of Autochrome and Paget colour transparencies. (P. 5.)

A notice of some of the colour transparencies shown at the Northern Exhibition will be found on page 6.

Practical hints on the development of Autochromes, a whirler for drying these transparencies and a method of using several light-filters during one exposure of an Autochrome plate are contained in paragraphs on page 8.

Some further notes on the old "Hillotype" colour process and its relation to methods of direct heliochromy are contained in letters. (P. 7)

EX CATHEDRA.

Electric Lamps. In the majority of half-watt installations the lamps are in fixed positions, or they are grouped in a stand or cabinet so that they can only be moved as a whole. This rather limits the variety of effects which can be obtained, and a single lamp which can be moved about independently is a very useful adjunct. The ordinary sliding standard will answer in most cases, but in small studios is rather liable to be in the way. In such circumstances the balanced fitting which was introduced with the Van der Weyde light may be adopted with advantage. This consists of an arm about eight feet long, pivoted at the centre with a universal joint so that it can be rotated or elevated and depressed. At one end the lamp is fixed; at the other is a sliding balance weight, a touch of the hand sufficing to place the light in any position. With such a fitting, carrying a 3,000 c.p. lamp and suitable reflectors, all the effects of lighting which made Van der Weyde famous could be reproduced. In the original form the light was fitted on a 42-inch reflector, but with the half-watt lamp the standard metal reflector would be more suitable.

* * *

The Affiliation. At the annual dinner of the Affiliation of Photographic Societies with the Royal Photographic Society, the chairman of the executive committee, Mr. G. C. Weston, referred to one movement within the Affiliation which he thought would be necessary in the near future to give full effect to the activities of that body. He had in contemplation a scheme embodying a certain measure of decentralisation, according to which groups of societies should be formed among those constituting the Affiliation upon a geographical basis. Affiliated societies are, of course, scattered throughout the United Kingdom, and inter-communication which goes on between those which geographically are related to each other does so, or at any rate is supposed to do so, through the medium of the executive committee at Russell Square. If we understand Mr. Weston rightly, it is his idea that machinery should be provided for bringing societies within a given area more closely into relation with each other by arranging for them to carry out exchanges of lectures and lecturers and generally, for example, by means of an area committee, to localise and intensify the services which the Affiliation can render. Undoubtedly, there is a great deal to be said for a scheme of this kind, for the usefulness of it is witnessed by the independent unions or federations which have come into existence since the establishment of the R.P.S. Affiliation in 1892, and owe their strength to the exercise of such functions as Mr. Weston now proposes for his groups. We have only to look, on one side at the list of lecturers in the Red Book and on the other upon the help which many societies derive from Affiliation lectures and lecturers, to see that there is the occasion for giving definite shape to a scheme of this kind.

Returning Money. We have been asked whether a customer can legally claim the return of any money paid at the time of sitting, if he or she is not satisfied with the proofs submitted and does not find it convenient to give another sitting. This is a delicate point, and if the matter were carried into court the decision would depend upon the impression which the photograph produced upon the judge, who, though skilled in law, might be altogether lacking in artistic perception. We should, in these circumstances, recommend the photographer to cut his loss at the earliest possible moment, and to return the money with as good a grace as possible, and certainly without any unpleasant comments, rather with an apology and a request for future orders. This leaves the sitter with the impression that the photographer is at least an honest and obliging person, and if she fares no better elsewhere she is likely to return to him with friendly feelings. This end is cheaply purchased at the cost of three or four plates and proofs. In the great department stores there is an understanding that "the customer is always right," and breakages and damages are allowed for, when it could be clearly proved that the fault did not lie with the firm.

THE EARLIER LITERATURE OF PHOTOGRAPHY.

I.

The issue of Messrs. Sotheran's "Bibliotheca Chemico-Mathematica," to which we refer on another page, provides an appropriate occasion on which to draw to photographers' notice the many pieces of literature which have long been out of print, yet possess a great interest for any but those who are content with a very superficial knowledge of photography as a whole. We are ready to confess that we fear the number of persons having this broader interest is small. Among the hundreds and thousands of people who "do photography," there are comparatively few interested in photography in the se se of the knowledge of photographic processes which has accumulated and is recorded in the literature since the appearance of the first work, that by Daguerre, in the year 1839. Nevertheless, we should like to do something to encourage a wider reading of the subject; and we cannot do that better than by calling attention to the opportunity of acquiring some of these bygone books which is afforded by Messrs. Sotheran's painstaking and accurate work in cataloguing those they have for sale. Moreover, the expenditure need not be great; with the exception of some of the scarcest of these works, for example, that by Daguerre, the average price is only a few shillings. Fortunately for the photographic student the bibliophile has not included photographic works among those which he covets, with a corresponding elevation of their price, as he has those in other branches of literature and science.

We notice that Messrs. Sotheran's list includes two of the classical pamphlets relating to the origin of photography, namely, Fox Talbot's "Some Account of the Art of Photogenic Drawing," the paper read before the Royal Society early in 1839, in which Talbot broadly outlined his discovery but did not give any precise details. The other is Sir John Herschel's paper "On the Chemical Action of the Rays of the Solar Spectrum on Preparations of Silver," a communication of 1840 which recorded Herschel's further observations, particularly the bleaching action of mercuric chloride, now familiar as the most commonly used intensifier, and the ferro-prussiate or blue-print process in almost precisely its present form. Among the works of the first decade of photography, 1840-1850, notable ones are "Nouvelles Instructions sur l'Usage du Daguerréotype," by Charles Louis Chevalier (1841), in which is described an improved racking camera for the process and directions given for the use of bromine in the sensitising of the plates, and "Derniers Perfectionnements apportés au Daguerréotype," by Gaudin and Lerebours, with a chapter by Fizeau on his process of gold toning which gave to the delicate images a permanence, without which the process could hardly have lasted as long as it did. Turning to the English literature of the period, a scarce book is Robert Hunt's "Popular Treatise on the Art of Photography," the first Glasgow edition of 1841. Hunt was a prolific experimenter in and writer on photography, and his "Researches on Light," issued in 1844, and in a second edition in 1854, contains a mass of observations relating to the action of light on inorganic and organic substances, which make it one of the most valuable books even for the present-day experimenter. A curiosity among this early literature is "Das Kaleidotyp, oder Katadioptrisch-Chemische Maschine," by Friedrich August Wilhelm Netto, a pamphlet of 1843 describing a combination of the kaleidoscope and Daguerreotype for the mechanical production of industrial designs. A far-seeing experimenter, Herr Netto, with an eye on the main chance.

The discovery of the wet-collodion process by Scott Archer in 1851, and the consequent speedy disappearance of Daguerreotype, gave a great impetus to publications dealing with what was then regarded as the "new photography." An important early work of this second decade is Gustave le Gray's "Photographie: Traité nouveau," first published apparently in 1852. As students of photography of the fifties know, the collodion positive attracted perhaps even more notice than the system of making negatives on collodion plates, since it provided a cheap and easily-worked substitute for the Daguerreotype plate, which previously had found enormous favour with the public. We are uncertain as to the origin of the collodion positive, but Messrs. Sotheran ascribe it to a work "Photographie Nouvelle: Procédé pour obtenir des Epreuvres Positives Directes sur Glace" of Adolphe Martin, published in 1852. But about this time text books began to be more plentiful; for example, Delamotte's "Practice of Photography" of 1853, a manual for students and amateurs, and the first popular handbook on photography. In 1855 Thomas Sutton wrote his "Calotype Process," and in the following year his "Dictionary of Photography," the first work to be compiled in an A.B.C. form. Nor should we omit from this catalogue of books of the early collodion period the "Manual of Photographic Chemistry," by T. F. Hardwich, which ran through edition after edition, and for many years continued to be one of the most widely-read text-books. Later editions were edited by George Dawson and Traill Taylor. We come in 1862 to the early "Traité Populaire de Photographie sur Collodion," by the Belgian experimenter, Desiré van Monckhoven, which in French and English passed through several editions. The development (and also the vulgarisation) of the collodion positive has its counterpart in later works on ferrotype, such as those of E. M. Estabrooke, "The Ferrotype" of 1872 and "The Ferrotyper's Friend" of 1880, both of Cincinnati.

Although two other works are of very much later date, we may refer to them here, since they deal particularly with the early history of photography. The first of these is an English translation, "A History and Handbook of Photography" of Tissandier's "Les Merveilles de la Photographie." The second English edition of this work is really the most valuable version, since it contains an

appendix by Fox Talbot (completed by his son, C. H. Talbot) on the development of his work in photographic and photo-mechanical processes. Tissandier himself is not by any means a thorough-going historian; his "history" is a lively recital into which unverified tradition and anecdote enter in considerable measure. The other work, however, in which the student of photographic history will find much to interest him is, on the other hand, the outcome of great scholarship and exact research—we refer to "Wedgwood: the First Photographer," by the late Mr. R. B. Litchfield. But our notes on these early books have already outrun their space; we must defer reference to those dealing with the later period of photography until a subsequent issue.

AN "ALWAYS-READY" PLATE BACKING.

As "always-ready" anti-halation backing in a full sense of the term; the mixture being always ready to hand without becoming dry in the pot, or absorbing an undue proportion of water from the atmosphere, and moreover the plate is ready for exposure immediately; no drying being required, while finally the developer is in no way damaged, so that no wiping-off is required previous to development; nevertheless, if desired, a full view can be had at any stage of the development, as a touch with a soft brush clears any part of the backing instantly during development, if an undermentioned precaution is taken.

This combination of advantages is realised by taking advantage of the hygrometric and other properties of ox-gall, the ox-gall being used in the form of the purified ox-gall of the pharmacist; additional and incidental advantages are ease and certainty of application, notwithstanding finger marks or like greasy patches on the back of the plate, and the complete elimination of halation under the most trying conditions: the optical union of plate and backing being perfect owing to nearness in refractive index, and the peculiar soap-like viscosity of the mixture.

The purified ox-gall of the British Pharmacopœia (*Fel bovinum purificatum*) can be obtained as a yellowish-green, viscous mass from any pharmaceutical chemist, or it may be prepared by following the instructions on p. 147 of the 1914 edition of the British Pharmacopœia. Evaporate half a litre of fresh ox-bile to one-fourth of its volume; shake with twice its volume of 90 per cent. alcohol. Set aside to clear, filter and evaporate on water bath to the consistency of an extract.

The backing mixture consists of one weight-unit of the purified ox-gall, four weight-units of gum arabic mucilage, and one weight-unit of vegetable black water-colour, as sold in a collapsible tube, these being well mixed after the containing pot has been warmed in the water bath for a few minutes. A rather stiff, flat brush, a string or wire across the mouth of the pot for striking off any excess from the brush, and a larger pot to cover the whole closely, complete the equipment for backing, but a cover plate for the backing is desirable. This at best is a plate of matted black glass, with corner-pieces of thickish microscopic cover glass, cemented on with Canada balsam, to prevent contact and inconvenient adhesion, but an old negative with four corner-pieces of thick paper gummed on is a substitute. Obviously only one sensitive plate can be used in an ordinary double back under these circumstances, but two sensitive plates may be used in the double slide if a thin sheet of black celluloid is laid on the adhesive backing of each plate and the two celluloid backs are placed together in the slide.

A note on the thin black, flat celluloid, a remarkably useful material in the photographic work-place. Thin celluloid is stained, first green with an alcoholic solution of acid green, then red with an alcoholic solution of magenta, in such ratio as to produce the best of all blacks, a mixed black. After washing in water to remove any soluble remainder of either colour, the celluloid is ironed flat between sheets of stout paper.

A very small quantity of the backing is required if the layer is uniform, say, 4 grains for a quarter-plate, and it is seldom or never desirable to apply the backing quite up to the edges of the plate.

Ordinarily the protecting or covering celluloid should be peeled off before the plate is put into the developing solution, and it is more convenient to drop the plate through the developing solution than to put the plate in the dish first and then pour the developer on; as in this latter case the backing is so immediately and uniformly softened that a touch with the finger or a soft brush will clear a place at once, should back views or through viewing be desirable.

There is, however, one case in which it is desirable to leave the protecting celluloid on, or to use an adherent protecting plate at the back, that is to say without the corner-pieces for giving distance. This is when the so-called "Aktinal" system of desensitising and subsequent daylight development is adopted (see article "Aktinal," p. 13 of 1912 edition, Cassell's "Cyclopædia of Photography.") In this case the protecting plate or celluloid is of use in preventing the soiling of the desensitising fluid (4 per cent. potassium iodide solution), which if thus protected may be used for several or many plates in succession.

The developer which I prefer to use, and one which I regard as a near approach to a universal developer, whether for plates or paper, is a rather strong hydroquinone developer with sodium sulphite and sodium carbonate:—

Hydroquinone	45 grs.
Cryst. sodium sulphite	2 ozs.
Cryst. sodium carbonate	2 ozs.
Water	5½ ozs.

(Total volume about 8 fluid ozs.)

This keeps well, has a Watkins factor of about 5, and I have never found it necessary to add bromide excepting under conditions like those of the "Aktinal" process or the Playertype process, when the film contains two grades of material, each developable, but in different degrees.

Even those professional photographers whose activities may be wholly confined to the studio, would do well to consider the service occasionally rendered by backing. The full lights and shades of a clear white dress cannot be rendered on an unbacked plate, and to copy an engineer's blue print is almost hopeless unless on a backed plate which should also be orthochromatic.

THOMAS BOLAS.

AMIDOPHENOL DEVELOPERS.—A recent patent specification, No. 154,198 (not yet accepted), of Hauff & Co. relates to photographic developers of the amidophenol or amidocresol class made with the addition of sulphite and soda or potash, and wherein alkaline salts of the carbo- or sulpho-acids of the ortho- or para-amidophenols or the orthoparadiamidophenols are present. In order to restore to such solutions containing carboxyl and sulpho-acids their original developing powers a further quantity of free caustic alkali is added. A developer instanced contained muriated paramidosalicylic acid (100 gms.), sulphite free from water (500 gms.), normal lye of 5-fold strength (210 c.cs.), and water (5,790 c.cs.). For use, this stock solution is diluted with an equal or double quantity of water, and a further quantity of ordinary soda lye added, according to the exposure and requirements.

EXHAUSTION TESTS ON DEVELOPERS.

A short while ago I was accorded the privilege of describing in the columns of this journal the method of preparing concentrated developer solutions by the help of caustic soda. The time of appearance of the image on bromide paper was taken as a measure of the activity of these solutions, and was always determined in a freshly-made solution, which solution was never used more than once. But this is not the way developers are most commonly used for the production of prints. On the other hand, print after print is put through the same solution, until this becomes too slow in its action, or begins to give bad coloured blacks, partly owing to the accumulation of soluble bromides and developer oxidation products in the liquor, and partly owing to actual destruction of the active developing agent, by aerial and chemical oxidation. Not enough is known as yet about the chemistry of development for us to be able to assign its proper value to these various factors separately, but their combined effect can be measured with some degree of accuracy by noting the time of appearance for a number of prints developed one after the other in a not too concentrated solution, if care is taken to keep the exposure and the temperature constant.

For this purpose I have used two types of developer formula: "Rodinals," containing 5 parts of developer per 100 of liquor, and solutions containing:—

Developer	2 parts.
Soda sulphite (anhydrous) ...	12 ,,
Soda carbonate (anhydrous) ...	12 ,,
Water to...	1,000 ,,

The carbonate solutions were used undiluted, the "rodinals" diluted with 24 volumes of water, so as to bring them to the same strength as the former. Quarter-plate Kodak Platino-Matte bromide paper was given such an exposure behind a Sanger-Shepherd test plate as was sufficient to produce faint image of the twelfth square. The temperature of the dark room was 65 deg., and 100 c.c.s. of developer solution was poured on to the dry paper, and allowed to act until no further image appeared to be formed.

The print was then taken out of the developer, allowed to drip into the dish for ten seconds, rinsed and fixed. The developer was then poured out of the dish into a beaker ready for the next print. One print after another was developed in the same (constantly diminishing) lot of liquor, until either the time of appearance became inconveniently long, or the last square failed to appear at all.

Six developers in carbonate solution were first compared:—

Para-amido-phenol Metol Dimethyl-para-amido-phenol	Fig. 1.
Para-amido-ortho-cresol (Monomet) Methyl-amido-ortho-cresol Para-amido-meta-cresol	Fig. 2.

On examining these curves we see that para-amido-phenol shows the longest time of appearance of any of the six bodies in the fresh solution (4.75 seconds), whilst methyl-amido-ortho-cresol and para-amido-meta-cresol have the shortest time, only 2 seconds, closely followed by dimethyl-amido-phenol (2.2 seconds), with metol and monomet between 3 and 4 seconds.

After 12 prints have been passed through the solution, methyl-amido-ortho-cresol still has a time of appearance of only 3 seconds, whilst metol, monomet, and dimethyl have risen to 6 seconds, the meta-cresol compound to 8 seconds, and amido-phenol 10.

After about 30 prints the developers are all practically exhausted: metol reaches 54 prints with a time of appearance of 22 seconds, monomet 25 seconds, whilst amido-phenol has fallen to 33 seconds, and methyl-amido-cresol, which began so well, only gives 29 prints with a time of appearance of 34 seconds.

Quinol and chlorquinol (chlorhydroquinone) were also examined in the same way, but at a concentration of 4 grammes per 1,000 c.c.s, instead of 2 grammes, so that their curves (Fig. 3) for the same concentration as the other developers should begin with times of appearance 22 seconds and 60 seconds respectively. It will be seen that these two developers are not only very slow at the start, but begin to fall off

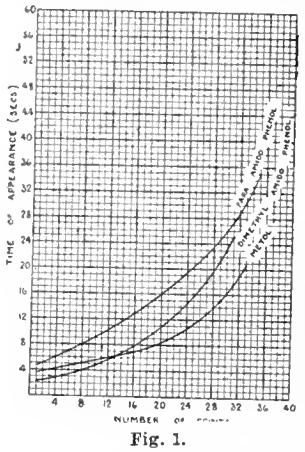


Fig. 1.

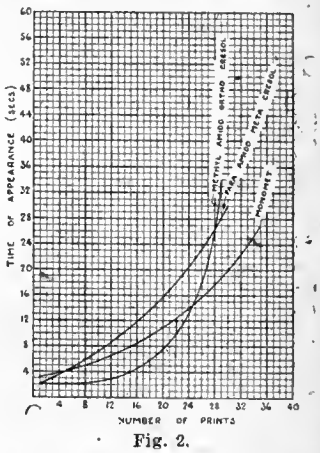


Fig. 2.

in speed right away at a very great rate, chlorquinol being much less easily exhausted than quinol.

On the same figure are shown the curves of decay given by metol and monomet in combination with quinol:—

Quinol	10 gms.
Monomet or metol...	5 ,,
Potass metabisulphite	45 ,,
Caustic soda	*q.s.*
Water to	300 c.c.s.

The first time of appearance for both these mixtures is again very short; but both fall off with great rapidity, the curves soon becoming almost straight lines, and the total number of prints obtainable is much smaller than in the case of carbonate solutions of the amido-phenols or cresols alone. Monomet can only give 17 prints, metol 24.

Fig. 4 shows the curves given by monomet and chlorquinol

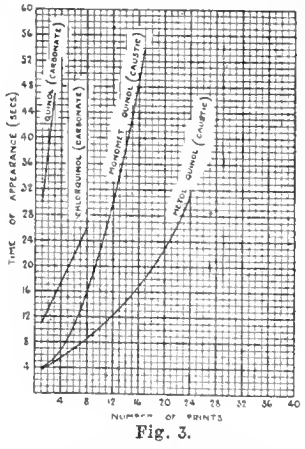


Fig. 3.

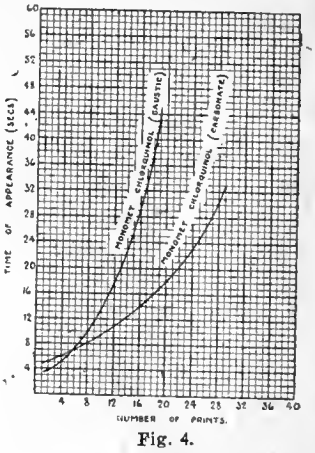


Fig. 4.

in caustic and carbonate solutions respectively. As one might expect from the behaviour of quinol and chlorquinol alone (Fig. 3), these mixtures fall off much less rapidly than those containing quinol and monomet, the carbonate solution being more stable and giving more prints than the "rodinal." I have mentioned above that all the prints were developed apparently to a standstill. Where the time of appearance was short the development factor was about 10, but as the

time of appearance lengthened the factor gradually fell, till it had reached a value of not more than 4.

The quality of the prints so produced cannot, unfortunately, be shown in an illustration, but, as a general rule, all the prints produced by one developer were very similar in strength and degree of contrast, with the exception of the last one or two of a series, where the high-lights began to fall off badly and the shadows looked weak and muddy.

There was very little difference noticeable between any of the single developer, carbonate, prints: all were inclined to be soft. Those containing quinol showed a stronger contrast, and altogether appeared to contain much more deposit. The heavy shadows were dense blacks and not merely dark greys. Chlorquinol alone was very similar to quinol in this respect, but was quite free from staining in the whites, whereas all the quinol prints were somewhat tinted.

Presumably a similar relationship between the different developers described above will hold for plates. I hope to be able to carry out this investigation at some future time.

W. Ermen.

DUPLICATED EXPOSURES FOR DIFFICULT SUBJECTS.

Occasionally one is called upon to make a negative of an extremely difficult subject, a subject which would perhaps cause the most experienced of us to pause and wonder whether a self-screen, ordinary, or a filtered colour-sensitive plate would give the best result, or, may be, whether an exposure of one hour or two hours is wanted, or, again, whether *f*/6, or, say, *f*/16, would give the better result. If the exposure of two plates is possible, and one is not limited as to time, the problem may be easier to solve, though the exposure of two plates becomes a very serious matter when the times of exposure are very long, as they generally are when working in dimly- or peculiarly-lighted interiors, the light coming through old stained-glass windows being at times very deceiving. Expense is also a consideration, especially when large plates are employed.

A professional worker of my acquaintance was called recently in great haste to a certain Royal residence where he was requested to make a negative of a room then vacant for about two hours, and although the exposure necessary was only about twenty minutes, he only exposed one plate, even though he had ample time to expose more. It was, however, quite certain that neither he nor anyone else would ever again have an opportunity to photograph the room as it had been left by men famous in the world's history. Blessed is the man who has such confidence in his abilities: unfortunately, I have no such confidence in mine, although a photographer of thirty years' experience in many parts of the world.

During recent years I have adopted a plan of dealing with difficult and uncertain subjects, a plan I can recommend, it not calling for much outlay, possibly none at all in many cases. I wish now that I had adopted it twenty years ago, when difficult subjects were for me the order of the day. I refer more particularly to the tasks of photographing the traditional scene of the Nativity and the Manger at Bethlehem, and the various sites in the Church of the Holy Sepulchre at Jerusalem. In each of these places, however, I managed to secure six exposures by flashlight before the priest custodians became alarmed, because of the fire and smoke, and bundled me and my tools most unceremoniously out of the buildings.

My present-day plan of dealing with extremely difficult subjects is more awkward to describe than to work. My apparatus consists of a double quarter-plate stereoscopic camera fitted with a pair of Dallmeyer's old C.D.V. portrait lenses, and I have also a pair of Petzval lantern objectives fitted with home-made stops of cardboard, as well as several other pairs of lenses of various foci. My idea, however, as I shall explain, is not to make stereoscopic pictures. I make this statement now in case my readers cease scanning these remarks in the belief that I am trying to revive stereoscopic photography.

I use the old Dallmeyer portrait lenses more often than any of the others, because they are invaluable for difficult subjects of most kinds. These lenses (made in 1868) are similar to the well-known Petzval instruments, the difference being in the shaping and arrangement of the back combination. These old Dallmeyer lenses are, I believe, fairly common to-day, and may often be picked up very cheaply. Such is my outfit, in which there is nothing new: my method of working, however, is, I believe, out of the common.

My aim, as I have said, is not to make a stereoscopic pair of prints, but rather to secure at one exposure two different results—two quarter-plate negatives of different qualities—and to make use of the better one, perhaps destroying the other. It is for this reason that a double quarter-plate camera is employed, one made by Chadwick, who was a strong advocate of the double-quarter size for stereoscopic work. The camera allows of two quarter-plates being used side by side, a thing the orthodox stereo camera does not permit of. The two quarter-plates I use side by side are rarely of the same brand, but of two different makes. Thus in cases of uncertainty when the use of, say, an ordinary plate or a self-screen cannot be decided upon one of each is used. One may also use ordinary plates of high and low H. and D. numbers to form a pair, a screened isochromatic and a panchromatic, and many other combinations, the worker selecting the two most likely to give the best results, rather than results which differ widely.

These differences in the sensitive plates, used on the same subject, are combined with the play one has with stops: changes may be rung to any extent. Sometimes particularly when stops are manipulated to make the exposures required about the same, there is little to choose between the two negatives, but in most cases one is better than the other, and from the better one the necessary enlargements are made.

Further differences in the quality of a pair of negatives on plates of different makes may be secured, if necessary, by developing with different developers. Most of my most difficult interior subjects are taken on an ordinary plate with a self-screen plate as its bedmate in the dark slide. Pyro-soda is commonly used as the developer for the self-screen plate, and M Q or Azol for the ordinary plate. I find the plate combination named the best for architectural "bits" in churches and old buildings, far better as a rule, than a pair of ordinary plates of different speed numbers, or a pair of like plates used with stops differing but little in their F values. In practice there is not a noticeable difference in plates of the same variety having different H. and D. numbers, unless, of course, the latter differ widely—a fact which speaks volumes for the extraordinary latitude to be found in modern dry plates. It is when using two plates of the same brand, if not of the same speed—that the use of a different developer for each comes in handy to give one a choice of negatives.

The choice of plate to make up a pair likely to give two good results depends largely upon the subject to be pictured, for although two perfect negatives are not to be scorned one only is necessary, as the worker is not making a pair of prints to illustrate an advertisement of a panchromatic plate; he is simply having two chances of taking something where

perhaps only one is possible when working in the usual way. And although my best results have been obtained on one or other of a pair made up of a self-screen and an ordinary, some subjects call for a self-screen and an ortho plate with a yellow filter, while others may suggest a self-screen and an unscreened panchromatic, and so on.

The old portrait lenses, as well as the Petzval lantern objectives, are really excellent lenses for difficult architectural "bits." The large apertures permit of easy focussing, and fairly large stops may be used when only the centre of the negative is wanted for enlargement. My practice is to get my subject within a 3-in. square marked upon each half of the focussing screen, and let the remainder take care of itself.

This plan of working calls for a double quarter-plate camera, or one of the orthodox type with plates cut to fit, and, as so many workers have stereoscopic cameras lying idle, it may be that my hints may be of service to those who desire to find a use for them, and who, like myself, are sometimes puzzled to know what plate, exposure, or method of development will give the best result.

P. R. S.

FORTHCOMING EXHIBITIONS.

January 22 to February 5.—Northern Photographic Exhibition, Walker Art Gallery, Liverpool. Particulars from the Hon. Secretary, Liverpool Amateur Photographic Association, 9, Eberle Street, Liverpool.

February 14 and 19.—Leicester and Leicestershire Photographic Society. Latest date for entries, February 5. Particulars from the Hon. Secretary, W. Bailey, Cank Street, Leicester.

February 19 to March 5.—Edinburgh Photographic Society. Latest date for entries February 10. Particulars from the Hon Secretary, G. Massie, 10, Hart Street, Edinburgh.

February 19 to March 12.—Scottish Salon, Dundee. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

March 16 to 19.—Hackney Photographic Society. Latest date for entries, March 1. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

THE AFFILIATION DINNER.—The annual dinner of the Affiliation of Photographic Societies was held on Saturday last, January 29, under the chairmanship of Mr. G. C. Weston. A large company, including many ladies, spent an enjoyable evening, interspersed with items from a lengthy musical programme arranged by Mr. George Hawkings. The speeches were few. Mr. T. H. B. Scott proposed the toast of the Royal Photographic Society, to which Dr. G. H. Rodman replied. Mr. J. Vacy Lyle, in an exceedingly witty speech, proposed the toast of the Affiliation, in responding to which the chairman, Mr. Weston, referred to the things which the Affiliation had accomplished, and briefly outlined some of the directions in which he thought it was necessary for it to advance. Mr. W. L. F. Wastell proposed the toast of the Visitors and the Artists, to which Mr. Hawkings replied.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, January 17 to 22:—

COLOUR PHOTOGRAPHY.—No. 2,720. Colour photography. L. Keller-Dorian.

PRINTING-FRAME.—No. 2,530. Self-masking printing-frame for photography. C. J. G. Goodman.

REPRODUCTION METHOD.—No. 2,822. Photographic method for pictorial reproduction of a solid. L. Lumière.

STEREOSCOPY.—No. 2,339. Method of producing stereoscopic phenomena. T. E. R. Phillips.

CINEMATOGRAPHY.—No. 2,835. Cinematographic apparatus. T. Baron, A. E. Bettles, R. Neil, and F. R. Parnell.

CINEMATOGRAPHY.—No. 2,795. Cinematographic apparatus. S. H. Crocker.

CINEMATOGRAPHY.—No. 2,813. Cinematograph lantern shutters. H. F. Edney.

STEREOSCOPIC PROJECTION.—No. 2,584. Producing or projecting pictures showing a stereoscopic effect. B. F. J. Day and J. F. Duke.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

TRIPLET ANASTIGMAT LENSES.—No. 155,640 (September 22, 1919). The invention relates to an improved triplet anastigmat lens comprising three single lens components, of at least two different dispersions, each of which components has a refractive index for the D-line greater than 1.61, where the middle dispersive lens is placed symmetrically or approximately symmetrically (to within 10 per cent.), between the outer, double convex lenses, the combination having an aperture-ratio of at least 1 : 3.

It is well known that the symmetrical form offers considerable advantages in the correction of distortion, coma and chromatic difference of magnification. In fact these aberrations are automatically corrected in a symmetrical lens working at unit magnification. A photographic objective, however, is usually used at magnifications varying from zero to unity, so that the best result is obtained by correcting the lens at some magnification less than unity. This leads to some slight departure from the strictly symmetrical form. In the lenses to which the present invention relates, the separations and lens thicknesses are practically equal (within 10 per cent.), but the lens curves in front of the mid point of the system, *i.e.*, nearer the object, are shallower than those behind, but the difference in the powers of corresponding surfaces is no more than 25 per cent. of the power of the complete system. A better correction is thus obtained by slight departure from strict symmetry, without losing the advantages of symmetry.

Previously lenses of this type have been made of three glasses, in which the positive lenses are of crown glass, of high n_D and

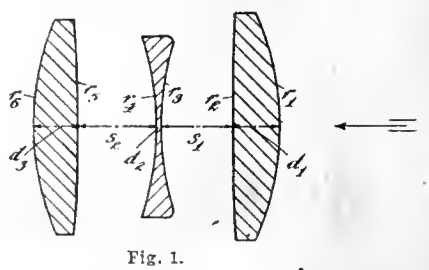


Fig. 1.

low dispersion, combined with flint glass of lower n_D and higher dispersion as described in Patent No. 15,107 of 1895, in which

the aperture ratio did not exceed *f*/6.5; also, in the case of a lens with aperture *f*/4 as described in Patent No. 22,607 of 1893, in which the positive lens consists of crown glass of low refractive index, combined with flint glass of higher negative index; also, in the case of a similar lens with aperture *f*/6, as described in Patent No. 4,714 of 1911. Also in the lens described in Patent No. 2,619 of 1911, where the mid lens is not placed symmetrically with regard to the outer lens, and these outer lenses are not double convex but plano-convex and meniscus respectively. Furthermore, in the first two cases it was stipulated that the coma ("diaphragm corrections") should be removed in all these lenses simultaneously.

Calculation has shown that this last condition is not necessary to the correct performance of a lens as a whole, and moreover, that to obtain a large aperture-ratio it is necessary to use glasses of high refractive index for both positive and negative lenses.

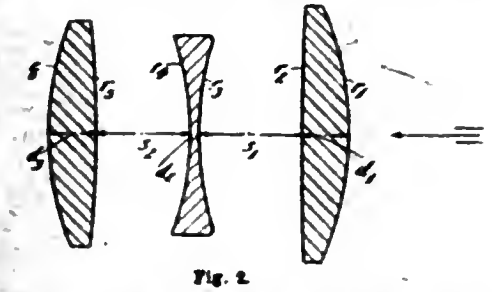


Fig. 2.

In a lens thus formed, the flatness of field is obtained by the use of highly refractive glass for the crown, and freedom from spherical aberration by the use of highly refractive flint.

Two numerical examples of lenses made according to the improved construction of the present invention, will now be described with reference respectively to fig. 1 and fig. 2 of the accompanying drawings; the letters PM. and C. referring to the catalogues of Parra-Mantois and Chance respectively.

EXAMPLE I. (Figure 1).

Equivalent focal length 1 unit; the radii, etc., being expressed in the same units. Aperture ratio F/3. Flat field of view 45 deg.

Radii	Thicknesses	Diameters	n_D	Nu-value	
$(r_1) + .4013$ / $(r_2) - 5.370$	(d_1) .06	.34	1.613	58. 5	PM.6540
Separation (s_1) .10			1.		
$(r_3) - .4702$ / $(r_4) + .4001$	(d_2) .01	.3	1.621	36. 2	C. 361
Separation (s_2) .1076			1.		
$(r_5) + 2.345$ / $(r_6) - .3794$	(d_3) .06	.3	1.613	58. 5	PM.6540

EXAMPLE II (Figure 2).

Equivalent focal length 1 unit. Flat field of view 35 deg. Aperture ratio F/3.

Radii	Thicknesses	Diameters	n_D	Nu-value	
$(r_1) + .4156$ / $(r_2) - 4.64$	(d_1) .06	.34	1.613	58. 5	PM.6540
Separation (s_1) .13			1.		
$(r_3) - .4266$ / $(r_4) + .3603$	(d_2) .01	.3	1.621	36. 2.	C. 361
Separation (s_2) .121			1.		
$(r_5) + 1.8138$ / $(r_6) - .3546$	(d_3) .06	.3	1.613	58. 5	PM.6540

—Taylor, Taylor and Hobson, Ltd., and Horace William Lee, B.A., Stoughton Street Works, Leicester.

The following complete specifications are open to public inspection before acceptance:—

AERIAL MAPPING.—No. 157,236. Process and apparatus for the production of maps from overlapping, oblique photographic views. Ipag. Internationale Aerogeodatische Ges.

COLOUR CINEMATOGRAPHY.—No. 157,196. Cinematograph projection of coloured and other images. E. Belin.

New Books.

Photographic Technique. By L. J. Hibbert. London: Sir Isaac Pitman and Sons. 2s. 6d. net.

MR. HIBBERT, in his preface, says the aim of this little book is "to deal thoroughly with the elementary stages of photographic technique." The editor of the series (of which the manual is one) declares that each book treats of fundamental principles "in a practical manner." Technique and fundamental principles! There you have a declared conflict of aims; for technique, even in the sense unrelated to fine art which it has come to have, may be (and usually is) empirical from beginning to end without reference to fundamental principles. We suspect that this little text-book has come to grief through these discrepant aims. Its obvious defect is unsteadiness of key, little flutterings between principles and technique. Flutter No. 1 is a spasmodic excursion into the wave-theory of light: a pretty subject, of course, but it soon has to be left in the lurch, because in such a manual you can't teach either the purely optical or the photo-chemical facts of photography in terms of that theory. Mr. Hibbert has a try at it, by way of "explaining" the formation of an image by a lens, but in the next paragraph (p. 23) he has exchanged the physical conception for a little flutter in geometrical optics, which adds nothing to the understanding of conjugate foci, and moreover contains a confusing literal error.

The fact is, he is trying to do a great deal too much in 115 small pages. He would have done better not to have gone so far back in the effort to relate fundamental principles to photographic operations. In the parts of the work where he is telling the student to do this or that, and is not over-anxious to assign a reason, he is altogether excellent—clear, concise, and technically correct without exception. We notice only one or two passages which invite a dissenting comment, *e.g.*, it is rather misleading to refer to bichromate as the "sensitive salt" in the carbon process; and the recommendation to use so strong a solution as 1 part of .880 ammonia with 3 parts of water as the darkening bath in mercuric intensification is surely a slip of the pen.

Bibliotheca Chemico-Mathematica. London: Henry Sotheran and Co. 1921. 2 Vols. £3 3s. net.

To catalogue over 17,000 books in any way whatever is a task of some magnitude, calling for a vast amount of clerical work and a large measure of skill in arrangement if the compilation is to be of service. What, then, must have been the total of the long and patient labour which has preceded the publication of this great catalogue of scientific and technological works? Though it is a commercial catalogue—the books are for sale—it represents the expenditure of precise scholarship on a scale without parallel in the sale of any other goods. Messrs. Sotheran have undertaken this great task as bookmen rather than book dealers, and have spared no pains to make the list a bibliographical work of great value. That such has been their aim is shown by the cataloguing of innumerable works which are offered at a shilling or two. On a mere sales basis it could not conceivably pay to compile or print the numerous entries for these latter. It can only have been done with the object of providing students and collectors with the knowledge gained at first hand by the sellers. The bibliographer is worthy of his hire; we hope that their courage in issuing these two large volumes will not go unrewarded.

Since the chemical, physical, and mathematical sciences provide the greater part of the subjects of the works here catalogued, an adequate review would be out of place in these pages. Even the photographic literature which is here represented we cannot discuss at the length it deserves in a notice of the "Bibliotheca," but we refer to it in an article on another page. Here, however, we must point some features of the catalogue. The arrangement is according to authors, and a great deal is done in giving the full names of authors identifying them with their chief discoveries or inventions, providing the key to pseudonyms, and introducing in the appropriate place, in the Appendix form adopted in the British Museum catalogue, particulars of books *on* as well as *by* a given scientific writer. The inclusion of the date of publication of

every work catalogued and the notes distinguishing different editions are other valuable features, but chiefly are to be mentioned the profuse annotations, some quotations from recognised authorities, others by the compiler of the catalogue. All this bibliographical commentary, as Mr. Sotheran very cordially acknowledges in the preface, is by Heinrich Zeitlinger, a German whose opinion of the modern Junker-dominated Germany may be gathered by such footnotes as "every book by a professor at Louvain will serve as a memorial of the irruption of the savages in 1914."

Exigencies of production have made it impracticable to make the catalogue one single alphabetical list. It comprises several such lists, viz., pp. 1 to 284 of vol. I., pp. 285 to 788 of vols I. and II., and a classified list, pp. 789 to 868 of vol. II. In looking up an author the student must therefore note that there are two main alphabetical lists. A key to the subjects treated in this vast collection is provided by a subject index which itself occupies nearly 100 pages, and is a highly analytical guide to the literature of the fields and sub-divisions of the mathematical, physical, and chemical sciences and their applications. Finally, the catalogue is enriched by 127 plate illustrations, reproductions of title pages of the classical books of science, drawings, diagrams, specimen texts and portraits. These add a relish, if such were needed, to the list. They serve to give prominence to the classical pieces of literature, but they are not necessary to the plan of this exceedingly valuable catalogue, which, without them, would still be a work both invaluable for reference and of inexhaustible interest to anyone dipping here and there in its pages.

News and Notes.

THE HACKNEY EXHIBITION.—Any exhibits sent to this Exhibition can be forwarded to Portsmouth and Hammersmith or other Exhibitions carriage paid.

TELECTRO PHOTOGRAPHY.—The current issue of the "World's Work," that for January, contains a long illustrated article describing the technics of the processes worked out by Korn, Belin, and others for the electrical transmission of photographs.

THE estate of Sir William Abney, K.C.B., D.C.L., D.Sc., J.P., of Measham Hall, Leicester, adviser to the Board of Education (Science Department) and an accepted authority on photography and the subject of colour vision, who died on December 2, has been proved at the gross value of £27,534, with net personalty £12,869.

DRAWING AND SURVEYING APPARATUS.—Messrs. Holmes Brothers (London), Ltd., Walthamstow, E.17, have just issued a catalogue of the drawing boards, T-squares, plane tables, and other appliances of the draughtsman and surveyor which are manufactured by them, and include also drawer cabinets for the storage of plans, etc., and printing frames for the making of photo-copies.

DEATH OF CAPTAIN G. R. ILLINGWORTH.—The many friends in the photographic industry of Mr. Thomas Illingworth will extend their sympathies to him and to Mrs. Illingworth in the death of their second son, Captain Guy Russell Illingworth, I.A., 91st Punjabis, who met his death in a motor accident at Poona, India, on January 21. Captain Illingworth was only 22 years of age.

Commercial & Legal Intelligence.

LEGAL NOTICES. Notice is given of the dissolution, by mutual consent, of the partnership between Ernest Foster and Joseph Thomas, carrying on business as sports and photographic dealers, etc., at 159, High Street, Poole, Dorset, under the style of Thomas & Foster. All debts due to and owing by the late firm will be received and paid by Joseph Thomas, who will continue the business.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, FEBRUARY 7.

Bradford Phot. Soc. "Natural History Photography." G. A. Booth.
Catford, Forest Hill and Sydenham Phot. Soc. Print and Lantern Slide Competition.
Cleveland Camera Club. Whist Drive.
Dewsbury Phot. Soc. "Amateur Photographer" Prize Slides.
South London Photographic Society. "Faking." M. O. Dell.
Walthamstow and District Phot. Soc. "Lantern Slide Making." E. Willcocks.
Willesden Photographic Society. "The Present-day Importance and Power of Photography." A. Dordan-Pyke.

TUESDAY, FEBRUARY 8.

Royal Photographic Society. "A New Method for the Measurement of Photographic Filter Factors." Raymond Davis. "A Description of a Monochromatic Illuminator Designed for a Special Purpose." F. C. Toy, M.Sc., A.Inst.P. "A New X-ray Plate, Reducing Exposures to One Twenty-Fifth; Its Special Applications to Radio-Metallurgy." Dr. Leonard A. Levy, M.A., F.I.C., and T. Thorne Baker.
Bournemouth C.C. "Blood Parasites." Dr. Coles.
Doncaster Camera Club. "Memories." C. F. Walker.
Exeter Camera Club. "A Loon in London." W. L. Wastell.
Hackney Phot. Soc. "Time and Tank Development." A. Dordan-Pyke.
Leeds Phot. Soc. "On the Track of the Raiders." R. Mackay.
Portsmouth Camera Club. Miss Kate Smith's Portfolio.
Rotherham Phot. Soc. "Amateur Photographer" Prize Slides.
Sheffield Phot. Soc. "Tank Development." G. W. McIntosh.
Stalybridge Phot. Soc. "Egypt and the Nile." T. E. Briggs.
Welfare C.C., Linthouse. Scottish Federation Portfolio.

WEDNESDAY, FEBRUARY 9.

Accrington C.C. "Wandering in Southern Italy." T. H. Greenall.
Croydon C.C. "Flashlight Photography." A. Dordan-Pyke.
Dennistoun Amateur Photographic Association. "Finishing the Exhibition Print." A. T. Edgeley.
Ilford Phot. Soc. "After Dark." H. Creighton Beckett.
Partick Camera Club. Whist Drive.
Photo-micrographic Society. "Some Problems in Photo-micrography." H. C. Whitefield.
Rochdale Phot. Soc. "Irish Wit and Humour." A. H. Turner.
Woodford Phot. Soc. "Mounting and Framing." T. W. Pallet.

THURSDAY, FEBRUARY 10.

Brighouse Photographic Society. "The Evolution of the English House." Hugh P. Kendall.
Camera Club, The. "Architecture off the Beaten Track in the West." C. H. Horton.
Everton and Dist. Phot. Soc. "Along the Rhine." J. W. Hobson.
Hammersmith (Hampshire House) Photographic Society. "Northern Europe." C. Atkin-Swan.
Hull Photographic Society. Lecturette Evening.
Kryn and Lahy (Letchworth) Phot. etc., Soc. "Seymour" Flower and Fruit Slides.
North Middlesex Phot. Soc. "Essentials in Photography." Louis Dick.

FRIDAY, FEBRUARY 11.

Bedford C.C. "Experiences in the Late War." Dr. G. T. Birks.
Birmingham Photographic Art Club. Enlarging Evening.
Glasgow and W. of S. Amateur Phot. Assoc. Whist Drive.

SATURDAY, FEBRUARY 12.

Glasgow and W. of S. Amateur Phot. Assoc. "Bagdad and its Environments." J. Davidson.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, February 1. Following routine business, the president vacated the chair in favour of Mr. E. W. Mellor.

Mr. P. King delivered a lecture on commercial models of cinematograph camera, illustrated by a large number of lantern slides, and also by exhibits of the actual apparatus. Like the photographer's stand camera, although in a different way, the cinematograph camera has its "movements," which from the nature of things are altogether different from those which in ordinary photography are contrived for the more effective use of a lens which may be of any focal length from, say, 5 to 20 inches. But in the cinematograph camera the optical system is of negligible importance, that is to say, in respect to the design of the camera. When it is remembered that a 2-inch lens on a cinematograph picture is

working at the quite narrow angle of 30 deg., whilst the cinematographer will rarely use a lens of greater focal length than 5 or 6 inches, it will be understood that it is not the purpose of the camera to help out, so to speak, the performance of the lens. On the other hand, the cinematographer requires to do a host of other things with his camera—view the picture whilst exposure is taking place, vignette the picture down to a vanishing point and back again whilst the film is running, combine accurately two exposures on each of the tiny film sections, run the film at speeds much less or greater than the normal 16 pictures per second. The list might still be added to and then not exhaust the "movements" which particularly for trick effect work is required of the camera. Mr King dealt very explicitly with the commercial patterns of camera on the market, explaining the different ways in which these various functions were performed, and showing the different degrees of complication of the respective mechanisms. He was fortunate in having persuaded to come to the meeting the makers or designers of a number of the instruments. Following his lecture, Mr. Van Neck explained and demonstrated the "Aeroscope" air-driven cinematograph hand-camera; Mr. Vinten showed the camera of his design; Mr. Arthur S. Newman delivered quite a little lecture on the almost human movements of the Newman-Sinclair camera; a representative of Messrs. Moy showed this firm's camera; Mr. Colin Williamson very clearly explained the technics of the cameras of his design; and lastly, Mr. King himself, on the suggestion of Mr. Colin Bennett, showed and briefly explained the De Brie camera.

Votes of thanks to the lecturer and to these demonstrators brought the proceedings to a close.

CROYDON CAMERA CLUB.

The annual general meeting was held last week, when, as anticipated, everything was found to be in a thoroughly satisfactory state. Mr. Ackroyd, the treasurer, announced a good profit for the year, apparently derived from ever-threatened deficits, for the rent alone of the club rooms about equals the subscriptions. The hon. secretary still sticks it, plaintively remonstrating at appropriate and disregarded intervals. He read a shorter report than usual, couched in congratulatory vein. Once again, right through the year the club has run a continuous round of lectures and demonstrations. Mr. Inskeep preserves the best traditions in the refreshment department, and the "office boy" continues his rest cure with unabated zeal.

As regards President John (surnamed "Keane"), under a rule limiting office to two years, resignation, desired by him, would have been secured automatically. This rule was made many years ago to meet the special case of a fixture in the chair. No further need for it exists, and it, and not the president, received the order of the boot. Right well has he served for four years with a gap midway, and has most materially helped to carry on during trying times. As a slight recognition of this, a few friends conferred with one another, and last Wednesday the conspiracy bore fruit in the shape of a presentation to him of a handsome clock.

Prior to the imposition of an entrance fee (the subscription remains unchanged) new members were rapidly roped in to the "house full" point. Subsequently the rush materially abated, though whether this be cause and effect or merely coincidence cannot be stated. As illustrating the peculiar lure of Croydon, one new member, whose initials are appropriately "O. D.," travels from Hendon; the latest hails from Battersea; and, to cap all, an application for membership was received from a sporting resident in Sarawak—a Britisher, not one of the wild men of Borneo, as might be expected.

At the end of the proceedings Mr. Salt sternly indicted the president and secretary, the charge being that, on divers occasions, they had discharged out of their own monies certain obligations which in fairness ought to have been met by the club. He regarded this misappropriation of liabilities as one of the worst cases which had ever been brought to his notice, and asked that the accused be severely dealt with. Thanks largely to a well-intentioned defence put up on their behalf by Mr. Harpur, both were unanimously found guilty, and the Council was directed to take all steps to prevent a repetition of the offence.

LANCASHIRE SOCIETY OF MASTER PHOTOGRAPHERS.

A general meeting was held at the Albion Hotel, Manchester, on January 26. Among those present were Messrs. F. Read, J. W. Stott, W. H. Baylis, Duke Dawson, F. Cummins, F. Kenworthy, R. H. Greswell, J. S. Browne, H. Taylor, W. G. Frisby, E. J. Carr, W. T. Carter, J. W. Berry, B. Goodman, A. Goodchild, and A. Walmsley.

Mr. Fred Read, president, took the chair. In the absence of the secretary, Mr. Hulse, Mr. J. S. Browne acted *pro tem.*

The question of Sunday closing was raised by a letter from Mr. Parkinson, of Warrington, and was discussed by Messrs. Goodman, J. W. Berry, R. H. Greswell, and F. Kenworthy, among others. Mr. Walmsley, in response to a request for his views, said that he had done a great deal more business since he adopted Sunday closing. On the proposition of Mr. Kenworthy, seconded by Mr. Carr, it was decided that all members should be asked to vote on the question.

The hon. solicitor, Mr. J. G. Mahaffy, then gave a short address on the Rent Restrictions Act as applied to business premises. He outlined the chief points of the amended Act which shortly comes into force, and pointed out that it provides a much greater degree of protection for tenants of business premises, since it gives greater security of tenure to the person who has established a profitable business and so enhances the letting value of premises occupied by him by creating a valuable goodwill. Moreover, the owner or agent was compelled to offer suitable alternative accommodation, a somewhat difficult matter in view of the nature of a photographer's business. Mr. Mahaffy advised any of those among his audience who might receive a blue form from the landlord to take no notice of it; if necessity compelled them, they might consult their solicitor, who, he thought, would be able to set their minds at ease. A hearty vote of thanks was accorded to Mr. Mahaffy for his address.

Mr. J. S. Browne then introduced a discussion on prices and price cutting. He quoted from letters and price lists received from manufacturers, one of whom stated that there was no immediate prospect of any reduction in prices owing to the continued high level of the cost of raw materials and wages, whereas another notified the introduction of postcards at a reduction of 10s. per thousand and with offer of a larger discount.

Mr. R. H. Greswell spoke at some length on the subject in special reference to photographers keeping up prices to a working level consistent with the prevailing figures for labour and materials. The general conclusion was one of deprecation of the British manufacturers in maintaining the enhanced prices which it was found necessary to impose during a period of great shortage under war conditions. Manufacturers were no doubt aware that at the present time the market was receiving foreign materials which were much cheaper, and the consumer could not be blamed if he bought in the cheapest market to the disadvantage of the British manufacturer.

A vote of thanks was accorded to Mr. J. S. Browne for his services in organising the meeting, which then adjourned to a larger hall and spent the rest of the evening in the enjoyment of a musical programme arranged by Mr. W. H. Baylis. A vote of thanks to the artists contributing the entertainment was proposed by Mr. F. Kenworthy and seconded by Mr. W. T. Carter.

DENNISTOUN AMATEUR PHOTOGRAPHIC ASSOCIATION.—Last week, members were treated to a most instructive and interesting "Elementary Talk on Lenses," by Mr. G. F. Burrell. The speaker gave a brief *resumé* of the principles of optics and the formation of images. Proceeding to the aberrations of lenses, he explained spherical and chromatic aberrations, astigmatism, curvature of the field and distortion, and indicated the methods used in their correction. The lecture was illustrated by means of apparatus devised by the speaker—a spectroscope and a lens-testing bench—on which the various aberrations were pointed out. Mr. Burrell promised to give a further talk on the subject this (Friday) evening, February 4, and members are asked to bring any lenses which may not be giving satisfaction to the meeting room, 27, Hillfoot Street, and have them tested.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers o e given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

RAILWAY PHOTOGRAPHERS.

To the Editors.

Gentlemen,—Mr. G. W. Atkins in his letter (published in the "B. J." dated January 21) throws an interesting side light on early railway-photographic history, his story of seeing Mr. Bridge at work at the North London Railway's Works in 1869-1870 proving Mr. Bridge to be one of the earliest railway operators.

Those of us, however, who are particularly interested in photographic history have always looked upon the elder Thomas Scotton as being the first of the really official workers, and talks with old photographic and railway hands at Derby and elsewhere have convinced me of the fact that Mr. Scotton was working—solely and officially—for the Midland Railway Company in July, 1876. There were, of course, photographers at work for railway companies long before this date, but they were called in from their own businesses to do the work—as Mr. Bridge probably was, and Mr. Scotton, too, before his appointment. Derby photographers before 1876 appear to have shared the Midland's work, for many of the early Midland engines (before 1876) were photographed by Mr. W. W. Winter of Derby.

The archives at Derby must contain an immense quantity of interesting photographic-railway material, the collection of which was begun before the days of Mr. Scotton. There is, for example, a set of 15 × 12 wet-plate negatives of plans showing the proposed St Pancras Hotel and station, and although not dated it is said they were made in 1855-1856 by a Mr. Warwick, who at that time was employed in the company's telegraphic department.

The Midland did not bring its railway to London until 1866, although it was talked of and preparations made many years before, the palatial terminus not being built until 1873-1876.—Yours faithfully,

L. Tennant Woods.

KEY INDUSTRIES.

To the Editors.

Gentlemen,—Your correspondent C. L. Smith seems to hit the nail on the head. We, as professional photographers, at the present time are very much imposed on by manufacturers of all sensitised surfaces.

It is a fact that an extremely strong arrangement exists between the makers of all these articles. It is certainly not a ring, as rings and trusts are not allowed by law for the purpose of controlling prices, but it is patent, owing to the fact that practically every maker of sensitised material in this country has identical price lists, identical terms, and wholesale and professional lists common to the whole of them, that the profession is up against a price maintenance arrangement.

During the war, when there was practically no competition, one did not trouble very much about this, and any costs were put on to the finished article, but matters are very quickly becoming different. We are up against lower selling prices, yet we get no consideration whatever from the controllers of British sensitised materials. A certain amount of foreign material is now coming into the country at prices in some cases a little more than half the war prices, which are still being maintained by British sensitisers. The cost of silver has come down, the cost of raw materials has come down, and many of our makers are actually getting baseboard, and even glass, from the Continent at very much lower prices than they had to pay for the home-made article during the war, and it is evident that they do not intend to give us any advantage until they are compelled.

It is rather surprising that they should wait until inquiry commences as to prices before they see fit to reduce their figures. "Much wants more" is very true in their case, for, looking round, it is easy to see that many of the firms with extensions, and their principals in evident affluence, are doing well. Nobody wishes them otherwise, but at the same time they ought to give a little consideration to their humbler brethren in the trade.

If the Professional Photographers' Association get busy at once they will have no difficulty in proving when the time comes that it is not to the good of the photographic profession of this country that they shall any longer be without the advantages of reasonable competition by foreign and allied makers.—Yours truly,

Alfred Jones.

26, Grange Terrace, Halifax, January 28.

MATT GROUND PLATES WANTED.

To the Editors.

Gentlemen,—Now that we are settling down to business again after the war, and getting most of the materials we are in need of—if we can afford to pay for them—may I, through your columns, ask the plate-makers to give matt ground plates another and a fair trial? We have now amongst us hundreds—possibly thousands—of new workers who have never heard of matt ground plates, and it is possible that such plates would become very popular.

The first matt ground (or surface) plates I met with were those made—experimentally, I believe—by Mr. E. J. Wall, a generation ago, and some years later the Leto Company placed an "Edwards" matt ground plate on the market, but these, I understand, were not a commercial success. Only last week I came across an opened box of these old plates (batch No. 5,890), and they are as perfect to-day as on the day of manufacture.

The advantage of having dry plates, with a ground glass-like emulsion, was appreciated by those who used them, and the advantage will be obvious to present-day workers who may have had no experience with them. I do not suppose for one moment that matt plates would replace the clear variety, but there should be a good sale for them among portrait and landscape workers. I do not suggest that all plate-makers should issue them, but they might agree that one firm should again give them a trial, the other firms following if the plates were found to be a success. Failing this arrangement, could such plates be made to order?—Yours faithfully,

H. Green.

WARMING THE STUDIO.

To the Editors.

Gentlemen,—I am sorry to have to disagree with my old friend, Mr. F. E. Jones, but when he expects us to accept his statement that 5 cubic feet of gas per hour, however consumed, will warm a studio, he is asking too much. It may do so just now when the temperature outside is higher than last July, but it is quite impossible to keep a fairly large studio really warm in frosty weather with two *large* gas radiators. The Ventiheta might keep an ordinary room, with small windows, from being chilly, but I am quite sure it would not make a studio comfortably warm. And a studio must be warm in winter. We cannot get a pleasing portrait of a sitter who is shivering with cold.

After some thirty years of constant studio work I ought to know something about it. And no one but a photographer knows the difficulties of making the studio comfortable at all times of the year. In the summer it must be kept cool, if possible. This cannot always be done; but in the winter it is possible to keep it warm, if adequate arrangements are made. Five feet of gas per hour is not adequate, especially with 2,000 feet of air pouring in from outside, when it may be freezing hard. I remember a stove which worked on that principle, but in cold weather it failed to keep even a small office warm unless we stuffed a duster into the air inlet.

I have tried many ways of warming studios—coke stoves, open fire places, plus gas radiators, hot-water pipes, and lastly an anthracite stove, the last has proved the best; but the ideal would

an open fire-place, plus hot-water pipes. A stove or a fire-place gives an air of cosiness to a stodio, which is a valuable asset in making a sitter feel at ease.

I work in a studio measuring 33 ft. x 21 ft., and, of course, there is a large area of glass, and the room stands free of the rest of the building, except at one end, so that the two sides and one end are outside walls, at the top of a building exposed to every wind that blows. Does Mr. Jones ask me to believe that 5 feet of gas per hour is going to keep that room warm?

During the sharp spell last December I had to use a gas radiator for an hour or so every morning to get the studio really warm, when the stove alone was sufficient. The moral of which is—always have some means in reserve of raising the temperature. I am quite sure that the most convenient, most efficient, and cheapest means of heating a studio, in the absence of hot-water pipes, is an anthracite stove.

Mr. Atkinson, I think, has misunderstood what I wrote about galvanised pipes, or perhaps I expressed myself badly. I did not mean that the flue-pipe should not be galvanised, but that the ordinary galvanised pipe of thin sheet iron, which is soon corroded into holes, should not be used, but one of cast iron. Aluminium paint can be used for such a pipe quite successfully, but it makes the ugly pipe rather conspicuous; ordinary blacklead would be better, especially if the stove can be fixed in a shady part of the room.—Yours, etc.,

COMFORT.

AN IMPROVED BOX PRINTER.

To the Editors.

Gentlemen,—It was with very much surprise that I read in Mr. Drinkwater's article on the box printer the words, "It seems as if there were no powers of control over exposure other than shortening or lengthening the period of contact. There are no means of locally intensifying or reducing the power of the light, to overcome inequalities in opacity in various parts of the negative, and this is a control that is at times very urgently needed." I am still wondering what kind of printing box Mr. Drinkwater has been using, because in all those I have seen the arrangements for control are excellent. The first printing box I used I made myself, and arranged so that any shading of the various parts of the negative could be done with ease.

A few inches above the lamps a sheet of glass is fixed, upon which sheets of waxed paper can be laid to diffuse the light, and these can be made of any shape necessary to reduce the light where required; if a part of the negative needs more exposure, the paper can be cut away to allow more light to reach the negative. But the means of shading is only used when broad spaces have to be controlled. For instance, in one 12 x 10 negative of a long, narrow picture six sheets of waxed paper were used at one end and only one at the other. The first sheet was laid upon the glass full size, the next was cut an inch or so shorter, and so on. For controlling the light for smaller parts a second sheet of glass is fixed about an inch below the piece of plate supporting the negative; on this tissue paper can be laid, cut to the necessary shape, and, if necessary, parts can be shaded by working on the paper with black lead or chalk. If still more exact shading is required, a piece of common ground glass can be laid immediately under the negative and worked on with black lead. If it is desired to give more light to some part, a little olive or other oil can be painted on the ground glass to make it more transparent. Surely here is control enough without moving the lamp at all.

I find that I get the best results by keeping, where possible, to an exposure of five seconds, with ordinary bromide paper. If the negative is thin more waxed paper is laid on the glass shelf, and if it is dense the paper is taken out; and if the negative is one that is likely to be used again a note of the number of sheets of paper used, and also the developer, can be made on the envelope.

Working with a regular time of exposure often prevents waste of paper through wrong exposure, because it is quite easy to forget the time, if it changes with each negative; for example, if a large number of prints have been receiving seven seconds and the next negative, after trial, is found to need only four seconds, an absent-minded printer (and there are such people about) may forget all about the four seconds after he has printed one or two and give the next seven seconds, quite unconsciously, and does not find it out until the prints are developed. I have done it more than once myself. Then it is easier to time five or ten seconds more accurately, owing to the divisions being more clearly marked on the clock face. It is not difficult with average negatives to control the light by adding or removing tissue paper so that five seconds may be the correct exposure.

Mr. Drinkwater's arrangement of having 17 lamp holders inside the box would need a huge box to take them, and the board on which they are fixed has to be moved up and down to secure control of lighting. This seems to me like putting the fire in the middle of the kitchen and making the joint revolve round it to cook it equally, instead of having a fixed fire and turning the meat round with a jack.

It appears to me to be better to arrange the lamp holders to give the most even lighting possible, and then control it locally when required.

To enable the 100 c.p. lamp to be lowered to 23.5 in. from the negative means having a box at least 30 in. deep. Altogether it would be a very big and clumsy thing for the printing room of the average provincial photographer. And I do not think it would be as effectual in securing control of lighting, nor so convenient to use, as a very much smaller box, such as those already on the market.—Yours, etc.,

BIFOCAL.

HUMOURS OF PHOTOGRAPHY.

To the Editors,

Gentlemen,—During the course of a discussion recently, a friend suggested that photographers, as a rule, lacked a sense of humour, and claimed as a proof of this statement the fact that there are no humorous photographic short stories or anecdotes to be found. Whilst disagreeing with the first statement I was bound to accept the "so-called proof" as true, at the moment, but merely because no effort had ever been made to record humorous photographic incidents. Are there any good stories of photographic humour to be found, amateur or professional? Surely some of your readers could supply at least one. It would afford me the greatest possible pleasure to compile a collection of such storyettes, etc., and to present a copy of the completed work to each person contributing to it: also, provided fifty or more are forthcoming, to offer a prize of £2 2s. for the best and most humorous contribution. I feel sure that such a collection is possible, and if you will grant space in the "B.J." for this letter, an interesting, entertaining and desirable book might be obtained.—Yours most faithfully,

WILLIAM A. RICHARDSON.

81, Rayleigh Road, Wolverhampton, Staffs.,
January 29.

THE P.P.A. EXHIBITION.

To the Editors.

Gentlemen,—May I, through the hospitality of your columns, inform members of our profession that the P.P.A. annual Congress is fixed to take place at the Royal Horticultural Hall, Westminster, in April next, and that my Council are arranging a very attractive programme?

The particular object of this letter is to call attention to one of its most important features, viz., the picture exhibition, which, for the first time, will include specimens of "technical" with that of "portraiture."

The Exhibition Committee are engaged drawing up the rules, which will shortly be in the hands of the members. My desire is to call attention to the importance of this opportunity to exhibit, from a "publicity" point of view, and to urge all those whose ambition it is to be "hung" to begin looking up suitable pictures, so as to be ready when "sending in" time arrives.

If any assistance or information is needed, a letter addressed to the honorary secretary, Mr. Marcus Adams, 83, White Knights Road, Early, Reading, will, I am sure, receive his courteous attention.—Yours faithfully,

LANO SIMS,
General Secretary.

THE POSITION OF PHOTOGRAPHIC SOCIETIES.

To the Editors

Gentlemen,—On the actual subject of this discussion we have nothing to add to our previous letter. We should, however, like to assure "L. P. W.," whose letter you published on January 21, that the details he gives of our origin are quite correct. At first we were composed of the president and his more enthusiastic pupils—a group of keen workers led by an expert, which is precisely the base on which one would suppose any photographic society would be built. As to the future, we hope by adapting our methods to changing needs we shall continue to grow and keep our members interested. We must apologise for thrusting these comments about ourselves into a correspondence which we were hoping would develop along lines likely to be of material assistance to any societies in the "moribund" condition described by "Fuller Hope."—Yours faithfully,

The Catford Camera Club,
F. COLEMAN,
Hon. Sec.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent. International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

G. B.—The makers of the metal frames known as "Arco" are Messrs. Whitehouse, Willetts & Bennion, Ltd., Tything, Worcester.

G. & Co.—A 10-inch lens of *f*/5.6 to *f*/6 aperture should be satisfactory, and practically any of the anastigmats of this aperture by leading makers should serve your purpose.

A. B.—(1) Certainly send in your bill when the print is published. (2) Presuming that you have definite permission, preferably in writing, you follow exactly the same course as regards charging for the right of reproduction granted by *you*.

K. B.—We think you will have to write to the original publishers of the "American Annual." Messrs. Murphy, of New York. Still it might be worth while trying Messrs. W. & G. Foyle, Ltd., 121-123, Charing Cross Road, London, W.C.2.

A. D.—You should apply to the Magna Gelatine Plate Co., 2, Eastborough, Scarborough, from whom you can get a little sixpenny book containing formulæ for developing-fixing. The company supplies the sensitive material, though whether in reels we do not know.

H. E.—In the absence of dimensions it is not possible to speak with certainty. If the side-light is 12 or more feet in height it will answer very well. The obstruction caused by the end walls if the glass were carried in depends on the length of the studio. As to cost of alterations you must consult a local builder.

C. K.—Put a teaspoonful each of olive oil and vinegar in a saucer and dip a soft piece of flannel in the mixture, rub gently on the frame and polish till quite dry with a soft clean duster. If there is any pattern use a very soft brush to finish polishing. This will take off the smoky look, but will not give a "treacly" surface like a varnish would.

C. L.—If you are limited as regards candle power probably engineer's tracing cloth would be a more suitable diffuser than paper or muslin. We should think, from what you tell us, that a single half-watt lamp of about 1,000 c.p. would be the best for your purpose. You can hardly do with less, but one lamp of this power is quite satisfactory for single figures.

W. R.—Aluminium is about the worst metal for a tank containing an alkaline solution such as a developer. Nickel steel is perhaps the best material, though somewhat difficult to work. We should not advise copper for a solution containing ammonia, although for almost all other photographic solutions it is quite the best for the purpose. Personally, we think a well-made hardwood tank is better than any of metal.

E. C.—A 7-inch lens (your No. 3) is about the best focal length for such an interior subject. You will probably need to use it at from *f*/8 to *f*/16 aperture. Difficult to say how much powder you would need, but probably, if the walls are of dark colour, ½ oz. would not be too much. If you have not a lamp, the powder should be laid in a train in some shallow metal trough of about 18 inches length, firing it by means of a piece of touch-paper or a tuft of gun-cotton placed about midway in the train.

W. T.—If, as we understand you, the camera extension, diaphragm aperture and other conditions, remained the same for the exposure of both the 8½ x 6½ and 24 x 18 plate, then obviously there is no cause, connected with these factors, for the difference in the light-action on the plate. It is not unknown, of course, for plates of the same batch number to vary in speed, but yours appears to be a regular occurrence, so can hardly be put down to that. So far as we can judge from the particulars given there is nothing to account for the difference.

A. W.—The double-pose photographs are very simply made by arranging the model against a dark background and exposing the plate twice, the model meanwhile moving over from one side of the background to the other. If you want any background other than a dark one, then you must use a shutter on the lens in form like a pair of opening doors, making one exposure with one door open and the other with the other door open. We think you can still obtain from some of the dealers a shutter for this purpose, but it is not a difficult matter to make one.

J. B.—(1) You might try easing the leaves of the iris with a little very thin oil, such as is sold for the lubrication of typewriters. But it is a rather delicate job, and you can easily damage the iris by using any force. We should think it is a case for having the iris overhauled, say, by Messrs. Fairbrother & Bowen, 9, Farringdon Avenue, E.C., which is a firm specialising in these kinds of repairs. (2) We have no doubt that at *f*/16 of *f*/22 the lens would cover a whole-plate quite well enough for groups, but we do not think you would be satisfied at larger apertures. The lens of the same series for whole-plates has a focus of 10½ inches.

W. A.—(1) There is no view-finder which you can fit to a camera which will provide a reliable means of keeping the subject in focus on the ground-glass after the dark-slide has been inserted. The only means of doing that with any degree of certainty is with a reflex or a twin-lens camera. (2) Yes, some wood, and particularly new wood with a good deal of resin in it, is liable to fog plates and in some cases to make them insensitive. We expect the wood you have is old and probably is free from this defect, but you could easily make sure of it by painting it with a fairly strong solution of permanganate and allowing it to remain in bright light, sunlight if you can get it, for a day or two.

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THE BRITISH

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Contents.

SUMMARY.

Regular receipt of the Continental photographic journals having been re-established, we are able to revive the "Foreign Notes and News," which in pre-war days were a regular feature. The first instalment contains notes on panchromatic sensitisers, bromoil, light-sensitiveness of collodion and colour toning with colloid silver. (P. 77.)

The incorporation is announced of Amalgamated Photographic Manufacturers', Ltd., formed by the fusion of the Paget Prize Plate Co., Ltd., Rajar, Ltd., Marion and Co., Ltd., Marion and Foulger, Ltd., A. Kershaw and Son., Ltd., the Kershaw Optical Co., Ltd., and the Rotary Photographic Co. (1917), Ltd.

The new company has an authorised share capital of £1,100,000, and is offering cumulative participating preference shares to the amount of £250,000 for public subscription. (P. 79.)

Other particulars of the amalgamated firm, of which Messrs. Gerald Bishop, of Marions, and C. F. S. Rothwell, F.C.S., of the Rajar Co., are joint managing directors, will be found on page 83. It is proposed to equip an existing factory of Messrs. Kershaw's at Leeds for the manufacture of popular plate and film cameras.

The Honble. Sir Charles Parsons, K.C.B., F.R.S., has acquired a controlling interest in Ross, Ltd. Mr. John Stuart, C.B.E., remains on the board. (P. 86.)

In a leading article we trace the stages through which the use of quinone in toning and intensifying has passed, following the first suggestion of it by MM. Lumière in reference to the hitherto unexplored field of the employment of organic substances for such purposes. (P. 74.)

Mr. A. Lockett gives some interesting particulars of the application of lens aberrations in the making of decorative patterns. (P. 76.)

In a contributed article Mr. Arthur G. Willis describes a simple scheme for discovering the direction in which studio practice, as regards exposure or development, can be improved. (P. 75.)

A reduction is announced in the price of half-watt lamps. (P. 86.)

Time-saving hints on the use of printing boxes are given in an article from "Rajar Trade Notes." (P. 80.)

A hand-drawn miniature, almost entirely monochrome, is something of a novelty in this style of portrait. (P. 74.)

Development in a tank with a specially weak solution is often of great advantage in the making of view negatives. (P. 73.)

Methods devised for the making of platinum mirrors are described in a recent patent specification. (P. 81.)

Mr. Chapman Jones is to deliver a memorial lecture on the work of the late Sir William Abney. (P. 81.)

Formulæ for warm tones in the development of lantern-plates were given by Mr. B. C. Wickison at Croydon. (P. 85.)

EX CATHEDRA.

Amalgamated Photographic Manufacturers Ltd.

The firms whose amalgamation into this company is announced are evidently following the example of many concerns engaged in such various industries as chemicals, engineering, glass and textiles. A prominent motive in consolidations of this kind is a reduction of the cost of selling goods; and we understand that this consideration applies in large measure in the present instance. The individual user in this country may perhaps think the means out of proportion to the end, but in overseas business, which is an important matter to all photographic manufacturers, a conjunction of interests has come to be an almost necessary condition of personal and adequate representation in foreign countries. What one firm alone could never afford to do at all, a union of firms can undertake at an economic rate. And as the volume of foreign trade is a factor which largely determines moderate home prices, it may be thought that the amalgamation, instead of being a movement to maintain or increase prices, as some may readily be disposed to regard it, has as an object the reduction of prices; or at any rate, the avoidance of their further elevation.

* * *

Stand Development and Contrasts.

Those photographers who sometimes undertake local view work will be aware that it is desirable that any cloud forms existent at the time of making the exposure should be retained in the original negative, in preference to printing in clouds separately. It is not an easy matter in the case of subjects containing the delicate high-lights of cloud forms at one end of the scale and deep shadows of trees or buildings at the other, to retain the clouds, while at the same time full printing detail is obtained in the shadows. Many photographers are not aware what a real help stand development, with a very dilute solution, can be in cases like these. Only the other day we were shown a negative that included the most delicate of cloud forms, though with full detail in its deep shadows. Subsequent conversation elicited the fact that the photographer used plates of the "anti screen" variety, and gave a full exposure. Stand development, with a very dilute solution, ensured the retention of the gradations of the high-lights, while the shadow detail was fully brought out. Ordinary development, with the normal strength solution, would have clogged up the high-lights long before the requisite density was obtained. The correct rendering of high-lights and deep shadows upon the same plate is, at the best, from the technical point of view, a compromise, but the stand method of development provides the finest results in cases like this. The hint may prove of value, not only to the outdoor worker, but also to the portrait or commercial photographer, when encountering difficult lighting and contrast in his subjects.

Monochrome Miniatures. We have recently seen some old miniatures drawn upon ivory in a sepia tint with the cheeks and lips indicated in colour, which would seem excellently adapted for imitation by photography. The ordinary miniature, if well coloured, is an expensive luxury, and unless the work is really well done is not acceptable to discriminating patrons. The tinted sepia on the other hand has a refined appearance and calls for little hand work. The ordinary warm sepia is not a suitable colour; a cold sepia or brown, of which several tints can be obtained, is very much better, even a warm black being suitable for some subjects. If the production of the print on ivory cannot conveniently be done at home, it is wise to entrust it to a trade firm at the cost of a few shillings. These little pictures should be shown either in the orthodox gilt rim or, what is perhaps even better, in the antique style of a square black frame with an oval opening with gilt rim.

* * *

Damp Materials. It is an established fact that dampness, even in a slight degree, is detrimental to the production of perfect results either upon plates or paper, and at the present season it is difficult to avoid it, unless a very dry and somewhat warm storage place is available. As a rule, a certain quantity of sensitive material has to be kept in the dark room, near a wet sink, and such a condition is inimical to quality. Damp may largely be avoided by obtaining an air-tight tin case—some of the Army boxes now on the market are excellent—and placing therein a perforated tin containing calcium chloride, the form used in the platinum process being the most convenient. As there is little dampness in the materials when received the calcium will keep active for a considerable time, but upon the slightest appearance of dampness it should be well dried either in a hot oven or even upon a fire shovel over a clear fire or gas ring.

* * *

Lighting Printing Boxes. Referring to recent letters upon modifying the light in printing boxes to suit negatives of various densities, a correspondent suggests the trial of an arrangement which he has found satisfactory. It is to fit as closely together as possible two or even three lamps of varying power, say a 16 c.p. carbon lamp, a 32 c.p. metallic filament and one of the smaller gas-filled or "half-watt" bulbs. A small three-way switch permits of the current being directed through any of these without interfering with the regular exposing switch, which always remains in use. The portrait photographer, whose negatives do not vary greatly, may not require such an arrangement, but for amateur work it is invaluable, as very dense or stained negatives cannot be successfully printed by a weak light, no matter how long an exposure is given. It also affords a ready means of shortening exposures with gaslight papers or weakening the light for thin negatives with bromide paper. In extreme cases waxed paper may be used to damp the light further, but this will rarely be found necessary.

* * *

Developing Tanks. Although tank development is growing in favour among professional photographers, there are still many who have given the subject but little consideration and have not grasped the difference between the amateur tank which is designed for daylight developing and the open tank which has to be used in the dark room, the type generally used for studio work. For service and economy a well-designed tank is absolutely necessary, and once such an appliance has been tried the owner will be loth to return to dish development. We are in favour of those models in which the rack is movable, so that the plates after being placed in the grooves need not be handled until they are put out to dry. It is advisable to have several extra racks, so that when a large number of plates have to be dealt with there is no delay in working. Necessarily washing takes longer than developing, and this keeps the racks out of use. If the tank is closely built and the grooves of the racks are fairly close together the minimum solution is needed, and a stronger developer than is generally prescribed may be used with a corresponding decrease in the time of development. If there are not sufficient exposures to fill the rack the solution may be kept up to its proper level by putting in a block of wood well coated with paraffin wax to fill the vacant space.

QUINONE IN REDUCING, INTENSIFYING AND TONING.

THE recent paper by MM. Lumière and Seyewetz on the use of quinone and other oxidising agents for the conversion of silver images into bromide or chloride marks the latest stage of a series of experiments, the first of which dates from more than ten years ago. Since the employment of an organic oxidising agent for this purpose represents a process which has been little applied to such photographic operations as reduction, intensification and toning, it may be of advantage to trace the stages through which it has passed. MM. Lumière and Seyewetz first drew attention to the use of quinone as a reducer of negatives in a paper[1] read before the International Congress of Photography at Brussels in August, 1910. They found that certain quinone bodies in acid solution act as reducers, giving effects similar to that of persulphate. The bath found most suitable was the following:—

Benzoquinone	5 gms. ...	45 grs.
Sulphuric acid	20 c.c.s. ...	3 drs.
Water	1,000 c.c.s. ...	20 ozs.

This is a solution of clear yellow colour at first, becoming brown in time, even in the dark, and then depositing a brown precipitate. It does not act on the negative at once. After some minutes, apparently after the solution has penetrated the film completely, the action commences, the denser parts being reduced before the lighter tones. The action is arrested by rinsing water and then placing the plate in 20 per cent. soda sulphite solution. This bath also dissolves the silver chloride which is formed in the film from the presence of chlorides (sodium chloride) in the wash water. So far as our knowledge goes, the quinone reducer, however, has never come into widespread use as a substitute for persulphate, although Stenger and Heller, in a paper in "Photographische Rundschau"[2] confirmed the French experimenters' observations as to the proportional reduction, in the persulphate manner, through a scale of densities, and further showed that an effect more akin to that produced by Farmer's reducer was obtained by cutting down the period of action or by increasing the proportion of sulphuric acid. Stenger and Heller also showed that by addition of chlorides to the reducing solution in small proportion, such as about .02 per cent., the action was almost exactly similar to that of the hypo-ferricyanide reducer of Farmer.

MM. Lumière, in a subsequent paper,[3] extended the application of quinone to intensification and colour toning. They pointed out that benzoquinone, as also its sulphonate, in conjunction with a bromide or chloride acts as an intensifier of the silver image. The plain quinone

1. "B.J.," Aug. 19, 1910, p. 625.
2. "B.J.," Dec. 29, 1911, p. 989.
3. "B.J.," Dec. 16, 1910, p. 949.

compound gives greater density than the sulphonate; and bromide, better results than chloride. The following are the formulæ recommended for intensification:—

QUINONE.

Quinone	5 gms.	...	44 grs.
Potass bromide	25 gms.	...	220 grs.
Water	1,000 c.c.s.	...	20 ozs.

SODIUM QUINONE SULPHONATE.

Sodium quinone sulphonate...	10 gms.	...	90 grs.
Potass bromide	25 gms.	...	220 grs.
Water	1,000 c.c.s.	...	20 ozs.

This solution forms a single intensifying or toning bath. The image produced by it has a slight general opacity which disappears on immersing the plate, after a brief rinse, in a solution of ordinary ammonia of 10 per cent. strength. The quinone sulphonate gives a more yellowish and less intense action, and the first formula is preferable to the second, although the former has a slight sharp odour whilst the second is odourless. The intensifiers also exert a strong hardening action on the gelatine film. MM. Lumière pointed out that the intensification produced with this single solution is of considerable degree and is practically permanent, the intensified image only browning slightly under the prolonged action of direct sunlight. They also indicated the variations in the colour of the deposit which may be produced by the use of other subsequent baths than ammonia. Sodium or potassium carbonate, hypo, sulphite or bisulphite, and diamidophenol developer form baths which can be used for this purpose and permit of a distinct variety of tones being obtained. The process in this form is an excellent one for the toning of lantern-slides, the amidol bath yielding a fine purple-brownish black. At one time we made a great many lantern-slides in this way and were exceedingly pleased with the agreeable and rich tones. One of the best was obtained by following the quinone toner with a weak bath of ammonium thiomolybdate, which at that time was on the market as a solution sold as a substitute for sulphide. One recommendation of the process, which particularly appeals to makers of lantern-slides, is the avoidance of mercury compounds which, under the heat of a high-power projection light-source, are liable to undergo changes leading to the disfigurement of the transparencies The process of employing quinone for these purposes of intensification and toning was protected by patent by MM. Lumière.[4]

The use of quinone in intensification and toning was carried a stage further by Mr. John Goulding,[5] whose contribution, we must confess, we had unfortunately overlooked in adding a note to the paper in our issue of January 7 last. MM. Lumière first used quinone with acid as a reducer; then with bromide as an intensifier or toner. Mr. Goulding carried the process a stage further by employing quinone in conjunction with hydrochloric or hydrobromic acid as a bleacher. He pointed out that a mixture of quinone and hydrobromic acid allows of a stainless bleached-out bromide image being obtained from an ordinary black bromide print. The image can be treated in any of the customary ways, such as re-development or treatment with sulphide. And he further emphasised the advantages of quinone in the shape of its tanning action on the gelatine and its freedom from tendency to stain the high-lights. It will thus be seen that when employed in this way quinone is comparable with the many formulæ, such as ferricyanide and bromide, bichromate and chloride, or bromide, in presence of an acid, which serve to convert the silver image into a haloid compound. The interest of the question, and one that has been further set forth in the most recent paper by MM. Lumière and Seyewetz,[6] is that in this application of quinone we have a solitary example of the use of an organic oxidising agent for the conversion of the silver image into bromide or chloride; and in a form which is suitable for practical purposes. It is, however, hardly conceivable that there are not many other organic bodies which may perform this same function and may possess advantages of one kind or another not exhibited by quinone.

4. Eng. Pat. No. 25,751 of 1910. "B.J.," June 16, 1911, p. 460.
5. "B.J.," Nov. 5, 1915, p. 726.
6. "B.J.," Jan. 7, 1921, p. 6.

A PRACTICAL EXPERIMENT.

Most photographers are at present suffering from a "slack period," and it seems likely that the same state of things will continue until either prices drop considerably (a very distant prospect) or until the general level of photographic work is raised far above its present standard. It may therefore be an opportune moment to suggest to my fellow professionals a simple series of experiments, which, if carried out intelligently, can hardly fail to lead to a notable improvement in their routine work.

Since Studio work remains the backbone of most businesses, my remarks will be confined to that class of negative; but it will be perfectly clear that the same method of procedure will give equally valuable results in any other branch.

Without the least doubt the reason why so many of us fail to obtain satisfying results in the studio is that we do not really know the results of variations in exposures and development. The general facts, that short exposures give dark shadows and long development blank high lights, are pretty generally accepted, but unless one has investigated the matter by means of practical and systematic tests it is almost impossible to realise the more subtle, but none the less important effects of differences in treatment within what is known as the latitude of the plate.

As you are a practical worker, you have probably a decided aversion to "plate curves," "opacity logs," and the other stand-bys of the plate makers. You want to know, in short, how various things are going to effect your results. Very well, at the cost of one dozen plates you can get the finest possible lesson in photographic practice you could desire.

Get a patient assistant into the studio, light him according to your usual practice (a fairly contrasty head and shoulders is best perhaps), and fire away a dozen plates, as follows:—

We will suppose that under the circumstances of the test you consider 4 secs. as the normal exposure. First of all, then, expose six plates at this, with as little difference as possible. Make these plates A, B, C, D, E, and F. With the remaining half-dozen plates make a series of graduated exposures, say—½ sec., 1 sec., 2 secs., 8 secs., 16 secs. and 32 secs. Number these 1 to 6, and you are then ready to develop.

Let us suppose 8 minutes to be your normal time for development (whether you use dish or tank does not matter). The second series of exposures, those numbered 1 to 6, should be developed together for the normal time. The first series, A to F, having had the same exposure, should be developed for various times; with the 8 minutes standard a useful series will be 5, 6, 7, 8, 9 and 11 minutes.

You now have a dozen negatives as follows:—

Plates	A. B. C. D, E. F,	
Exposure 4 secs. ...	5. 6. 7. 8, 9. 11,	Development in minutes.
Plates	1. 2. 3, 4, 5, 6,	
Exposure in secs. ...	½. 1. 2. 8, 16. 32	Development 8 minutes.

Make no attempt to judge the results by the look of the negatives; send the whole batch to the printer with instructions to get the best possible from each negative on your standard paper. Have the prints marked to correspond to the negatives when they are made, otherwise you may have trouble in sorting them out.

You now have a most valuable series of prints. Let us examine them, and see what practical points they bring to light.

The first point to decide is if print D, that is, from the negative made with your standard exposure and development, is the best. Now I have introduced this series of tests to a number of photographers, and the proportion of "standard" prints which proved to be the best has been remarkably small. In my experience, it is usually print 5 or print C which proves nearest the ideal, that is, one with either more exposure or less development than the normal. It is obvious that, as the trials are systematic, it is easy to see what adjustments are advisable in your standards.

The most striking point in these tests is that although the variation in development is only 5 to 11, and that of exposure is ½ to 32, yet the former has the greater influence on the results. In fact, a difference of six times in the exposure may be hard to trace in the print, but so small a difference as one-sixth of the total time of development will be apparent at once.

This is fortunate, as development is under much more complete control than exposure, and can be made absolutely definite, while exposures, in the studio at least, can be obtained quite near enough to correct to give you a perfect negative very time.

It is more than likely that when examining the negatives side by side with the prints you will find that it is not your ideal negative which gives the best print. The best print usually comes from a somewhat "flat" looking negative, and since prints, not negatives, are your object, you will do well to adopt the new type as your normal.

A thing that will at once strike the keen worker about the set of prints is that the more exposure the negatives receive the less retouching they need. By making a difference of a couple of seconds in exposure you may save 50 per cent. of your retouching. This is not "theory," but a solid, business fact.

Time development is certainly the most practical for really big batches, and it can be relied on to get a very good average of good results. But there will be many who, like myself, like to see the negatives "come up." It is undoubtedly an advantage in one way to work with a dish, any difference in exposure being obvious at once, and therefore may be corrected before much damage has been done. Personally, I use the factorial method for all studio work (having various factors for the different types of lighting), and find it ideal.

If development is judged by inspection, and the trials have shown a new standard to be desirable, it is a useful tip to bind up your standard with tissue paper of such thickness that the high lights are of the same opacity as those of an unfixed negative. This will assist materially in obtaining uniform results.

In conclusion, I should like to suggest that when these tests have proved their value, as I am sure they will do, it may be worth while to make a similar, but less extensive series of negatives with other lightings. The ideal negatives for "sketch" and Rembrandt lightings, for instance, are absolutely unlike, except in their ability to give good prints, Always judge by prints, as the best negative is the best printer.

It may be objected that tests made in such a rough and ready way are valueless. To the scientist they may be, but to you, who want to know practical facts, they will prove the best invested dozen plates you have ever exposed.

ARTHUR G. WILLIS.

LENS ABERRATIONS USED IN DESIGNING.

It is well known that a simple uncorrected lens is subject to a number of optical defects, the most evident being chromatic aberration, whereby objects tend to be shown with a fringe of colour. Few, however, are acquainted with the fact that these faults are capable, in certain circumstances, of producing very beautiful patterns and designs.

This can be demonstrated with an ordinary reading glass, a metal-filament electric bulb, and a sheet of white cardboard. The writer used a bi-convex glass of 6 ins. focus and 2¾ ins. diameter, in conjunction with a 60-watt Osram lamp of the usual pear shape, run on 205-volt alternating current. The bulb should be brought within a short distance of the table by means of an adapter and flexible wire connection. With a lens of the focus stated, about 26 ins. from the bottom of the bulb to the table will be found most suitable.

On holding the reading glass in an horizontal position about 5 ins. from the bulb, with the white card directly underneath, as shown in fig. 1, an exquisite feathery design with a dark centre and blue spots, edged with tints of orange and red and shaded with delicate pearly greys, will be seen. This, of course, is a greatly aberrated and out-of-focus picture of the numerous incandescent filaments, viewed end-on.

On tilting the lens away from the horizontal, moving it out of the centre, or varying its distance from the lamp, many different patterns will result. Fig. 2 is an attempt, with some artistic licence, at recording one of these, though the drawing necessarily conveys little idea of the filmy softness and brilliant colouring of the original.

At a certain distance of the lens the design resembles a sun-

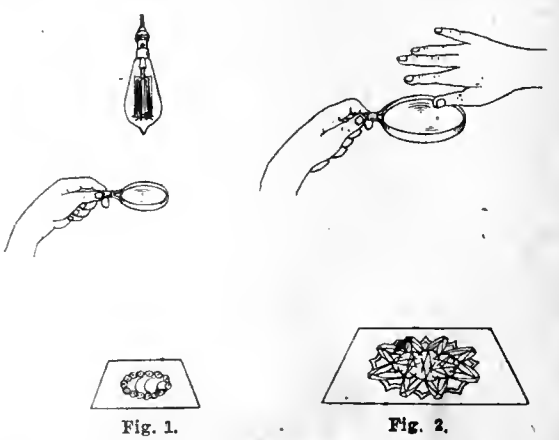


Fig. 1. Fig. 2.

flower, at another a dahlia is suggested. In some positions the minute veining and gauzy shimmer of a butterfly's wing will be indicated, or prismatic feathers worthy of a humming bird.

Obliquely used, the lens will produce strange, weird shapes which, if photographed, might readily pass for spirit pictures in psychical circles.

If the fingers of one hand are spread open and held above the lens, between the latter and the lamp, as seen in Fig. 3, the pattern increases in complexity and becomes of a more star-shaped character. On moving the fingers to and fro across the lens the design will change and coruscate, something after the style of the old lantern chromotrope. A few narrow strips of cardboard laid across the lens like bars may also be used to vary the device.

For a more leisurely inspection of the patterns, it would be easy to make some kind of stand to support the lens, with provision for adjusting it at any desired distance or angle.

The designs possess a blended softness which, though an added beauty in itself, renders them difficult to copy by hand, but the artist or draughtsman should be able to gather many hints of dainty outline and subtle colouration by studying them attentively. If the lamp were mounted horizontally and the reading glass vertically, so that the image could be thrown on an upright screen of finely-ground glass placed a suitable distance in front of the camera, it should be possible to obtain colour photographs of the patterns, by working from the back.

The result is much improved by affixing an opaque disc of card or paper, about 2 ins. in diameter, over the centre of the lens, which reduces the spherical but increases zonal aberration, and also heightens the colour effect. It may be pointed out that the late Professor Silvanus P. Thompson treated the subject of zonal aberration exhaustively in the Traill Taylor Memorial Lecture for 1902 (see "B.J.A.," 1903), but he naturally dealt with a point source of light (an arc lamp),

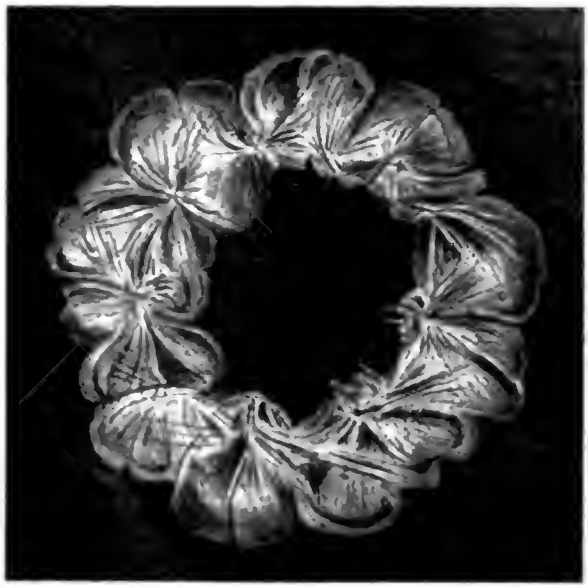


Fig. 3.

which, though giving many interesting and curious figures, does not lend itself to decorative designs like a multi-filament bulb

A. Lockett.

FOREIGN NOTES AND NEWS.

Panchromatic Sensitising Dyes.

In a recent note in the "Bulletin" of the French Photographic Society MM. A. and L. Lumière and H. Barbier describe the properties of a new series of dyes for colour sensitising which have resulted from experiments previously made by M. Barbier and communicated to the Paris Chemical Society. These dyes have been obtained on the one hand from the cyanine group of which ethyl red, pinaverdol and others are members, and, on the other, by prolonged boiling of an alcoholic solution of a mixture of di-methyl-amino-benzaldehyde with an iodo-alcoholate of quinaldine or lepidine in the presence of a condensing agent such as piperidine. The dyes thus contain one or two dimethylamino or diethylamino groups. A large number of the dyes have been prepared and tested, the most notable among them appearing to be one to which the name "Pantochrome" has been given. This sensitiser is obtained by the condensation of iodo-ethylate of dimethyl-aminoquinaldine with dimethylamino benzaldehyde. It is found that its absorption spectrum contains two bands from 490 to 530 and from 660 to the end of the spectrum. Its spectrum sensitiveness shows a maximum about 480, and then a remarkably even band from 520 to 630, with progressive fall to the limit of the visible red. "Pantochrome" thus sensitises for the whole spectrum, whilst exhibiting a small minimum about 500.

The Bromoil Process.

A recent issue of the "Bulletin" of the Belgian Photographic Association contains an abridged translation of papers by Professor R. Namias in "Il Progresso Fotografico" on recent improvements made by him in the technique of the Bromoil process. Signor Namias repeats the bleach formula which he has found satisfactory, viz.:—

Copper sulphate cryst.	10 gms.
Potass bromide	8 ,,
Chromic acid, pure cryst.	1 gm
Water	1,000 c.c s.

As regards inks, their composition should be solely of lithographic varnish, pigment and dammar resin. An ink of this kind, softened, if need be, by means of a little litho varnish, allows of excellent results provided that a paper of good quality is used. As the ink keeps well only in a sealed metal tube, it is convenient to make it up of a somewhat greater degree of fluidity for convenient filling of the tubes. This may be done by adding a volatile solvent such as essence of turpentine, toluene or benzene. In this case, after the ink has been spread on the pallette, sufficient time should be allowed for the solvent to evaporate completly. Turpentine requires about half an hour; benzene or toluene only a few minutes.

The qualities emphasised by Namias for a bromide paper for Bromoil printing are:—(1) Hard and well-sized paper base. (2) Emulsion rich in silver and gelatine, and somewhat thickly coated. (3) No hardening substances to be introduced in manufacture, and (4) opacity of the sensitive film. According to Namias, the bromide paper which best fulfils these conditions is that issued as "Bromoil" by Messrs. Illingworth.

For swelling, Namias describes a new method yielding better results than the ordinary process. It consists in subjecting the paper to the action of water, so that only the gelatine film is wetted. The print is secured to a sheet of glass by means of a 10 per cent. gelatine solution, or with a mixture of one part commercial fish-glue and five parts of water, to which is added, after the glue has been allowed to stand for some hours in the water and then dissolved by the aid of heat, 300 c.c s. of denatured alcohol. The mixture should be cooled before the alcohol is added, but the adhesive is warmed on a water bath immediately before use.

The bleached fixed and washed Bromoil print is made surface-dry with filter paper, and the back then coated with the 10 per cent. gelatine solution or with the above fish-glue mixture, the print being fixed to a slightly larger sheet of glass and left to dry. When dry it is swollen to the usual

way or by means of the following mixture, such as is employed in collotype:—

Water	100 c.c.s.
Glycerine	100 c.c.s.
Ammonia	4 to 10 c.c.s.

The advantage of this bath is that the gelatine film does not dry during inking. After inking, the glass plate, with the inked print attached to it, has only to be immersed for a short time in cold or tepid water in order to remove the print.

Measuring Gloss or Mattness.

Herr K. Kieser has described in the "Chemiker Zeitung" a method and instrument for rating the surface, as regards gloss, or mattness, of photographic papers. The process is based on the property of rectilinear polarisation of light. The degree of gloss is measured directly by the angle of rotation of the analyser of a Martens polarimeter. The surface to be measured may be slightly coloured, a somewhat bright colouration increasing the degree of gloss, apparently in correspondence with the proportion of black in the colours. Highly glossy photographic papers yield, by this method, a value of 30 deg., equal to that of glass. Those of semi-glossy surface yield a figure of about 20 deg.; matt papers, about 10 deg. In the case of papers of dead matt baryta surface, the figure may be as low as 1 or 2 deg. Uncoated papers of fine surface are rated at from 3 to 12 deg. The instrument for these measurements has been made by Messrs, Schmidt & Haensch.

Light-Sensitiveness of Collodion.

Dr. B. Homolka, in a paper in "Photographische Korrespondenz," deals with the phenomenon of sensitiveness to light possessed by pyroxyline, as observed many years ago by Gladstone and Hofmann. The action of light is to liberate extremely minute quantities of nitric acid. The reaction which takes place requires the use of a highly delicate test for nitric acid, such as is now available in the substance 9-aminophenanthrene. By the use of this reagent the decomposition of collodion in sunlight, with formation of nitric acid, can be quickly and plainly shown. If a sheet of baryta paper, coated with a collodion film containing this substance, is exposed under a negative, a positive of red colour is immediately obtained, and may be fixed by dipping in benzene in which the aminophenanthrene is soluble, whereas the compound formed from it by reaction with nitric acid, viz.:— 9-9¹-azoxyphenanthrene, is insoluble.

This experiment can be made as follows:—A mixture is made of 10 c.c.s. alcohol and 10 c.c.s. ether, in which is dissolved 1 gm. of 9-aminophenanthrene and 0.2 gm. of citric or other non-volatile organic acid. The filtered solution is mixed with 20 c.c.s. of 4 per cent. collodion and coated on baryta paper. Exposed under the Chapman Jones plate in diffused bright light for a minute or a minute and a half, a red positive print is obtained, and can be fixed by one or two successive dips in benzene.

The experiment may be done in a different way, allowing of the production of a visible from a latent image. The baryta paper is coated with a pure collodion film without addition of the aminophenanthrene and, when dry, exposed under the negative. No visible change is produced, but a kind of latent image, owing to the greater or less loss of nitric acid by the collodion film in the exposed portions. If the exposed sheet is saturated with a solution of aminophenanthrene in benzene and again exposed after drying, but this time under a clear glass plate instead of a negative, there appears a negative in red, that is to say, a duplicate of the scale of tones used for the original printing. The experiments show that the decomposition of collodion in sunlight comes within the possible conditions of print-out processes, and cannot be neglected. While perhaps its photographic importance is limited, the phenomenon provides an interesting comment on the use of collodion for the protection or decoration of metal articles. Owing to the production of nitric acid by exposure to light, the collodion coating may give rise, in a much worse form, to the very evil which it is intended to prevent.

Warm Tones with Colloid Silver.

In "Photographische Rundschau" Dr. Felix Formstecher has a paper on the production of prints in a range of warm colours by suitable (chemical) reduction of a silver chloride image. He recalls the process in which such results are obtained by restrained development of a gelatino-chloride emulsion and prescribes a method based on the conversion of a developed image into chloride and its subsequent exposure to light in presence of reducing agents appropriate to the production of tones ranging from blue to red chalk. The tones thus obtained are much more vivid in colour than those resulting from the sulphide process and others dependent on the conversion of the silver image into a different metallic compound. The mixture found most suitable for the conversion of the developed image into chloride is:—

Copper chloride	30 gms.
Hydrochloric acid, sp. gr. 1.17 ...	3 c.c.s.
Ammonium persulphate	10 gms.
Water	1000 c.c.s.

This causes the image to disappear completely, other bleachers, such as ferricyanide and mercuric chloride, leaving a faint visible residue. The print is washed for a few minutes, treated in one or other of the following baths, and exposed to light:—

For red to yellow colour:—

Stannous chloride	10 gms.
Hydrochloric acid, sp. gr. 1.17 ...	1 c.c.
Water	100 c.c.s.

The print should not be washed after exposure to light; the stannous salt may remain in it without ill effect.

For blue colour a solution of hydrazine sulphate is used, but prints must be washed after immersion in it, otherwise they turn yellow.

Hydrazine sulphate	10 gms.
Water	500 c.c.s.

Nitrite yields a colour intermediate between those produced by the two foregoing baths:—

Potass nitrite	10 gms.
Water	500 c.c.s.

Papers coated with unripened chloride emulsion are most susceptible to this process. Gaslight papers, as a rule, are more suitable than bromide, and yield good results, particularly with hydrazine and stannous chloride. With some chlorbromo paper the hydrazine is found to yield a remarkably bright colour, but the print must not be left too long in the bath, otherwise the tone becomes degraded with black in time. Washing out the hydrazine sulphate scarcely affects the tone; and with some gaslight papers the process yields a violet blue tone scarcely obtainable in any other way. With stannous chloride, on the other hand, the tone is red-chalk, becoming brownish purple. Both tones are fairly permanent.

A necessary precaution in the use of the process is to avoid too strong a light when bleaching and treating in the subsequent bath. The prints should be handled and dried in a darkened room, and not exposed to bright light until dry. If so exposed whilst wet, spotted points with yellowed whites are obtained. The process leads to a certain loss of contrast, though this can be avoided by omitting the persulphate from the bleach, which then leaves a slight residual image. Dr. Formstecher does not anticipate extensive use of the process, owing to the time required for exposure, but puts it forward as the most convenient method for the special purpose of obtaining vivid tones. The process, of course, is not new (cp. Gamble and Woolley, "B.J.," December 26, 1913, p.p. 987-991), but the particular formulæ given above have their practical interest.

Removing Uranium Intensification.

An alternative to the use of soda carbonate or ammonia for the restoration of a uranium-intensified negative to its original state is recommended by Karl Gander in "Wiener Mitteilungen." The negative is washed by soaking in successive

changes of still water until the water shows no yellow tint after the plate has remained five minutes in it. The plate is then placed (not in bright light) in a 2 per cent. solution of silver nitrate in distilled water which is allowed to act until the negative on the glass side has no brown colour, i.e., is completely black. The plate is then washed. It is not evident what advantage this method has over the much more rapid treatment with alkali.

AMALGAMATED PHOTOGRAPHIC MANUFACTURERS, LTD.

Issue of Participating Cumulative Preference Shares.

As announced in our advertising pages this week, a fusion has taken place of seven photographic manufacturing firms, viz., the Paget Prize Plate Co., Ltd., Rajar, Ltd., Marion and Co., Ltd., Marion and Foulger, Ltd., A. Kershaw and Son., Ltd., the Kershaw Optical Co., Ltd., and the Rotary Photographic Co. (1917), Ltd.

The company formed by the purchase of these businesses is Amalgamated Photographic Manufacturers, Ltd., having an authorised share capital of £1,100,000, divided into 100,000 7 per cent. cumulative preference shares, 600,000 10 per cent. participating cumulative preference shares, and 400,000 ordinary shares, each of £1.

Of these shares, 98,000 of the 7 per cent., 322,000 of the 10 per cent., and 330,000 of the ordinary have been issued in payment to the seven vendor companies. The following table shows the terms upon which directors of the new company are being paid (in shares of Amalgamated Photographic Manufacturers, Ltd.), for their holdings in the respective vendor companies in which they hold shares :—

Vendor Company.	*Shares of £1 in Amalgamated Photographic Manufacturers, Ltd., received as purchase consideration by the directors of vendor company.*
Rajar, Ltd.	
Each preference £1 share	1 10 per cent. Pref.
Each ordinary £1 share	.487 10 per cent. Pref. + .662 Ord.
Marion and Co., Ltd.	
Each preference £1 share	.757 7 per cent. Pref. + .319 10 per cent. Pref.
Each ordinary 10s. share	1.640 10 per cent. Pref. + 2.726 Ord.
Paget Prize Plate Co., Ltd.	
Each preference £1 share	1 7 per cent. Pref.
Each ordinary £1 share	2 10 per cent. Pref. + 1.750 Ord.
Marion and Foulger, Ltd.	
Each ordinary £1 share	.345 7 per cent. Pref. + .898 10 per cent. Pref. + 1.243 Ord.
A. Kershaw and Son, Ltd.	
Each ordinary £1 share	1.254 7 per cent. Pref. + 3.263 10 per cent Pref. + 4.517 Ord.
Kershaw Optical Co., Ltd.	
Each ordinary £1 share	.270 7 per cent. Pref. + .702 10 per cent. Pref. + .972 Ord.
Rotary Photographic Co., Ltd.	
Each ordinary £1 share	6.611 10 per cent. Pref. + 7.632 Ord.

The amount payable in shares to each of the vendor companies under the said sale and purchase agreements is as follows, viz. :—To Rajar, Ltd., £200,554; Marion and Co., Ltd., £70,898; Marion and Foulger, Ltd., £41,706; the Paget Prize Plate Co., Ltd., £168,314; A. Kershaw and Son, Ltd., £218,953; Kershaw Optical Co., Ltd., £28,350; Rotary Photographic Co. (1917), Ltd., £71,216; in addition to which the Company undertake to pay, satisfy, and discharge all the debts, liabilities and obligations of the respective vendor companies as at September 30, 1920, as follows :—Rajar, Ltd., £73,869; Marion and Co., Ltd., £25,969; Marion and Foulger, Ltd., £43,467; the Paget Prize Plate Co., Ltd., £49,566; A. Kershaw and Son, Ltd., £27,784; Kershaw Optical Co., Ltd., £2,661; Rotary Photographic Co. (1917), Ltd., £56,325.

An issue to the public is now being made of a further 250,000 10 per cent. cumulative participating preference £1 shares at par, which, if fully subscribed, will bring this denomination of issued shares to a total of 572,000.

It is hardly necessary in these pages to say anything by way of description of the constituent firms of the combined company; particularly as we understand that for the present, at any rate, each will be carried on as hitherto. All of them, with the exception of the Kershaw Optical Co., which is a war-offshoot of Messrs. A. Kershaw and Sons, Ltd., are of considerable, though very different establishment. Messrs. Marion, and, next to them, the Paget Co. being among the oldest firms at present in the photographic industry. The prospectus on another page briefly signalises the manufactures most prominently associated with each, and photographers will need no reminder of the distinctive and meritorious goods of theirs, which have long been well known in this and many other markets.

Moreover, the affairs of the combined company and of its constituent concerns are to be managed by a board composed exclusively of directors of the former companies, viz. :—Messrs. G. Sidney Whitfield and L. D. Whitfield, of the Paget Prize Plate Co.; Mr. Gerald Bishop, of Marion and Co.; Mr. C. F. S. Rothwell, of Rajar, Ltd., and the Rotary Photographic Co.; Messrs. Abraham Kershaw and Cecil Kershaw, of A. Kershaw and Son, Ltd., and the Kershaw Optical Co.; Mr. H. C. Rich, of Marion and Foulger, Ltd.; Messrs. A. E. Parke and T. L. Parke, of Rajar Ltd., the Rotary Photographic Co., Ltd., and Wiggins, Teape and Co.; and Mr. F. G. Thomas, of Marion and Co., Ltd.

The chairman of this board is Mr. A. E. Parke; Mr. Gerald Bishop and Mr. C. F. S. Rothwell are joint managing directors. As set forth in the prospectus, they and certain other directors have entered into service agreements with the new company for a period of five years.

The amount of the issue now offered for subscription by the public is to be applied in the equipment of the recently-built factory of Messrs. Kershaw for the production of popular plate and roll-film cameras, for developing the sale of roll and cinematograph film, and for the general purposes of the company.

The prospectus contains a chartered accountant's certificate of the aggregate profits of the various vendor companies for the years ended December 31, 1918, and December 31, 1919, viz., £193,636 and £131,179, respectively. The aggregate profits for the nine months ended September 30 last have been ascertained at £106,961, and on this basis the average annual profits for the 2¾ years ended September 30 last are obtained as £157,009, after charging for depreciation and providing for bad debts, but before charging interest, directors' remuneration, income and corporation taxes, excess profits duty, and non-recurring items.

In estimating the future profits and dividends the figure of £36,478 is set down for excess profits duty, corporation tax, directors' fees, and salaries, leaving a balance from the above average of £120,531. Possibly the removal of excess profits duty may permit of a lower value being given to the charge just mentioned.

For the payment of 7 per cent. interest on the preference shares of this class and of 10 per cent. on the 572,000 cumulative preference shares (in which total is included the present issue) a sum of £64,060 will be required, leaving a balance of £56,471. A dividend of 10 per cent. on the 380,000 ordinary shares would absorb £38,000, leaving a sum of £18,471 for further distribution between shareholders and directors. It is anticipated that the profit from the manufacture of plate and roll-film cameras and from that of paper to be manufactured at the extensions of works not yet in operation will amount to £75,000 per annum, and with the above balance of £18,471 will be available for further dividends on the participating cumulative preference shares and the ordinary shares, and for the establishment of a reserve fund. The Articles of Association of the company provide that one-tenth of the balance, that is to say, after the payment of the fixed dividends on the preference shares and a dividend of 10 per cent. on the ordinary shares, is payable to the directors as further remuneration for their services. The remaining nine-tenths is to be applied by the directors in payment of futher dividends, as may be judged advisable, to the holders of the 10 per cent. participating cumulating preference shares and the ordinary shares *pari passu* in proportion to, and not exceeding, 2 per cent. upon the amount for the time being paid up upon such last-mentioned preference shares and ordinary shares.

Further surplus profit may be applied in payment of dividends to holders of the ordinary shares.

It will thus be seen that the preference shares which are now offered for subscription have only the prior charge in front of them of the 7 per cent. issue which at the most can claim only £7,000 from the profits. The statement of recent profits certainly shows that there is ample to pay the 10 per cent. on the preference shares of this class, and there may easily be a balance permitting the payment on these preference shares of the additional 2 per cent. by way of participation in further profits. Photographers who may have been inclined to look with somewhat envious eyes upon the profits made by manufacturers of photographic materials now have the opportunity presented to them of sharing in such profits. The prospectus states that in making allotment preferential consideration will be given to applications from customers and employees of the vendor companies. The subscription list closes on Tuesday next, February 15.

EXPOSING BROMIDE AND GASLIGHT PRINTS.

(From "Rajar Trade Notes.")

ALTHOUGH electric-light is now obtainable in most towns there are still some photographers who have perforce to use gas, or oil, for exposing bromide and gaslight papers. The question of exposure is so important that we think a few suggestions on the subject may be helpful.

Dealing first with bromide printing, we find there is a tendency amongst some printers to use an exposing light (electric) which is far too powerful, necessitating very rapid exposures. In some cases this is done to "speed up" the work, but we doubt if there is any advantage in quickness when we take into consideration the time occupied in re-printing "spoils." It is easy to make a 50 per cent. error in very short exposures, and we strongly advise printers to screen down the light, or use a lower candle-power lamp, so that the exposures average 3 to 5 seconds. Those who print in strips will appreciate the point of correct and even exposures.

Exact data as to exposure cannot be given as there are so many factors to consider, but a great deal of help can be obtained if the negatives are graded by the printer himself who should also choose the grade of printing paper. When possible the grading of negatives should be done in daylight so as to make allowance for the colour of the image. Printers will find this task very difficult in cases where, owing perhaps to a careless assistant, less than the usual amount of sulphite has been put in the pyro developer used for the development of the negatives, thus causing the image to be of a yellowish colour.

In printing by electric-light, the exposing box should be fitted with a switch which is either worked by the foot, or by the contact of the pressure pad. The switch must be of a definite make and break type somewhat similar to the ordinary house switch, but we do not recommend the type of switch that is inclined to "arc" or burn up. The exposing box should have a "spy hole" so that the printer can be quite certain of the correct action of the switch, and it also acts as a guide in counting the exposure seconds. In some towns the electric-light loses some of its intensity about the time when theatres are lighting up, and allowance must be made for this.

Printing on gaslight paper offers no difficulties to those who have electric-light, but the printer who has only gas or oil at his disposal can use daylight by fitting up a room with a simple exposing device.

A window can be blocked up completely, with the exception of a space of say 20 inches square, and against this space can be put a printing box open at the back but containing a reflector at an angle of 45 degrees.

There should also be a reflector outside the window at an opposite angle to the reflector in the printing box. The exposures should be made by a shutter similar to the roller-blind shutter.

In conclusion, we should remind our friends that the first essential in bromide printing is correct exposure, and every possible device or precaution should be used to ensure correctness. In gaslight printing, which has been prophetically described as the "contact paper of the future," there is more latitude in exposure.

Photo-Mechanical Notes.

Intaglio Printing Plates.

A PROCESS of preparing the plate for intaglio (photogravure or rotary photogravure) printing is described in a recent patent specification, No. 156,420, of Ernst Sauer, Schloss Kaibitz, near Kamnath, Post Kastl, Oberpfalz, Germany.

The object of the process is to give to printing plates any required depth by a method of printing without hand work, and also to prevent the ink being dragged out of the printing block by the roller when the ink is removed from the surface of the block by the roller.

According to the invention a printing block is formed by coating a more or less transparent material, such as "cellon," celluloid, or paper on one side with a film of chromated gelatine, 0.06 to 0.08 millimetre thick, in such a way that the gelatine adheres firmly to its support, this film of gelatine forming the printing surface. The screen plate (which has transparent lines and black dots) is laid over the gelatine film and exposed until the lines of the screen have become tanned on the gelatine, an operation which in full sunlight requires an exposure of about 3½ to 4 minutes. The screen plate is then removed and the printing plate exposed from the other side through a transparency, that is to say, the transparency is laid over the transparent support of the film of chromated gelatine, so that the light passes through the transparency and the support on to the film of chromated gelatine. During exposure the rays of light pass through those places in the transparency which let strong light through right to the upper surface of the film of chromated gelatine so that it becomes completely tanned. The less transparent places in the transparency let only so much light through that a portion of the film of chromated gelatine is tanned, and as no tanning takes place under the highly opaque parts of the transparency when the film of chromated gelatine is exposed, it follows, when the film is washed with warm water, that the front of the printing block remains level in so far that the screen lines lie at the same height all over the entire surface of the picture.

On the other hand, however, the exposure from the back of the printing plate forms a relief corresponding exactly to the picture, so that the hollows which are to hold the printing ink are formed on those parts of the picture where less light has penetrated and between the screen lines. At the upper surface of the film of chromated gelatine the screen lines are of the same width as they are in the screen plate, but are thinner in the depths of the gelatine film, because the light during the printing of the screen cannot act so intensively in the depths of the gelatine sheet. These extremely fine lines in the depths of the gelatine film are fixed in the bottom of the gelatine sheet by the exposure of the transparency from the back of the printing plate, so that they cannot fall together when the plate is washed. In consequence of the lines in the depths being thinner, they form hollows between the screen lines, which are wider in the depths of the gelatine film than at the upper surface. By this means the printing ink is retained better in the hollows of the printing block when the surface is cleaned off. In order to enable the printing block formed by the upper surface of the gelatine film better to withstand the action of the roller the surface is lightly moistened with acetic acid and then coated with a film of zapon varnish.

The following patents have been applied for :—

PRINTING.—No. 1,527. Photographic printing presses. Graphische Kunstanstalten F. Bruckmann Skt.-Ges. and H. Kühn.

PHOTO-LITHOGRAPHY.—No. 156,692. Process for the production of negatives from the originals that cannot be photographed by transmitted light, for use as patterns for photo-lithography. F. Ullman Ges.

PRINTING PROCESSES.—No. 157,216. Photographic printing processes. H. Kuhn and Graphische Kunstanstalten F. Bruckmann Akt.-Ges.

REPRODUCTION SCREEN.—No. 766. Screen for photo-chemical and photo-mechanical reproductions. Herbst and Illig.

REPRODUCTION SCREEN.—No. 156,718. Screen for photo-chemical and photo-mechanical reproductions. Herbst and Illig.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Some Practical Hints.

In almost every photographic workroom one sees some practical dodge or other for the more efficient carrying out of the work. They have usually been evolved to suit the special conditions of a particular business; many are of general application. A few are collected here. If their publication will induce others to give the fruits of their experience to their fellow workers in the same way a great many most practical hints might be made generally available.

When it is desired to dry a batch of prints quickly without recourse to spirit, an excellent tip is to squeegee lightly each print on a sheet of glass before placing it on the drying net. In this way a full two-thirds of the water is removed. It will not affect the most delicate of surfaces as long as the squeegee is used lightly.

Don't be bothered with weights for chemical of bulk, such as carbonate and sulphite. Providing you always get them in the same form, measuring can be done with quite sufficient accuracy by cutting down a round cardboard canister so that it holds the required amount. One canister for each chemical must be the rule, and it may well be kept in the cask in which the chemical is stored, so that all one has to do is to scoop up enough crystal to fill it.

If you use crystal carbonate much time may be saved in dissolving if it is crushed before being added to the water. A roughly made bag of stout, well-washed canvas and a wooden mallet are the most practical tools.

There is no need to throw away "spirit" that has been used for drying negatives or prints; it is a wasteful thing to do in these days. Add some "dry" potass carbonate to it—the water will combine with the chemical, sinking to the bottom, when the clear and dried spirit may be poured off.

When retouching by artificial light it is almost essential to have some means of softening the glare if eye-strain is to be avoided. Blue is the most restful colour to work by, but blue glass is not satisfactory as a rule. The most effective filter in my experience is a solution of copper sulphate. If contained in a thin glass flask or beaker it may be well diluted, and will give a most pleasing working light if placed just between the illuminant and the reflector.

For sharpening retouching pencils I have found a much more satisfactory surface than glass paper, that is, a fine grade hone, such as is used for sharpening small knives. It never wears out, has just the right "grip," and can be washed when it becomes much used.

ARTHUR G. WILLIS

ROYAL PHOTOGRAPHIC SOCIETY.—At the request of the Council Mr. Chapman Jones, F.I.C., has consented to deliver a memorial lecture on the life and work of the late Sir William Abney. The date of the lecture has been provisionally fixed for Tuesday, April 26.

DEATH OF REV. J. B. MACKENZIE.—We regret to hear of the death of the Rev. J. B. MacKenzie, F.S.A., minister of the Perthshire parish of Kenmore. Mr. MacKenzie, who was in his 83th year, was one of the oldest amateur photographers in the Kingdom, and had practised photographic processes from the year 1860. For a very long period he spent much of his leisure in carrying out a photographic survey of ecclesiastical remains and Celtic sculptures in the county of Argyll. His photographs, which have been deposited with the Scottish Society of Antiquaries, have frequently been used for the illustration of publications, and have served to record many Celtic carvings which have suffered very greatly from exposure to the weather.

FORTHCOMING EXHIBITIONS.

February 14 and 19.—Leicester and Leicestershire Photographic Society. Particulars from the Hon. Secretary, W. Bailey, Cank Street, Leicester.

February 19 to March 5.—Edinburgh Photographic Society. Particulars from the Hon. Secretary, G. Massie, 10, Hart Street, Edinburgh.

February 19 to March 12.—Scottish Salon, Dundee. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

March 16 to 19.—Hackney Photographic Society. Latest date for entries, March 1. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Professional Photographers' Association, at the Photographic Fair, Horticultural Hall, Westminster, S.W. Hon. Secretary, Marcus Adams, 83, White Knights Road, Earley, Reading.

April 15 to 23.—Photographic Fair, Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, January 24 to 29:

STEREOSCOPY.—No. 3,502. Means for imparting stereoscopic effect to photographic negatives, prints and projections. F. G. and J. McKim.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

PLATINUM MIRRORS. No. 156,472 (September 16, 1920). Hitherto the method adopted for coating glass with platinum or other metal is to spread some viscous, usually oily, mixture containing the metal salt on the glass. After burning off, the resulting metallised surface shows a certain granularity and want of homogeneity in the structure of the metal coating, which diffuses a good deal of the light falling on it, and renders it inapplicable for many optical purposes, for instance for first surface mirrors for prisms or reflex cameras.

The improvement consists in electrically depositing a platinum salt, or salt of one of the other metals of the platinum group in a solution of collodion. The glass plates are coated with this solution, which forms a dry, structureless collodion film, which, on being brought to a suitable temperature in an electric furnace leaves an absolute mirror-like structureless metallised surface free from grain and practically free from irregular diffusion of the light impinging on it.

The collodion is prepared by dissolving any suitable form of soluble gun cotton, such as collodine or pyroxyline in methyl alcohol and then adding to it a solution, preferably in ethyl

alcohol, of the platinum salt, or the salt of a metal in the platinum group. Some of the salts suitable for the purpose are platinum chloride, chloroplatinic acid, palladium chloride, iridium chloride, chlor-iridic acid. The collodion coating mixture may, if desired, be conveniently thinned down by a further addition of ethyl alcohol. These salts may be used singly or in combination.

The temperature to which the glass is subsequently raised in the furnace will determine whether the structureless mirror surface is (1) in the form of a loose deposit, (2) an adherent deposit, (3) a deposit partially adherent and partially incorporated within the surface layer of the glass (partial burning in), or (4) completely incorporated within the surface layer of the glass (completely burnt in). These four stages are reached successively at successive increases of temperature, but the actual temperature required for each stage depends likewise upon the composition of the glass, and has to be determined experimentally. The temperature to attain stage (1) does not exceed 500 deg. C., for any kind of glass; to attain stage (4) the temperatures in general range from 600 deg. to 750 deg. C. Ordinary kinds of plate glass, for example, attain to stage (4) at temperatures from about 690 deg. to 740 deg. C., whereas for ordinary kinds of crown glass the temperatures average about 30 deg. C. lower.

In order to avoid disturbances of the glass surface itself, and to keep it as near as may be optically flat in the case of a plane mirror, or true to its curvature in the case of lenses, it is very desirable that the temperature to which any glass should be raised should be the minimum possible, and a further improvement in the process therefore consists in the addition of a very small proportion of a lead salt or a bismuth salt, preferably bismuth chloride, to the collodion solution, which enables the temperature to be reduced frequently by as much as 30 deg. C. The exact reduction of temperature achieved has to be established experimentially for every kind of glass.

The bismuth chloride solution is conveniently made up as a 5 per cent. solution in industrial spirits, adding 5 per cent. hydrochloric acid. This solution is further diluted with industrial spirits immediately before use.

A typical platinising coating mixture would be made up as follows:—

6 per cent. celloidine dissolved in methyl alcohol. 3 parts by volume.

12 per cent. platinum chloride (chloro-platinic acid) H_2PtCl_6 dissolved in industrial spirits. 3 parts by volume.

Ethyl alcohol. (Industrial spirits.) 3 parts of volume.

1 per cent. bismuth chloride solution in industrial spirits. 1 part by volume.

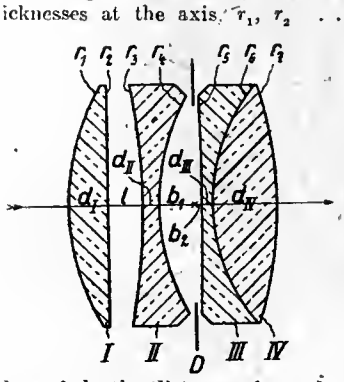
The platinised surface mirrors resulting from this process are structureless and transparent, and have a neutral grey tint. The depth of tint can be nicely regulated by varying the proportion of the platinum in the coating mixture, but it is not practicable to produce beyond a certain depth of tint in a single coaling. To increase the depth of tint, the metalised glass is re-coated and the process gone through again. It is feasible to repeat the process as often as three or four times, but in practice it is rarely necessary to give more than two coatings for fully-metalised surface mirrors, or a single coating for semi-metalised mirrors.—Julius Rheinberg, 57, Holborn Viaduct, London, E.C.1.

FOUR-LENS ANASTIGMATS.—No. 146,211 (October 15, 1917). The invention relates to spherically, chromatically and astigmatically corrected objectives consisting of four lenses, two of which are joined in a collective cemented surface, while between the other two, which are disposed at one and the same side of the cemented lenses, and of which the outer one is a collective lens and the inner one a dispersive lens, there is an air-space, and they form a pair of facing surfaces having a negative power.

The arrangement of the lenses as it is chosen for objectives of the present type, which are principally designed for the purposes of photography and projection, and which are described for instance in Patent Specification 13,061/02, is specially suitable for obtaining a spherical correction even in types with a large aperture ratio of the objective, whereby, in addition, a relatively large area of anastigmatic flatness of the field may be attained. However the obtaining of such a correction in the desired measure seemed to be possible only in the event of glass with a high refractive index being employed for the single collective lens to be made of crown glass. This restrictive condition meant a disadvantage for the objectives in so far as crown glasses with a high refractive index, as is well known, cannot easily be made homogeneous and free of bubbles, and offer little resistance to chemical influences. The heavy baryta crown glass, for instance, is such a glass, the employment of which frequently seemed necessary for the collective lens.

However, calculations made of late have shown, that it is possible to use for the single collective lens glass with a more favourable refractive index of less than 1.57, which may be done without impairing the hitherto attainable state of correction of the objectives in question. From the glasses with a refractive index of less than 1.57, such may always be chosen, as do not show the disadvantages alluded to, so that these disadvantages are at least avoided as regards the single collective lens, which as a rule will form the front lens of the objective, and which is therefore specially exposed to detrimental influences.

In the drawing, which is elucidated in the table appended below, between the two lenses marked I and II there is an air-space, and they are separated from the two cemented lenses marked III and IV by a diaphragm D, the outer lens of the two cemented lenses being a collective one and the inner lens a dispersive one. This object is to be introduced into the path of the rays in such a manner that the single collective lens faces the object. The example is spherically corrected for a relative aperture of about 1 : 4.5 and the anastigmatic flatness of the field extends to about 60 deg. Furthermore, the letters d_1, d_{11} . . . . . signify the thicknesses at the axis, r_1, r_2 . . . . . the radii



of curvature, b_1 and b_2 the distances from the diaphragm D to the adjacent lens vertices, and l the central thickness of the air-lens between the two lenses I and II. The numerals given are proportional numbers and relate to the focal length of the whole objective of 100 units. The glasses used are characterised by the refractive index for sodium light, n_D, and by the reciprocal power of dispersion γ. The numerals for the example are as follows:—

Radii.	Thicknesses and distances.
$r_1 = +\ 21.64$	$d_1 = 3.49$
$r_2 = \pm\ \infty$	$l = 3.12$
$r_3 = -\ 57.88$	$d_{II} = 1.44$
$r_4 = +\ 20.36$	$b_1 = 3.19$
$r_5 = -\ 257.18$	$b_2 = 0.25$
$r_6 = +\ 17.04$	$d_{III} = 0.98$
$r_7 = -\ 36.23$	$d_{IV} = 5.76$

Kinds of Glass.

	I.	II.	III.	IV.
n_D	1.5323	1.5739	1.5328	1.6176
γ	58.3	42.6	51.6	54.6

—Carl Zeiss, Jena, Germany.

The following complete specifications are open to public inspection before acceptance:—

CINEMATOGRAPHY.—No. 157,874. Cinematograph projection apparatus. Petra Akt.-Ges. für Elektromechanik.

PRINTING PRESSES.—No. 157,807. Photographic printing presses. H. Kuhn and Graphische Kunstanstalten F. Bruckmann.

COLOUR PRINTS.—No. 157,811. Multi-colour prints secure against photographic imitation, especially for securities. C. W. Lacher.

APPARATUS.—No. 157,818. Stereotopometric apparatus. J. Predhumeau.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

NEOL.—No. 408,742. Photographic developers included in class 1. J. Hauff and Co., Gesellschaft mit Beschränkter Haftung, Stuttgarterstrasse 333, Geusrbach, near Stuttgart, German Republic, chemical manufacturers. October 15, 1920.

New Books.

Pictorial Photography in America, 1921. New York: 63, Cliff Street. J. D. Drew $3.

THIS is the second annual volume of reproductions of American pictorial photographic work produced by the body which calls itself "The Pictorial Photographers of America," and has Mr. Clarence H. White on its editorial committee. The work which it has chosen to exhibit in this way has been highly selected. There are not three-score of reproductions, but nothing has evidently been spared as regards engraving, paper, and printing to ensure a truthful transcript of their qualities. They include some delightful works; eccentricities are commendably few in number; and the globe or ball, so long the hall mark of "art" among American pictorial photographers, seems at last to have been abandoned. The literary portion of the volume does not occupy many pages. The opening feature is a review of the year's progress in the pictorial sense elicited from Mr. Clarence H. White by Henry Hoyt Moore. Perhaps we are strangers to American methods of labelling literary output of this kind, but it seems remarkable that the text should be headed "By Clarence H. White: An interview with Henry Hoyt Moore." However, Mr. Moore asks all the questions, catechism fashion, and Mr. White is ready with the answers, so why should we quarrel with the form in which their relations are stated? Mr. White thinks that the most prominent element in pictorial work is the use of the *soft-focus* lens, but with moderation; it must give softness, not fuzziness. He looks with modified approval upon what has been done with it for cinematography, but hopes for better things from this application. We are not surprised that Mr. White should take the conservative attitude of regarding photography as a monochrome art. His own sense of tone values must constrain him to that view, so that for the present he is quite content to leave colour processes out of consideration. But why Mr. Moore should intrude into this esthetic conversation a question on the value of the "Photostat" passes our comprehension. But Mr. White was not to be caught; he answered that he had only heard of it. A feature which no doubt will greatly appeal to the pictorial aspirant is a collection of short articles by those whose work is exhibited, giving the technical particulars of camera, lens, plate, and printing process concerned in their respective productions. British materials and apparatus figure frequently in these confessions, and some of the works are of truly cosmopolitan origin for example, one made in a Lancaster reflex, on a Scul plate with a Goerz lens and printed in Bromoil on Wellington paper.

R. P. S.—The group formers seem to be active in the R.P.S. It is announced that a pictorial group has been formed and will hold informal meetings on the first and the third Friday of each month at 6 p.m. Prints are to be exhibited and criticised, and discussions held on subjects related to pictorial photography. There is no doubt that such a group as this can serve a really useful purpose to many of the members of the Society. And we hear also, by a side-wind, of a dark-room group, formed in the interests of those whose chief purpose in becoming members of the Society appears to be the use of the facilities in the way of dark room and enlarging work. The extension of these facilities has recently been made the subject of a little pièce of political propaganda within the Society in connection with the forthcoming election of Council.

New Materials.

Desensitol for White Light Development. Sold by Ilford, Ltd., Ilford, London, E.

THE Ilford Company is to be congratulated in giving photographers the opportunity of making practical trial of the process of desensitising plates for development in full light, which was introduced to the notice of those in this country by Mr. Raymond E. Crowther in the article which we published in our issue of January 7 last. The phenosafranine dye, by which the sensitiveness to light of an exposed plate is reduced to a degree ranging from 200 to 800 times, has been placed upon the market in solution form which requires simply mixing with water in order to form the desensitising bath. Messrs. Ilford, Ltd., recommend the use of such a 1 : 50 solution applied to the plate for a minute or so before development in preference to the addition of the solution to the developer. The plate has simply to be soaked in this solution for a very short time either in darkness or by the light of the ordinary dark-room lamp. It can then, without any further treatment, be developed by ordinary light, which in the case of a non-colour sensitive plate may be a 15 c.p. incandescent lamp at a distance of 6 or 8 ft. With panchromatic plates a weaker light, e.g., that of an ordinary candle, requires to be used. Although the dye forms a strongly coloured solution, its action does not depend upon its absorption of actinic light. After the plate has been treated in the separate dye bath, or has remained for a minute or more in a developer containing the dye, it may be handled in light of the strength indicated above without fear of fog, and the progress of development watched just as when working in the ordinary way. The only modification in the ordinary procedure which the process involves is the washing out of the red colouring matter from the gelatine. In many cases the dye will be completely discharged by the customary process of washing, but if washing for the normal time leaves the gelatine film still stained, the latter may be cleared by soaking in a bath of

Hydrochloric acid	5 parts
Alum	2 ,,
Water	100 ,,

This is applied after the plate has had, say, at least 15 or 20 minutes' washing after fixing, and requires to be followed by a short wash in order to complete the process. "Desensitol" is supplied in 3 oz. bottles, price 2s., post free in the United Kingdom, 2s. 9d.

Commercial & Legal Intelligence.

NEW COMPANIES.

BAGSHAW, REYNOLDS AND DIX, LTD.—This private company was registered on January 31, with a capital of £10,000 in £1 shares. Objects: To carry on the business of lithographers, photographic printers, engravers, etc., and to adopt an agreement with H. S. Dix, W. W. Hull and F. E. Baddeley. The permanent directors are H. S. Dix, 51, Chatsworth Road, Croydon, Surrey; W. W. Hull, 35, Marchmont Road, Wallington; F. E. Baddeley, Lenton, Cecil Road, Cheam, Surrey. Registered office: 11, St. Matthew Street, Westminster, S.W.

AMALGAMATED PHOTOGRAPHIC MANUFACTURERS, LTD.—Amalgamated Photographic Manufacturers, Ltd., has been registered with a nominal capital of £1,100 in £1 shares: 100,000 "A" pref., 600,000 "B" pref., and 500,000 ordinary. The objects are: To acquire all or any of the businesses carried on by Rajar, Ltd., at Mobberley, Cheshire, and elsewhere, by Marion and Co., Ltd., at Southgate, at Soho Square, London, and elsewhere; by Marion and Foulger, Ltd., at Bedford, and elsewhere; by the Paget Prize Plate Co., Ltd., at Watford, and elsewhere; by the Kershaw Optical Co., Ltd., at Leeds, and elsewhere; by A. Kershaw and Sons, Ltd., at Leeds and elsewhere; and by the Rotary Photographic Co. (1917), Ltd., at West Drayton, and elsewhere; and to carry on the business

of manufacturers, exporters and importers of and dealers in photographic cameras, plates, films, papers, mounts and frames, cinematograph projectors and films, optical lenses, prisms, binoculars and optical glass, astronomical, surgical, scientific and technical instruments, post cards, show cards, advertising specialities, etc. The minimum subscription upon which the directors may proceed to allotment is 7 shares. The first directors are: A. E. Parke, Edgehill, Wadhurst, Sussex, paper maker; G. S. Whitfield, Little Cassiobury, Watford, dry plate and paper maker; L. D. Whitfield, Northlawn, Cassiobury Park, Watford, dry-plate and paper maker; C. Kershaw, 25, Mexborough Avenue, Leeds, engineer; A. Kershaw, O.B.E., Raincliffe Avenue, Scarborough, engineer; T. L. Parke, Withnell Fold, near Chorley, paper maker; F. G. Thomas, C.M.G., 115, Baker Street, W., barrister; H. C. Rich, Barsham House, Bedford, frame and mount manufacturer; G. M. Bishop, Clere, Welgarth Road, N.W.11, photographic plate manufacturer; C. F. S. Rothwell, F.C.S., Thornedge, Spring Road, Hale, Cheshire, photographic paper and film manufacturer. Qualification £100. Remuneration £250 each per annum, with £250 extra for the chairman and a share in surplus profits as shown below. The profits of each year available for distribution are to be applied (subject to provision for reserve): (1) In payment of a fixed cumulative preferential dividend at 7 per cent. on the "A" pref. shares; (2) in payment of a fixed cumulative preferential dividend at 10 per cent. on the "B" pref. shares; (3) in payment of a non-cumulative dividend at 10 per cent. on the ordinary shares; (4) in payment of 10 per cent. of the remaining profits to the directors as extra remuneration; (5) in payment of dividends to the "B" pref. and ordinary shares *pari passu* in proportion to and not exceeding 2 per cent. upon the amount paid up thereon respectively; and (6) in payment of the surplus by way of dividends on the ordinary shares. In a winding up, the "A" and "B" pref. shares take priority in order named for return of capital and arrears of cumulative dividend, and the ordinary shares take the remaining surplus assets. The directors may borrow and raise money and issue debentures or other securities, provided that the amount at any one time owing shall not, without the sanction of a general meeting, exceed the amount of the issued capital. Each share confers one vote, provided that the "A" and "B" pref. shareholders may only attend and vote at general meetings when their fixed dividends are three months in arrear or their interests are directly affected.

Wheeler, Fisk-Moore, Ltd.—This private company was registered on February 3, with a capital of £3,000 in £1 shares. Objects: To take over the business of a photographer, photographic artist, and portrait or minature painter, etc., carried on by P. S. Lankester, at 36, High Street, Tunbridge Wells, and to adopt an agreement with H. D. H. Wheeler. The permanent directors are—H. D. H. Wheeler, 7-9, Church Street, Folkestone; Grace H. Wheeler, 7-9, Church Street, Folkestone; J. Fisk-Moore, St. George's Tate, Canterbury; W. Fisk-Moore, St. George's Tate, Canterbury. Registered office: 7 and 9, Church Street, Folkestone.

Flexible Films.—A recent German patent specification, No. 154,902 (open to inspection but not yet accepted), of F. Schoepp and O. Dorendahl, relates to photographic films. As a substitute for celluloid or transparent paper, what is known in Germany as "Glashaut-papier" (glass-skin paper) or "Zellophane" (cellophane) or "Zellstoffglashaut" (cellulose glass-skin) is used. The material is obtained from viscose and forms a flexible and tough skin similar to celluloid and gelatine, and it is not inflammable.

The Prize of £1,000, offered by the "Scientific American" for the best short paper explanatory of the Einstein theory of relativity, has been awarded to Mr. L. Bolton, one of the senior examiners in the Patent Office. Mr. Bolton is a student of the scientific side of stereoscopic photography, and some years ago read a paper on this subject before the Royal Photographic Society. Reverting to Einstein, our contemporary, "Nature," in its issue of February 17 next (Macmillan: 1s.) is publishing a large number of special contributions by scientific men, dealing with the theory of relativity from various standpoints of present-day thought.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, February 14.

Bradford Photographic Society. "Preparing the Exhibition Print." T. Lee Syms.
Cleveland Camera Club. Exhibition.
Cripplegate Photographic Society. "Personal Practice in Pictorial Printing." E. C. Perry.
Dewsbury Photographic Society. "The Churches of Holderness." F. Atkinson.
Glasgow and W. of S. Amateur Phot. Assoc. Competition slides.
South London Photographic Society. "Truth In and About Photography." T. H. B. Scott.
Walthamstow and District Phot. Soc. "Gum Bichromate." F. D Hunt.
Willesden Photographic Society. "A Chat on Snow Photography." S. Brigden.

Tuesday, February 15.

Royal Photographic Society. "Picture-making on the Cornish Coast." Walter Thomas.
Bournemouth C.C. R.P.S. Affiliation. 1919 Competition Prints.
Exeter Camera Club. "Satista Printing." T. W. Melhuish.
Glasgow and W. of S. Amateur Phot. Assoc. "With a Military Bacteriological Laboratory in East Africa." Dr. J. Hume Patterson.
Hackney Phot. Soc. "Bromoil." J. J. Beasley.
Leeds Phot. Soc. "A Naturalist and His Camers." Riley Fortune.
Manchester Amateur Phot. Soc. "The Production of an Illustrated Newspaper." F. G. Curson.
Portsmouth Camera Club. "Amateur Photographer" Prize Lantern Slides.
Rotherham Phot. Soc. Members' Lantern Slide Evening.
Sheffield Phot. Soc. "Lincoln." J. Tremayne Blackshaw.
Stalybridge Phot. Soc. "Car-bro." J. Kershaw.
Walthamstow and District Phot. Soc. "Pictorial Work in Grest Cities." A. H. Blake.

Wednesday, February 16.

Accrington Camera Club. "Photographic Chemistry." J. Hill.
Borough Polytechnic Phot. Soc. "Flashlight Photography." A. Dordan-Pyke.
Croydon Camera Club. "Enlarged Negative Making." R. H. Lawton, F.R.P.S.
Dennistoun Amateur Photographic Association. "The Art of Picture Making." Dan Dunlop.
Glasgow and W. of S. Amateur Phot. Assoc. Competition slides.
Halifax Scientific Society. "The D.I.P. Process." J. A. Wade.
"Self-Toning Papers." J. W. Smith.
Ilford Photographic Society. Whist Drive.
Partick C.C. "The Evolution of the Book." J. McBeth.
Rochdale Phot. Soc. "Carbon Process." A. E. Cooper.
Woodford Phot. Soc. "Picture-Making in Northern Africa." P. B. Dannatts.

Thursday, February 17.

Birmingham Phot. Soc. "Bromide Toning." E. A. Bierman.
Brighouse Phot. Soc. "Life of a Dragon Fly." W. Cliffe.
Camera Club, The. "The Ruin and Restoration of Belgium." Sir Cecil Hertslet.
Everton and District Photographic Society. "Portraiture: A Few Tips on Posing." W. Brinsley.
Gateshead and District C.C. "Negative Making." G. A. Keen.
Glasgow and W. of S. Amateur Phot. Assoc. "With the 7th Cameronians on Five Fronts." Lieut.-Col. R. Blair.
Hammersmith (Hampshire House) Photographic Society. "One Man Show." Walter Selfe.
North Middlesex Phot. Soc. "Photography—Its Present-day Importance and Power." A. Dordan-Pyke.

Friday, February 18.

R.P.S. Pictorial Group. "Hands in Portraiture." C. P. Crowther.
Bedford Camera Club. "Java: Its People and Temples."
Birmingham Photographic Art Club. "The Romance of the Gunpowder Plot." A. Clark, F.R.P.S.
Edinburgh Photographic Society. Social Evening.
Glasgow and W. of S. Amateur Phot. Assoc. Competition slidea.

Saturday, February 19.

Glasgow and W. of S. Amateur Phot. Assoc. "With Allenby through Palestine." W. Butcher and Sons.
Walthamstow and District Phot. Soc. Visit to National Gallery.

ROYAL PHOTOGRAPHIC SOC

Meeting held Tuesday, February 9, the
Robinson in the chair.

Discussion arose as to whether smoking should b
a technical meeting. Only one member ob
heavily outvoted.

The chairman, in opening the meeting, re
ing for the election of a fresh com
Technical Group, and reminded mem
tions was the payment of the an
announced that at the next meeting of the
group (February 16th, at 8 p.m.)
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Mr. F. C. Tay
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able *hypo-thesis* evolved by the Walrus in one of his flashes of inspiration, to which attention has already been drawn in this journal.

South Suburban Photographic Society.—Mr. J. W. Hodges, of Blackheath, lecturing last week, spoke very highly of the Eastman portrait films for difficult and harshly-lighted interiors. Mr. Hodges dealt first with cameras, lenses, etc., for architectural work, and afterwards showed about one hundred of his best pictures in the form of lantern slides—many of them medalled—depicting all the well-known cathedrals, abbeys, etc. The collection included a very fine series taken recently in and around Ludlow, the Kodak flat film being used for them; the results were of a particularly high quality and quite free from halation.

News and Notes.

Half-watt Lamps have been reduced in price, as from February 1. The General Electric Company's latest price list shows reductions of 5s. for the 1,500- and 1,000-watt lamp; 4s. for the 500-watt; and 3s. 6d. for the 300-watt. The respective new prices are 32s 6d., 25s., 20s., and 16s. 6d.

Pure Chemicals.—The Cooper Laboratory, Watford, have issued a price list of certain pure chemical re-agents prepared by them, consisting chiefly of indicator dyes, but including a number of pure inorganic substances, such as potass, bichromate, sodium oxalate, and sodium thio-sulphate.

L.A.P.A. Prints.—On Monday next, February 14, a collection of prints by members of the Liverpool Amateur Photographic Association will be on view at the house of the Royal Photographic Society, 35, Russell Square, London, W.C. The exhibition will remain open to the public, daily from 10 to 5, until March 14.

Cinematographic Technique.—The New York Institute of Photography, of 141, West Thirty-sixth-street, New York, is publishing "A Condensed Course in Motion Picture Photography." The volume will have special chapters by research specialists of the research laboratories of the Eastman Kodak Company. There will be many illustrations.

Ross, Ltd.—The Honble. Sir Charles Parsons, K.C.B., F.R.S., having acquired, as from January 1, 1921, a controlling interest in the old-established optical and scientific instrument firm of Ross, Limited, will shortly join the board as chairman. Mr. John Stuart, C.B.E., who has been head of the firm for over 50 years, remains on the board.

21-year Sittings.—Messrs. William Spencer and Son, of Pudsey, Yorks., have just finished an interesting series of photographs. They have taken a photograph for 21 consecutive years of a Mr. Bradley since birth to his twenty-first birthday, the exposures having been made on his birthday each year. The series forms a remarkable collection of portrait work. The prints have been mounted all on one card.

The Photographic Journal of America.—Mr. Frank V. Chambers, publisher of the "Bulletin of Photography," has taken over in addition "The Photographic Journal of America," formerly published in New York by Mr. Thomas Coke Watkins, who has had to retire through illness. The "Journal" will now be published in Philadelphia, where it was originally started as "Wilson's Photographic Magazine," by the late Edward L. Wilson, in 1864.

Paget Process Plates.—Messrs. Hunters, Ltd., 16-18, St. Bride Street, London, E.C.4, have just issued an illustrated circular descriptive of the series of Paget plates manufactured for half-tone and three-colour photo-engraving. The advantages of a dry-plate over wet collodion for half-tone work are set forth, and particulars given of the red-sensitive, green-sensitive, and process panchromatic plates made by the Paget Prize Plate Co. for three-colour reproduction. The circular is obtainable free on application.

Classical "Views" of London.—Some "Daily Chronicle" readers have been discussing the question of the spot from which the most pleasing view can be obtained, and naturally (writes a correspondent) opinions differ widely. One writer of a literary rather than a photographic turn of mind states that the finest view in London was, according to Thackeray, the Serpentine seen from its own bridge. Robert Browning preferred the Regent's Canal from Maida Vale; the view from the windows of St. Stephen's Club excited the admiration of Alma Tadema; while both Dickens and Marcus Stone selected the view of St. Paul's from Bankside (across the river). Walter Crane's ideal view was obtained from Waterloo Bridge, looking down the river, and Lord Leighton's artistic eye found most beauty in Trafalgar Square.

Mr. Henry Stevens, the present head of the eighteenth-century auction rooms in King Street, Covent Garden, has recently added a further inducement to visit these premises. He has arranged on the walls of the inner room, where goods are chiefly displayed prior to the sales, a collection of his photographs of flowers and animals. It must be nearly fifteen years since these were last publicly shown, viz., at the offices of the "British Journal." For their technical quality, and particularly in respect to their extraordinary rendering of texture, they rank with the best things ever done in photography. Mr. Stevens has rendered a service by thus reminding the present generation of what the older technicians could do — and without colour-sensitive plates, too. We understand that the photographs are to remain permanently in their present position.

Correspondence.

****Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

WARMING THE STUDIO.

To the Editors.

Gentlemen,—I have been interested in the correspondence relating to the warming of the studio, and perhaps my own experience may help undecided purchasers to form an opinion. I write as a country photographer, where electricity (unless made on your own premises) does not exist, and where gas, though procurable, does not happen to be laid on. I have tried oil stoves and various kinds of coke and coal, but at last I have hit upon the most satisfactory of all—the Methuen Sawdust Stove, which can be procured in my own town, and is now being sent all over the country. It is clean, very economical, and easy to fill and prepare each day. Another great advantage to users of wooden studios, garages, etc., it is *safe*, being completely enclosed, and can be left with confidence either by day or night. Different kinds of sawdust vary somewhat in the degree of heat given, the fine, brown kind being slightly fiercer than the coarse white, but if kept dry, either kind is satisfactory, and if one wishes, the contents of the waste-paper basket, dry leaves, or vegetable refuse can be mixed with the sawdust, and burns well. If there is a chimney already in the studio, the stove can be placed to it at once; otherwise, some piping must be put in, and will increase the heating surface. Solutions can be warmed conveniently on the top,—Yours faithfully,

Herbert Spackman.

Priory Street, Corsham, Wilts.

KEY INDUSTRIES.

To the Editors.

Gentlemen,—I have read with interest the correspondence with regard to "Key Industries," and as an old professional photographer certainly do consider that our plate makers and paper makers are taking a mean advantage of their strong position to-day. I noticed in the Press only last week that a combination had been formed consisting of a number of important photographic manufacturers with a capital of £1,000,000. This and the Kodak combination seem likely to "rule the roost" as far as the photographic trade in England is concerned, and particularly when one bears

in mind that all the rest of the English makers are of the same opinion. Worse than this, I believe that they have actually managed to get several of the big foreign importers with works on the Continent into their way of thinking, and they also have increased their prices, for they are afraid if they give an advantage to the "wee" professional photographer that the Board of Trade may do something ultimately under the head of "dumping prevention" to make business awkward for them.

In pre-war days I know that our professionals were underpaid, and it was largely our own fault that we were. We ought never to come back to the old days of insufficient pay, and I am inclined to think that the material makers are trying to raise the standard of pay for work done by keeping their prices so high. But I contend there is no need for this. They ought easily to be able to give us a 25 per cent. cut in price of materials, and there is no necessity for any of us to lower our prices at all for work done, for we cannot be considered profiteerers, even during the boom war period, as far as photographic work was concerned. Whoever heard of a professional photographer retiring in affluence? I never did, and most of us go along to a hoary old age and sometimes manage to retire in a somewhat low fashion. Sad to relate, the majority appear to die "in harness," and not too well off at that.

These notes will undoubtedly come to the notice of the secretary of the Photographic Manufacturers' Association, and will be brought before their notice, and this correspondence will probably serve to show him that we are not taking this matter "lying down," and our P.P.A., which is certainly a strong body (if it shows its hand), is in a position "to do something." They have their own solicitor, and he ought to be instructed by the P.P.A. Council to keep well in touch with our Government authorities with regard to any restrictions of imports.—Yours truly,

JOHN ROBINSON.

MATT GROUND PLATES.

To the Editors.

Gentlemen,—With reference to the letter in your columns of February 4 and signed H. Green, regarding matt ground plates, it may interest your readers to know that we have made arrangements with Messrs. Elliott and Sons, Barnet, Herts, to supply us with such an article, and, in fact, we have tested samples and found them most satisfactory indeed. They undoubtedly are a great boon, to the earnest pictorial worker especially, and we feel sure Messrs. Elliott and Sons will supply to any of your correspondents.—Yours truly,

T. BAIRD AND SONS.

71, Queen Street, Glasgow,
February 5.

FACTORIAL DEVELOPMENT.

To the Editors.

Gentlemen,—In reply to Mr. Hall's letter (p. 59), if the error in observing the "time of appearance" is caused entirely by slowness of mental decision, such indecision is for a fixed time (varying perhaps from half a second for a skilled motor driver to half a minute for a man of no active occupation) and is multiplied by the factor, giving much the least total error for a short factor developer.

But if the cause is entirely poor sight, or a poor dark-room illumination, the error will be a percentage one on the time of appearance. And as this last is short in long factor developers, and long in short factor developers, the total time error in length of development will be about the same, whether a long or short factor developer is used.

Probably in most cases of difficulty of observing the "time of appearance" it is a blend of two or three of the above causes. Developers with long factors, say 20 or 30, and very short times of appearance, should be avoided. But I do not thing that with an ordinary observer there is greater inaccuracy with a developer of factor twelve than with one of five.

I think that motor and cycle driving have quite altered the quickness of mental decision in this generation. A remedy for not seeing when the image appears is to make the dark-room light copious and efficient. The plate should not be exposed to it all the time, only for a few seconds when observing.—Yours truly,

Hereford, February 6. ALFRED WATKINS.

To the Editors.

Gentlemen,—Mr. Watkins's invitation to practical photographers who are familiar with factorial development to publish factors for different developers and make their knowledge available for others is not meeting with the response that it deserves. I can remember that similar appeals from him in the past have been met with the same silence. A list of factors suitable for use in the development of bromide paper is given below :—

	Factor.
Amidol (Kodak formula), normal strength	12
Amidol (Kodak formula), ½ normal strength	15
Amidol (Kodak formula), ¼ normal strength	18
Amidol (Wellington formula), normal strength	8
M.-Q. (Wellington formula), normal strength	6
Tabloid Rytol, normal strength	6
Azol (1 in 30), normal strength	15

In general, a suitable factor for bromide paper development is from a half to two-thirds of the negative factor given in the Watkins Manual and the "B.J." Almanac. In my opinion the suggestion in the Wellcome Exposure Diary to divide the negative factor by three yields a factor which is too low and leads to under-development. With amidol of the normal strength, Kodak formula, a factor of five is particularly useful as a guide to the development of a bromide print destined for bromoil. This low factor necessitates the requisite amount of over-exposure in the bromide print appropriate to this process in order that sufficient depth may be obtained with the low degree of development.

Mr. Hall points out the possible error in timing the first appearance of the image. It is fallacious, however, to apply the data derived from experience with plates in order to make critical deductions in the case of bromide paper. The accuracy with which the time of the first appearance can be judged depends almost entirely upon the strength of the light under which examination is conducted and the rapidity of the growth of the image. Admittedly, a dark-room illuminated with an orange safe-light suitable for bromide paper is more happily conditioned than one illuminated with a red safe-light suitable for plates, and undoubtedly the image upon a piece of bromide paper grows more rapidly than it does upon a plate whose total development time is five minutes. This rapid growth and good inspection light makes the appearance of the image *a very clearly defined event*, and I am satisfied, as the result of many experiments relating to temperature coefficients, that an error of more than one second need not be feared. Under average conditions (not the 65 deg. F. of the instruction leaflets, which is only normally present in England upon a few days in each year), the time of appearance of the image upon bromide paper is usually about 15 seconds, yielding a total development time of three minutes. An error of 12 seconds in this total time of three minutes can readily be shown to make no appreciable difference to the depth of the finished print.—Yours faithfully,

B. T. J. GLOVER.

Sunnymere, Birkenhead Road, Meols, Cheshire.
February 7, 1921.

THE NORTHERN EXHIBITION.

To the Editors.

Gentlemen,—Now that the exhibition is closed, one may safely raise at least one point in connection with the management at Liverpool, and one which is of vital interest to exhibitors, and to the well-being of the standing of the "Northern" itself. It has been a tradition at this exhibition that the judges only selected the pictures to be hung. This is a safe policy, not only for exhibitors themselves, but as a safeguard to the managers and directors of the exhibition.

This year at Liverpool a self-constituted body of judges of members of the local society took upon themselves the duty of making a first selection of the pictures prior to the judges' work being undertaken. If the judges saw the whole of the prints and marked them afterwards I do not know, but we all realise it is a dangerous proceeding to act in this way if the confidence of the exhibitors is to be maintained. It is reported that many pictures selected by the

local committee had already been hung before the visit of the judges.

Having the above fact in view, I paid a visit to one of the Manchester society delegates, who told me he did not know what had happened at Liverpool, and would not commit himself, but he assured me it was a "landmark," that the selection of pictures be in hands of the judges, and it was usual to submit all prints and slides to the judges first, and who saw them marked A, B, or C. These prints to be disposed of as follows:—

A.—Must be hung.

B.—May be hung if wanted to fill walls or help in scheme of spacing of the prints.

C.—Must not be hung.

I hope with these few remarks to indicate that there is some feeling of dissatisfaction with exhibitors at least on this point. There are others, but to me the one mentioned above is the most vital to exhibitors, and it is hoped any wrong impression will be removed before the next Northern exhibition, which, I understand, is to be held in Manchester.—Yours truly,

NORTHERN EXHIBITOR.

[Several letters received at the time of going to press have had to be held over for appearance next week.—EDS. "B.J."]

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent. International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

G. E.—There is not at present a standard rate or minimum of reproduction fee. Portrait photographers in London have united to charge the minimum fees set forth in the "B.J." of December 24 last, page 790, that is to say a fee of 10s. 6d. for reproductions up to 4 sq. in.; 14s. up to 14 sq. in., and 17s. 6d. up to 30 sq. in. Also some of the large press photographer firms have likewise joined together in enforcing a minimum fee, which we think is 14s. 3d., as against the previous 10s. 6d.

G. S.—Presuming that the negatives have really been thoroughly fixed throughout we should first of all try soaking in a bath made up of chrome alum, ½ oz.; citric acid, 1 oz.; water, 20 ozs., for say 20 minutes. If this does not clear away the greenish stain we doubt whether it can be cleared so as to give a uniform colour of negative, but supposing that the above clearing bath is not sufficient for the purpose, we think the best thing to do would be to pass the negatives through the chromium intensifier, that is bleaching in the usual mixture of bichromate and hydrochloric acid and re-developing with amido[1]

F. T.—The amount of caustic soda required depends not only on the quantity of paramidophenol, but also on that of the potass metabisulphite, since both of these are neutralised by the caustic soda. We think it will probably be near enough for your purpose if we put the relative quantities in round figures as follows:—One part of paramidophenol hydrochloride requires 0.3 parts of caustic soda; one part of potass metabisulphite requires about 0.4 parts of caustic soda. Thus, supposing you use three times the weight of potass metabisulphite relative to the paramidophenol you will require a quantity of caustic soda equal to 1½ times the weight of the paramidophenol.

J. B.—We do not understand what you mean by "copyright number." It is not necessary for the word "copyright" to be marked on a copyright print, and to the best of our recollection, even in the days before the present Act came into force, it was not customary to assign a number to the works registered at Stationers' Hall. We think you can take it as practically certain that any photograph of recent date is copyright. The only question is, to whom does the copyright belong? If it does not belong to your customer, both you and he are equally and separately liable in respect to any action which the owner of the copyright may take on account of its infringement.

T. and R.—The Dallmeyer 3B lens has an intensity of about *f*/3.16, therefore it should require rather more than one-third the exposure of a lens working at *f*/5.8, not ⅛ as you state. You cannot do better than use the 3B, unless the field is not sufficiently flat. In that case one of the new Aldis *f*/3 lens would probably answer your purpose. It would work rather faster than the 3B. A 4.5 lens would only be about half as fast again as the 5.8. With 4,000 cp. and this aperture (*f*/4.5) good negatives can be made on 500 H. and D. plates in about ¾-second. It must be remembered that the distance between sitter and lamps is an important factor. Try placing the sitter nearer the lights.

G. D.—Try a mixture as follows:—Strong gum solution, 1 oz.; crystal caramel, 1 oz.; lamp black (previously ground in the minimum quantity of water), 1-2 ozs.; alcohol, 2 ozs. The crystal caramel is the special make of Litchtenstein, Silvertown, London, E., obtainable from large chemists, such as Johnson's, if you want only a small quantity. About the best method of applying the backing is to put the plate, glass side outwards, in an ordinary printing frame with a soft piece of pure filter paper between the emulsion side and the back. You can then hold the frame with its back to the safelight and apply the backing with the minimum of light-action and without risk of any of the backing getting on the emulsion surface.

R. T.—(1) The only effective means of avoiding reflections from the tablet is to fill the space on both sides between the camera and the tablet with screens of dark material. Professional copyists regularly do this by taking with them large screens of dark cotton stuff, which can be rolled on bamboo rods and extended by strapping these latter to chairs, or getting the help of assistants to hold them in position. It depends, of course, on the available light whether you should use such screens on one or both sides of the tablet. Smearing with oil would no doubt do a little good, but not much. (2) Impossible to say what the lens is. The photograph you mention was not enclosed, but even if we had it we do not think we could identify the lens from it. Some doublet lenses are not rectilinear, but it is unusual to find marked distortion in any doublet lens. Stopping down makes no difference whatever. You are quite right, for general work the R.R. type of lens is the most suitable. (3) In making a block from a photograph it is possible to enlarge just as in ordinary copying, but engravers do not care about doing it as the result is not so good. Still, it can be done up to, say, two diameters.

THE BRITISH

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Contents.

SUMMARY.

In a further article we deal with early and out-of-print works on special branches of photography which are listed in Messrs. Sotheran's large catalogue, "Bibliotheca Chemico-Mathematica." These include some notable books on studio lighting, photo-micrography, stereoscopic photography and photographic optics. (P. 90.)

Formulæ for a wide range of light-filters, published in the early part of the war by a Herr Hnatek, have become available via a French translation by M. L. P. Clerc. (P. 95.)

A thoroughly characteristic address by Mr. Pirie Macdonald, of New York, on a suggested code of ethics for professional photographers has received somewhat belated publication. It would seem that from the Scottish ancestry which his name suggests, Mr Macdonald derives the stern moral sense of the Shorter Catechism, combined with the worldly wisdom of modern Americanism. (P. 92.)

In a contributed article "Thermit" endeavours to signalise the factors in the making of portrait photographs which chiefly contribute to a life-like presentation of the sitters. (P. 91.)

Heroic methods for securing "life" in canine portraits have recently been mentioned by a correspondent. (P. 90.)

For washing a considerable output of prints there is no better system than the cascade washer which a photographer can readily have made from the description in a paragraph on page 89.

The view of a leading dealer in amateur photographic requisites is that the present scale of charges for dry-plates is accelerating the adoption of roll-film and roll film cameras by amateurs. (P. 89.)

We regret to record the death after a short illness of Mr. John R. Griffin, director of the well-known firm of John J. Griffin and Sons. (P. 97.)

Brief particulars have been published of the settlement of the dispute between the Eastman Kodak Company and United States Government in reference to the anti-trust legislation in that country. (Pp. 90 and 102.)

Lenses of "rusty" appearance which are occasionally found among the surplus instruments now being sold are best left alone rather than subjected to a re-polishing process. (P. 90.)

Hints on the use of the Pointolite arc lamp in enlarging and on routine in the making of enlargements with a lantern are contributed to "Assistants' Notes." (P. 98.)

Details of the production of dye colour images and of anastigmat lenses of *f*/2 aperture are published in recent patent specifications. (P. 98.)

A method of intensifying finger prints with aluminium powder prior to printing therefrom on to a photographic plate or film is described as an important improvement in the technique of criminal investigation. (P. 102.)

EX CATHEDRA.

Cascade Washers. We were recently asked for advice upon the selection of a system of washing prints and enlargements which were coming through all day at irregular intervals. In these circumstances we unhesitatingly recommended what is generally called the cascade method. It is based upon an old idea which has stood the test of time, and it is simple and not wasteful of water—a matter of some importance nowadays. The installation consists of a series of wooden troughs, each large enough to accommodate the biggest prints likely to be dealt with in quantities. These are arranged like a shallow flight of stairs, the water flowing into the uppermost one through a perforated tube at the farther edge. When the first tray has filled, the water overflows through a series of openings into the tray below and from that in the same way through the others. In most cases a convenient arrangement would be four trays, each about 24 x 20 and five inches deep, and if space be limited the trays may slightly overlap. The prints, after a preliminary rinse from the hypo, are placed in the lowest tray, and after five minutes in this are successively placed for the same time in each of the higher ones. If a large number of prints have to be dealt with the number of trays may be increased, so that the longer time will compensate for the crowding in each tray.

* * *

Plate Prices and the Amateur. The continued high level of the prices of dry-plates is the subject of an appeal—or perhaps we should call it a warning—from one who has his finger on the trade in amateur photographic requisites. When it is said that it comes in the shape of a letter from Mr. Oglesby, of Messrs. Sands, Hunter, and is moreover printed in the "Photographic Dealer," and endorsed by the editor of that journal, it cannot be dismissed as mere idle comment. Mr. Oglesby's diagnosis is that the present scale of prices of plates contributes to a movement which has been notable among amateurs during the last few years (in part as the outcome of other circumstances), namely, the choice of roll film and roll-film cameras instead of plates and plate cameras. The position appears to be that the users of roll-film cameras form the large and a growing majority of a dealer's customers, and, further, even though they do no more photography than the making of the exposure, are individually better customers than users of plates. On these grounds only, the dealer's interests lie more and more with film. Discounts, likewise, enter into the question of the sale of the respective materials, and give rise to the wish on the part of dealers that their own interests and those of dry-plate makers could be brought more closely into correspondence. We know Mr. Oglesby to be a shrewd judge of the trade tendencies which his position gives him the occasion to observe, and there seems good reason to confirm his view that the present

conditions are those for transferring amateurs' purchases of sensitive negative-making materials from plates to film in increasing volume.

* * *

The Eastman Kodak Trust. Assuming the correctness of the report telegraphed to the "Times," which we reproduce on another page, the long drawn out action by the United States Government against the Eastman Kodak Co., under the Sherman Anti-Trust Act, has had a very tame ending. The Company has been ordered to separate from itself that part of the undertaking connected with the manufacture of Premo and Century cameras, representing, so it is stated, less than one-twentieth of the capital value. It can be understood that this is the branch grafted on to the parent tree which can be most readily lopped off again, for the manufactures are distinctive products which have experienced little change at the hands of the Eastman owners. It has been different with other businesses, particularly those engaged in the manufacture of sensitive materials. These have been not merely absorbed by the Kodak organism (as Dr. Mees might perhaps express it), but digested to a state defying restoration to their original shape. An example of the saying of Pierpont Morgan that one may as well expect to dissolve a trust as unscramble an egg.

* * *

Rusty Lenses. Just now quite a number of high-class lenses, demobbed from Government service, are finding their way into the hands of photographers, and in some of these which we have handled the glasses are rather badly tarnished or rusted upon the surface. This has little detrimental effect upon their performance, especially with isochromatic plates; the only danger to be apprehended is from attempts to re-polish the surface. Some photographers imagine that friction with rouge or putty powder, the materials used in polishing, may be done with impunity, but there is a great risk of spoiling the definition of the lens by using such means. Moreover, it is as likely as not that the rust will persist in spite of the polishing. We have seen a lens in this condition which had been reground with emery and re-polished by the maker on which the stains were still evident. The best thing to do is to let well alone, and to keep the lenses in a perfectly dry place when not actually in use. The defect is caused by damp and will never occur if any condensation upon the surface is immediately removed. Tightly fitting caps for both ends of a lens are the best safeguards.

* * *

Canine Portraits. Any photographer who has ever had a single specimen, or worse still a group, of the canine species to photograph will admit that neither is to be regarded as an easy proposition, especially in the case of show dogs, where the particular "points" of each animal have to be emphasised in the photograph. Without these being clearly discernible the best technical photograph is worthless in the owner's opinion. Different photographers have each their own methods of attracting the attention of their sitters at the critical moment, with a view to securing good poses and interesting expressions. One worker of our acquaintance has found cat calls highly effective, but we are not all gifted with the necessary vocal ability to make these sufficiently realistic. Some time ago we were told by a dog-loving friend of a method of procedure which displayed not only originality of mind but an infinite capacity for taking pains. He arrived, in this particular instance, with a stuffed cat upon a pole, and he took an assistant with a violin. At the crucial moment the "sitters" were called out, and presumably while they were investigating the presence of the cat, the violin gave a scream that ensured upraised heads and the "alive" expression so desirable in a good dog portrait. That such a method is successful every time we should doubt, but the hint may have its application. The only other items essential are a reflex camera with large-aperture lens, fast plates; plus plenty of patience and a knowledge of dogs and their characteristics

THE EARLIER LITERATURE OF PHOTOGRAPHY.

II.

Returning to the notes on the many out-of-print books on photography contained in Messrs. Sotheran's "Bibliotheca Chemico Mathematica," to which reference was made in our issue of February 4 last, we may make allusion to some of the works dealing chiefly with processes which followed wet collodion, or with particular branches of photographic work. But first we should point out that Messrs. Sotheran's list includes copies of some of the old books relating to the pre-photographic history of the camera. Notable among these is the celebrated "Magiæ Naturalis," of Giovanni Battista della Porta, of 1585, in which is described a camera obscura, but one without a lens. Porta's description of a camera fitted with a lens occurs in a much later and greatly different edition of this work, and though he has often been popularly described as the inventor of the camera, the instrument may be traced to a much earlier date, for example, to the writings of Daniel Barbaro; and Messrs. Sotheran's commentator puts its first description in a work by Levi ben Gerson, translated in 1342 under the title "De Sinibus et Cordis." The student wishing to obtain an idea of the state of knowledge of the camera obscura and other scientific instruments in the seventeenth century may turn to "Collegium Experimentale," by Johann Christoph Sturm, of 1676, a review of the chief scientific discoveries of the time. Works on the camera obscura belonging to the eighteenth century are, of course, plentiful. One of these is that of Georg Friderich Brander, "Kurze Beschreibung einer Neuen Art einer Cameræ Obscurie," a rare work published in Augsburg in 1767.

But turning to the later processes of photography, two early works of Abney on dry-plate emulsions are "Emulsion Processes in Photography," of 1878, the only native treatise on emulsion making, and one which has been out of print for many years, and "The Practical Working of the Gelatine Emulsion Process," of 1880. A notable manual on processes of printing is "Elementary Lessons on Silver Printing," by W. M. Ashman, of 1888. Unfortunately, the valuable contributions which Ashman in collaboration with Offord made to the working out of formulæ for print-out gelatine emulsions occur only in the periodical literature, and chiefly in the shape of the series of papers published in the "Photographic News" of the year 1885. A manual which is still to be purchased fairly freely secondhand—Messrs. Sotheran price it at only 3s.—and is one of the best ever written from the technical standpoint, is "Photographic and Photo-Mechanical Printing," by W. K. Burton, issued by Messrs. Marion in 1887. Although the photographic printing processes, such as albumenised paper, plain salted paper and others, have passed out of use, the volume is a rare storehouse of the expert knowledge of the subject possessed by Professor Burton, and even to-day, as regards the photo-mechanical methods, contains much of value for current instruction. We come to a somewhat later date in two large general treatises, namely, "La Photographie Moderne," by Albert Londe, of 1896, and "Photography: Its History, Processes, Apparatus and

Materials," by A. Brothers, issued as a second and last edition in 1899 by Messrs. Charles Griffin. The latter large treatise occupies a place by itself owing to its size and arrangement. No other book of the time afforded such a comprehensive review of the technics of photography, and it may be thought a pity that Messrs. Griffin have not continued to issue it with revisions in correspondence with current progress.

The chemistry of photography is represented by few works, for writers on this subject have been few in number, and the treatises, by authors both in this country and the continent, have been somewhat fragmentary. But a notable book is "The Chemistry of Light and Photography," by H. W. Vogel, a revised English edition of 1876. Another book containing a vast amount of information on photographic chemicals is "Materia Photographica: the Manufacture, Properties and Uses of the Substances employed in Photography," by Clement J. Leaper, published in 1891. Then there is the volume by Abney, "The Action of Light in Photography," the basis of which is a series of lectures delivered at the Camera Club. It contains an account of the author's sensitometric work, which is not readily obtainable in any other form. A little pamphlet which is deserving of mention is that by the late Dr. W. J. Russell "On the Action of Wood on a Photographic Plate in the Dark," a reprint of the author's paper of 1904, in which the fogging or desensitising action of many materials previously supposed to be inert was systematically examined. And, to take a jump back to the mid years of photography, there is a copy of the large and scarce treatise of Edmond Becquerel, namely, "La Lumière: ses Causes et ses Effets," a large volume describing the author's many observations on phosphorescence and the chemical action of light.

Stereoscopic photography is a branch which has a somewhat scrappy literature. Messrs. Sotheran catalogue an interesting work of which we had not previously heard, namely, "Teneriffe, an Astronomer's Experiment," by C. Piazzi Smyth, published in 1858. It is stated that the score of photo-stereographs in this volume constitute the first application of stereoscopic photography to book illustration. We are quite ready to believe it, for Piazzi Smyth was accustomed to look far ahead towards photographic possibilities, as witness his suggestion many years ago of cameras, which have only lately been realised, in those of the vest-pocket and smaller size. An early manual is "How to Take Stereoscopic Pictures," by William Ackland (1859); two French manuals, both having the same title of "Traité de Photographie Stereoscopique," are by A. L. Donnadieu (1892) and L. Mathet, of about 1899.

What we imagine to be the first manual of photomicrography is "Die Photographie als Hülfsmittel Mikroskopischer Forschung," by J. Gerlach, published in Leipsic in 1863. Other manuals on the same subject are "Photo-Micrography," by A. C. Malley, of 1885; "Lehrbuch der Mikrophotographie," by R. Neuhauss, of 1890, and "Traité Pratique der Photomikrographie," by L. Mathet, of about 1899.

Among these manuals of sections of photographic work we should not omit to mention one or two of the old books on portrait photography, volumes containing a great deal of information for the present-day portraitist; for while methods of negative making and printing may suffer radical changes, the art of lighting a sitter for a pleasing portrait remains essentially the same. These books are "Artistic Lighting," by J. Inglis, of 1897; "The Skylight and Dark Room," by Elbert Anderson, published in Philadelphia in 1872; "The Photographic Studios of Europe," by H. Baden Pritchard, of 1882, and also an early work on retouching, "Concise Instructions in the Art of Retouching," by Burrows and Colton of 1876.

We must conclude these already lengthy notes by reference to the more important volumes on photographic optics which figure in Messrs. Sotheran's list. A manual which for many years was widely read is "Photographic Optics," by Van Monckhoven, of 1867. There are also "Traité Elementaire de l'Objectif Photographique," by E. Wallon, of 1891; "L'Optique Photographique," by P. Moessard, of 1898; "Telephotography," the large treatise by T. R. Dallmeyer, issued in 1899, and "Theorie und Geschichte des Photographischen Objektivs," by Dr. M. von Rohr, the most comprehensive and authoritative work on the history and properties of photographic lenses. And to go back nearly fifty years, there is the rare work of the Abbé Francois Napoleon Marie Moigno, "Repertoire d'Optique Moderne," a large treatise on the history of modern optical theories during the first half of the nineteenth century, and containing a section dealing particularly with the optics of photography.

LIFE IN PORTRAITS.

I HAVE just been looking over a number of portrait photographs by different camera artists in diverse styles and qualities, and I am struck by the fact that only a few of them have a real "live" appearance. In the others, there is nothing to convince the spectator that they are actually from life and not from models or drawings. There are three in particular, which, when placed in a line, show very plainly the point I am concerned with at present. No. 1 is a bust of an obviously theatrical person. The head is certainly a round and solid object, but to know that it was photographed direct from a human being I must depend on logic. An identical result could be got from a wax model. No. 2 is different. A man's head, but certainly not solid. Looked at from some little distance it might have been taken from another photograph or from an engraving, but close inspection leaves one in doubt of either. I happen to know that it is a "direct," but it has neither the brilliance nor texture that always belong in some degree at least to human skin. Of No. 3 I know nothing except the bald statement made by the print itself. But that statement says decisively that the subject was alive—and fully alive—when the picture was taken. It is interesting to note that this photograph does not appear otherwise to be as expensive or "classy" a production as either of the others.

Now what determines this live appearance in a portrait photograph? It is governed by the same factors that rule the production of good work in general, and so is sometimes obtained unconsciously. But it can be made a regular thing by any good worker, and need not be left to our leading camera artists as an exclusive feature.

The first thing is, naturally enough, a live appearance about the sitter, and this goes a long way, but nevertheless is not a *sine qua non*. A live expression on the face is more important. Every operator has—or should have—his methods of getting desired expressions, but for the benefit of those who need a hint I can recommend the following. Having got

everything ready for the exposure we address the sitter, regardless of empty grins or bored looks, something like this. "Now, Sir (or Madam as the case may be), please keep precisely as you are for another moment. You look fine (or beautiful as the case may be)." The sublime expression which invariably dawns has to be seen to be appreciated.

A sitter's complexion also affects the results we are aiming at. There is little or no white in human flesh and skin, which may show red, pink, purple, brown, cream, blue, green and other tints, and on this account colour-sensitive plates are more likely to preserve the living appearance than colour-blind plates can. At the same time excellent results are obtained on plates and films which are not—or are not supposed to be—colour-sensitive. I have mentioned films; which reminds me that halation alone can destroy the live quality of a picture, and therefore a non-halative plate or film should be used.

Exposures should be as nearly exact as possible. Neither under or over exposure will get the best scale of gradation from the latitude of any emulsion, though the last is not so detrimental as the first.

Lighting, for general work, should be full and plentiful without being flat. An expansive and high supply of diffused light with a small point of direct light somewhere near its centre is a rough description of a simple and effective form of lighting. Reflected light must be controlled by very deliberate inspection, and if it can be done without, so much the better.

Great depth of focus and pin-sharp definition all over are not required. Soft focus and a suggestion of fuzziness around outside edges give an impression of movement which is almost essential. At the same time, decided unsharpness is not wanted or of any use. Any lens other than one designed for portrait work should always be used at full aperture to avoid "still life" definition as much as possible.

Provided we can develop intelligently, there is only one point to consider here. If we are not using a non-halative plate or film, quick development in normal developer is calculated to give cleaner high lights than very slow action in a tank of diluted solution. The former will bring up the picture before reaching the halation, the latter will penetrate the emulsion before getting to work properly on the image. The necessary amount of development will depend on the grade of printing paper favoured. If this is soft, a fair amount of contrast must be developed into the negatives; for vigorous papers the development should be somewhat curtailed.

Retouching has a lot to do with the final result, particularly if ordinary plates are used, and here are three points for the retoucher who is not an expert. First, there is usually a high-light within a high-light in nature, or, in other words, high-lights are not even spots or patches, but are composed of gradations. To emphasise this by inserting smaller "higher-lights" in the high-lights of a portrait will help considerably provided it is not overdone. Second, light playing on a person's eyeballs can give the spectator quite a decisive impression of life, and this applies also to portraits. If the whites of the eyes and the points or triangles of reflection in the pupils are inconspicuous in the negative, much can be done by the judicious addition of a little retouching lead. Third, the style of work is a factor. Retouching which prints like wire netting or a layer of dust destroys any impression of life. To use an Irishism, retouching is most useful here when it is absent, but if a negative really requires decisive retouching, the shape and direction of the strokes are important. I have always got the best results by restricting myself to short lines, straight and curved running in the (curved) directions that the grain of the skin seems to take—horizontal on the brow, vertical at the temples, oblique on the cheeks, circular round the chin, and across the hands. I find the nose is best treated with horizontal strokes though the inclination is to work vertically.

Of printing mediums, those of the slow development type are at least as good as any, and of surfaces, matt and semi for small heads, semi or rough for large and "Royal" or "Cream Crayon" for extra large. Warm blacks, warm sepias and prints on cream base are naturally suited to representing skin, though strictly speaking, the effect can be obtained on even the bluest black and white if the negative is very good. I have yet to see a harsh picture that was "alive" though Rembrandts and silhouettes are the easiest styles to produce with life. They can, however—and must—be soft, in spite of their brilliant lighting. I have seen flat pictures that were full of life, but softness without flatness would have improved them.

Colour, like warm tones, will add to the impression, but the colouring must be fundamentally correct. The cream must be there, and the reds and pinks must not be opaque or overdone, while touches of blue in the high-lights and blue and green in the shadows—although this may sound unnatural to those unacquainted with painting—are almost certain to be wanted.

In conclusion, I would like to point out that while it is not possible for everyone to emulate our photographic genii we can all strive to improve the quality of our work, and attention to such details as I have enumerated will greatly help.

THERMIT.

A PHOTOGRAPHER'S CODE OF ETHICS.

WE sometimes hear the opinion expressed that among photographers the sense of a professional standard of ethics is not very highly developed, and certainly many things occur which justify that view. It would seem that the need of wider recognition of an ethical code among photographers is realised as clearly in the United States as here, for at its Congress last year the Photographers' Association of America drew up one and devoted a meeting of a Congress to its discussion. For some reason, neither the code nor the discussion of it was adequately reported at the time, but our little contemporary, "Portrait," the organ of the Ansco Co. in America, has now printed it, and has supplemented it by the highly characteristic speech made by Mr. Pirie MacDonald in reference to it. Mr. MacDonald is an old friend of ours, whom, to our regret, we have not seen for a long time. A most successful business man, he, perhaps, among photographers in the United States is the chief spokesman for that American idealism which many people here find to be so strangely interwoven with American business instincts. Individualist as Mr. MacDonald is in the conception and management of his own business as "photographer of men," we are convinced that he means exactly what he says in his pleas for broader and juster relationships of photographers among themselves. While it is less our habit in this country to treat business relationships in language which suggests in turn Marcus Aurelius, Dr. Samuel Smiles and the late Colonel Roosevelt, nevertheless there undoubtedly is a large body of opinion among photographers which will respond to the arguments which Mr. MacDonald advances for a higher standard of mutual dealing among those following photography as a profession. Inasmuch as a great part of his address would be unintelligible without the "code" to which it refers, we place the latter at the head of his remarks. It runs as follows:—

1. My business standards shall have in them a note of sympathy for our common humanity. My business dealings, ambitions and relations shall always cause me to take into considera-

tion my highest duties as a member of society. In every position in business life, in every responsibility that comes before me, my chief thought shall be to fill that responsibility and discharge that duty, so when I have ended each of them I shall have lifted the level of human ideals and achievements a little higher than I found them.

The practice of photography, both as a science and an art, is worthy of the very best thought and endeavour of those who take it up as a vocation.

2. Having accepted photography as a vocation, the practitioner should, at all times and in all places, esteem it an honour to be able to say, "*I am a professional photographer.*"

3. Our brother photographer's name and reputation should be as sacred to us as our own. The off-hand slur, the unnecessary criticism of his work or methods or manners, the meaning smile or shrug of the shoulder, have no place in the daily life of a professional photographer.

4. The re-photographing of the work of another to achieve a saving of cost for a patron is inconsistent with the best interests of the profession, and is not in accord with the established rights of our brother photographer.

5. The cutting of prices in order to get business away from other photographers without any other legitimate excuse is inconsistent with the dignity of our profession and not in accord with the rights of every man to have a fair and open chance to do business.

6. Advertising in its many forms is essential in these days of commercialism, but the claiming of false or ungained honours, untrue statements of any nature, boastfulness of work better done than others can do, depreciation of the work of other studios, are unworthy of the professional photographer, and its consistent repetition should be severely and publicly condemned.

7. The best interest of the patron should at all times be the first thought of the professional photographer. A studio based on service to the patron and demanding fair pay for real service in following the best tenets and precedents of the profession.

8. It is a privilege to give aid and advice to those whose knowledge is less than our own and who come seeking our help, so that they may progress in the practice of photography. We learn most by giving to others of our own knowledge. By refusing to give of the gifts that have been vouchsafed to us, we impede the progress of the art.

9. True service to our patrons is founded on giving them what they desire at a price which leave a fair profit to ourselves. This is not possible without a knowledge of what it costs to do business, therefore we cannot reasonably be giving true service, unless we know what it costs us to sell, and unless we sell at a price which will give us a return proportionate to our skill and to our expense, so that both our reputation as photographers and our credit as business men may be maintained.

The code of ethics is rather hard to talk about, because it is all so obvious. To the code of ethics we, as honest and conscientious men and women, naturally subscribe, and it seems to me that it is a waste of time to go into it in any great degree of detail.

However, the only way to examine this subject is to do it from a cold-blooded, business man's standpoint, but I don't pretend that it must be treated in an unsentimental way, because I feel that there is no real, deep-seated prosperity in any business that is not founded on sentiment.

In the discussion of a matter like the code of ethics, we recognise the fact that there are two types of people, those who first ask the question, "Does it pay?"—and those who ask the question, "Is it right?" However, the whole code might be easily examined from the point of view of, "Does it pay?"

The first item doesn't need any discussion from the standpoint of, "Does it pay?" Of course, you have got to give the very best endeavour and the very best thought. Who would try to run any kind of a business, say a shoe shop or a printing office, and not give it his best thought? An item like that is really a very nice thing to have as a declaration of ideals. "Does it pay?" Of course it pays! It doesn't pay to do anything else.

The second item in the code, however, is rather different, and it is put this way: "Having accepted the profession of photography as a vocation, the practitioner should at all times and in all places deem it an honour to say, 'I am a professional photographer.'" If you are not proud of your job the people that buy your goods are never going to be proud of the goods after they have bought them. They will buy them on sufferance, and though they take them away with them, anybody can knock them. The only way that you are going to put your goods over so that they will stay "put" is to make goods that you know are good. Be proud of them, and let people know you are proud of them. How much good would it do a shyster lawyer, a man who is chasing ambulances and doing all sorts of nasty tricks, to say, "I belong to an honourable profession"? How much honour would the man get out of his profession? He wouldn't get much!

The honour in this profession is the honour that you give to it. The profession can't honour you. You honour the profession by being the men that you ought to be, and therefore, friends, do your job properly every time, and be proud of it.

The third item: "Our brother photographer's name and reputation should be as sacred as our own."

This is the thought that struck me when I read that from the "Does it pay?" point of view: Did it ever pay to let somebody else know that you are jealous? No! The very minute that you suggest, by your manner or by innuendo, that the man around the corner doesn't make quite as good work as yours, the customer has every reason to believe that you are conscious of the fact that he *does* do good work. The only way that you are going to make your customer sure of the quality of yours is to acknowledge the good things that the man does—freely, generously, fearlessly. Then when they think of you, they are going to realise that you are not only a good workman, but a big, broad-minded man! After all, you are the man. There is nothing in the world that is quite so despicable as a fearful person. When a dog comes along on the other side of the fence with his mouth full of bark, if you run, the dog will jump over the fence at you. It is exactly the same way with people. All you have got to do is to show that you are afraid of the man around the corner, and the public will immediate commence barking about him and telling how good they think he is, because they have got something on you, whereas, if you have no fear of him, you will admit that he is what he is. Admit it, it pays! And folk love fearless men!

This question in the fourth item, of re-photographing other people's work, is a foxy question—what? There are a lot of you perfectly dead sure that whichever way I talk you are not going to agree with me! It is true that it would seem at the outset that there are two distinct answers. But we are talking now from the "pay" point of view. Does it pay? The question is, "Does it pay to show that you lack principle?" Doesn't it pay to show your customer, at the expense of a three or five or even a fifty dollar order, half a dozen times a year, that you have principle, that you recognise that there is "right and wrong"—and you know devilish well what the right is! People trust folk that have principle. The only value there is in this world to me is to be able to look in the eyes of some of you folk and have you signify "Why, hang it, we know you are on the level." Principle! Principle!

I am not going to discuss with you, I am not going to lower you by discussing, the question as to whether it is right or whether it is wrong to copy the work of somebody else who owns a negative from which he can make original prints. His genius was put into that negative. No matter whether it is greater or less than yours, it is his genius, and it belongs to him. If you throw a piece of work down every now and again, if you say, not churlishly, of course, "Go back to the man who made the work originally—he is the man who has the plate, and can make you better things from it than I can, and, secondly, it belongs to him and it doesn't belong to me," when then, when those people want somebody who is trustworthy, they are going to think of the man who threw them down for the sake of principle. When they really want something faithfully and well done, do you suppose they are going to take it to a man who they know is a crook? No! They are going to take it to the man who has backbone enough to throw them down and refuse to take money in order to maintain a principle. Bear in mind I am talking only from one side of the subject, "Does it pay? Does it pay? Does it pay?" That is the only point of view that I am trying to show you.

We have pretty well discussed the right and wrong of this copying business while we have been discussing the question of whether it pays. But did it ever occur to you that one of the ways of finding out whether a thing is right or wrong is, before you take a thing from a man, to say, "Would I do it for him?" In these more or less unpleasant times when the cases are so far apart, if a man were to say to you, "Will you?" most of us would say nothing at all, but grab the man by the coat and walk along with him. But you know, really and truly, in these days when it is so awfully short, it would be very wrong not to say to ourselves, "Well, suppose I only had two of them, would I ask him?" And if you wouldn't ask him, cut it out, friend, you have no right to that drink. Exactly the same thing holds true in the copying of pictures. What right have you to copy the picture of another man if you don't want him to copy yours? If there would be any objection at all on your part to his copying any one of your pictures what moral right have you to copy his? Anything that is not fifty-fifty isn't fair. And it doesn't make any difference what he would do. You are the man—yours is the honour or the shame!

Fifth item, the cutting of prices. Pretty nearly as large a question as the other. The attack is rather different, however, as I see it. In ninety-nine cases out of a hundred the other man is making work that is so good that you realise that your stuff is not worth the money you are asking for it, and you cut your prices. You don't believe that your stuff is as good as the other man's or you wouldn't go down. For if you really and truly believe in it you will buck yourselves up and say, "Darn it, I will fight some other way, because my stuff *is* good." When men have a thing that they know is right they fight for it. They don't lie down—and cutting prices is lying down.

I went through a pretty badly fought-over region in France not so long ago, and I am full of the idea that people fight for the things that they believe to be right, and when they have a suspicion that they are not right they are very apt to welch and lie down.

It is always hard to put the prices up. There are men here that were youngsters with me who realise that there was a time in their lives when to raise the price of work a dollar was a something that gripped your heart and made you frightened. When you have got your price up, why have to take another fright? It is *very* hard to go up—it is very easy to go down. I remember going up a mountain once on the ice and in the snow, that took me three hours to go up, and only three minutes to come down. It cost the seat of our trousers, but it only took three minutes coming down. It is just the same way with the cutting of prices. It will take you three years to go up, and about three minutes to come down. Then you have all that fight on your hands to do over again to get the price up to where you know it ought to be. The man around the corner may be getting the business "because he is cutting prices"! No! He is getting the business because his work and your work can't be told apart, in the eyes of the people that are buying the stuff, and they do see a difference in the price. It is your fault. You have not made it sufficiently apparent to the public that your stuff is the best.

Now, it is true in nine cases out of ten that price-cutting comes because a man is afraid. The answer is not to get all the other men in town to sign a hard and fast contract. No, it is not the other men I am talking about. I am talking about *you;* you are the man who is making the work, you are the man who is to stand before your community as a photographer and a gentleman. And the only way that you are going to do it is to find out as to whether your work is really good enough, and if it is not good enough and you don't know how to make it good enough get out and find somebody that will tell you how to make it good enough—and I know that this whole country is filled with fellows who will be glad to help you. I was a youngster once; they were all almighty good to me when I needed help.

The "right and wrong" of price-cutting. In the first place, it is not sportsmanlike. It is like trying to win a race by offering to pay the judges in order to win, offering to put up coin instead of running like hell! There is nothing sporting about the idea of price-cutting. Just once more let us say it means that you have not got confidence in yourself.

But now here in the sixth item is one of those fool obvious things so wrong that they do not need discussion. Why we should have to have it in a Code of Ethics I swear I don't know. Unclean advertising and making untruthful statements—it pays or it doesn't pay. "Does it pay" to make untruthful statements about anything? Does it pay to be boastful in the statement that you put in a newspaper that another man can disprove?—where the person that reads laughs about it. I will tell you where it doesn't pay. The very minute that you make an untrue statement or claim it gets into your soul and makes you feel like a cootie when you look at yourself in the mirror. That is exactly what it does to you. It brings about a quality of moral decrepitude that leaves its stain. I never swear really except when I remember something I have done that wasn't the square thing to do. It makes me cringe, and a man who gets accustomed to doing crooked things is going to find that after a while his soul gets numb and the d——n thing *won't* cringe.

Here is another article in the Code, the seventh, about the running of your business without regard to the best interest of your patrons. Go on and run your business without figuring the best interests of your customers and find out how soon you will blow out. There will not be enough left of you to bother the undertaker. Unless you give more than they pay for, unless a something comes out of the heart, that can't be bought, you can't win. Why, I have seen people, and so have you, that were so stingy that they hated to give up the twelve photographs even after they got the money for them. I actually did see a man wrap up a dozen of fifteen-dollar photographs in a piece of newspaper so as to save an envelope when he had a lot of envelopes under the counter! But *service* doesn't mean giving away envelopes. Service means giving your heart—giving everything you have *every time!*

The ninth article in the Code that says you ought to have a knowledge of what your photographs cost! Does it pay? Does it pay to know what a thing costs? Sure! There is a funny feeling on the part of some people in our business, and I have often wondered about it. They act as though they were wearing a Christian Endeavour Medal or a D.S.C. because they can tell you about costs. "Why, yes, of course." "Do you always keep books?" "Yes, they always keep the books." Friends, if you don't know what stuff costs, you had a good deal better get out and work for somebody who will keep track of what things cost. You are safer with him

than you are with yourself. One of the price-cutting troubles comes very largely because people don't know what stuff costs. As to the right and wrong of knowing costs, it is unfair to yourself, of course, and if it is unfair to you it probably follows that it is unfair to your customer, if you don't know what things cost. For you might sell them for below what they cost, or you might easily sell them for so much above what they cost that you are not fair to your customer. If I am going to take money away from people in the form of profit, I want to know how much there is, so I will know that I am taking it. I want a diagram of what belongs to me and if I am charging so much more for my professional services than my fair share, more than by any possibility I could be entitled to, and I therefore am a crook, I want to know how much of the money belongs to me and how much goes to the crook that I am.

The worst of not knowing is that it breeds suspicion of everybody that you have in the house. If by chance you are making money you don't quite know where it comes from If you are not making money, then you might think perhaps that some of your help are stealing. Lack of knowledge results in lack of confidence; you can't win.

In article eight is another item that is always attractive to me. It is a great thing to be able to give advice to those whose knowledge is less than your own, and it pays to give aid and advice to other people. In the first place it sets you up with yourself. You have something to give, or they wouldn't come to you! It makes you feel bigger. You feel proud of yourself, and you become more capable because of the fact that you have been recognised as capable, and you acquire confidence. Does it pay? The more a man knows the more he will charge for his work, and the more he charges for his work the more money he gets, and the more money he gets the less temptation there is for him to push you! Nobody but a fool is a thief, if he has any money in his clothes, and the man that is really well off doesn't cut into your business and take away your bread and butter Make the man capable of doing really good things and he might outstrip you and charge more money than you do, and then you have no right to kick!

One of the best points about it is that when a man here and there commences coming around to ask advice on technical matters you wake up and say, "I don't know how to answer him. It is something that I have been doing, yet I don't know how to answer his question." It drives you right down into analysis and you find out the why of the thing in order to be able to tell the man, and it pays, because you have found yourself. You have found something that you know the other man thought that you knew, and that now you really *do* know. But don't get chesty, for some day he is going to ask you a "lallapaloosa," one of those "twisters" that you don't know the answer of, and you will have to get busy!

You must apply this code of ethics to yourself and forget the other man. If you don't, you had better tear it up—it is not any good. Don't work like an Anti-Saloon League on another man, and go around and try to smell whether he is making "near beer" on the kitchen stove. No, if you have any morality to spare, stay home and use it. Stay home and attend to your own business, unless you have something to give and if you have something to give, give it as though you loved to give.

The code of ethics isn't built for the government of the other man. A code of ethics is not the thing whereby you get a man into an association and get his name down on a piece of paper, with your hand over the subject matter, and then give it to him with a glad smile and say, "Here is something that you have signed, and you have got to live up to it." A code of ethics is a guide for you. It is not to protect you from the other man. You don't need protection if you have the kind of stuff in you that belongs to our kind of people. I am talking about our American kind of people. I have been over half the world since I saw you last, and I like our kind. I like our kind, because in America we are the greatest bunch of practical, working, every-day thorough-going idealists that the world possesses.

That is the true basis of a League of Nations, but the first league of nations that we want is a league inside of our own nation of men that are really on the level—the right-thinking, hard-hitting, hard-working sort of folk that love one another.

PIRIE MACDONALD.

LIGHT-FILTER FORMULÆ.

Among the doubtless numerous technical contributions to the Continental journals during the earlier period of the war which have escaped notice is one which we are interested in seeing has been resumed by M. L. P. Clerc, and published in an abridged form in a recent issue of "Le Procédé." It consists chiefly of a series of tables of the dyes and the quantities thereof required in the making of light-filters of a wide range of transmissions. The paper appeared in "Zeitschrift fur wissenschaftliche Photographie" in 1915, and is by A Hnatek. We translate M. Clerc's abridgment, and hope that it is easier to prepare Herr Hnatek's filters than to pronounce his name. The formulæ are given for filters consisting of dyed gelatine coatings on glass, the filter usually consisting of two such gelatine-coated glasses, each containing one (in some cases, a greater number) dye. Filters of this form are uniformly indicated in the tables as (*a*), (*b*), and in some cases as (*c*) where a third separate dye-film is used.

The first column in the table is the number of the filter, the second its region of transmission in Angstrom units. The third column specifies the dyes which are used, and the fourth the weight of dye in grammes per square metre of filter, that is to say, the "dye density," to use the term of von Hubl. The fifth column contains the number of c.c.s. of a stock solution of the dye which are to be added to 7 c.c.s. of a 12 per cent. solution of gelatine in order to provide the quantity of coloured solution for the coating of 100 sq. cm. of filter. The entries in the last column relate to the transmission of the filter in respect to the infra red. The property is unimportant in ordinary or visual work, but enters into consideration in the use of panchromatic plates.

The stock solutions of the dyes are of various strengths. The figures given in column 5 therefore do not bear the same relation throughout to those in column 4 as will be clear from the following particulars of the stock solutions which it is necessary or advisable to make.

2 *per cent. Solutions*

Cocaine, new.
Eosine.
Tartrazine.

1 *per cent. Solutions*

Solid red D.
Bordeaux red
Rose Bengal.
Naphthol yellow.
Filter yellow K
Auramine.
Naphthol green.
Lumiere green.

1 *per cent. Solutions, continued:*

Alkaline blue.
Carmine blue.
Hoffmann violet.

½ *per cent. Solutions:*

Brilliant orange.
Martius yellow.
Brilliant green.
Methyl green.
Methylene blue.
Toluidine blue.
Gentian violet.

¼ *per cent. Solutions:*

Acid green.

Filters transmitting approximately 1,000 *Angstrom* units.

No.	Region of transmission in Angstrom units.	Dyes employed.	Dye density gms. per sq. m.	Dye sol. per 100 sq. cm. ces.	Transmission in infra-red.
1	Violet to 4,900	Hoffman violet ..	3.0	3.0	From 6,800
2	Violet to 4,800	(*a*) Eosine yellow ..	4.0	2.0	
		(*b*) Methylène blue 4B ..	1.0	2.0	From 7,000
3	4,500—5,600	(*a*) Quinoline yellow ..	1.0	1.0	
		(*b*) Carmine blue ..	2.0	2.0	From 7,000
4	4,800—5,900	(*a*) Auramine O ..	3.0	3.0	
		(*b*) Naphthol green ..	1.0	1.0	
		Lumière green S ..	1.5	1.5	
5	5,200—6,400	(*a*) Tartrazine	2.0	1.0	
		(*b*) Naphthol green ..	2.0	2.0	
6	5,500—6,500	(*a*) Brilliant orange ..	2.0	4.0	
		(*b*) Naphthol green ..	2.0	2.0	
7	5,600—6,600	(*a*) Eosine yellow ..	2.0	1.0	
		(*a*) Tartrazine ..	4.0	2.0	
		(*b*) Naphthol green ..	1.0	1.0	
8	5,900—6,900	(*a*) Solid red D ..	2.0	2.0	
		(*b*) Tartrazine	2.0	1.0	

Filters transmitting in 500—900 *A.U.*

9	3,900—4,500	(*a*) Eosine yellow ..	4.0	2.0	From 7,000
		(*b*) Méthylène blue 4B..	1.0	2.0	
10	3,900—4,600	(*a*) Eosine, bluish ..	3.0	1.5	From 7,000
		(*b*) Méthylène blue 4B..	1.0	2.0	
11	4,450—5,100	(*a*) Filter yellow K ..	1.0	1.0	From 6,800
		(*b*) Alkaline blue 6B ..	1.0	1.0	
12	4,800—5,500	(*a*) Auramine O. ..	2.0	2.0	From 7,200
		(*b*) Méthylène blue 4B..	0.75	1.5	
13	5,100—5,700	(*a*) Tartrazine ..	1.0	1.0	
		(*a*) Naphthol green ..	1.0	1.0	
		(*b*) Acid green J E ..	0.5	1.25	
14	5,600—6,300	(*a*) Tartrazine ..	2.0	1.0	
		(*a*) Naphthol green ..	2.0	2.0	
		(*b*) Eosine, yellowish ..	4.0	2.0	
15	5,800—6,600	(*a*) Rose Bengal ..	2.0	2.0	
		(*b*) Tartrazine.. ..	2.0	1.0	
		(*b*) Naphthol green ..	1.5	1.5	
16	6,000—6,600	(*a*) Solid red D. ..	2.0	2.0	
		(*a*) Tartrazine.. ..	2.0	1.0	
		(*b*) Naphthol green ..	1.0	1.0	

Filters transmitting in 200—500 *A.U.*

17	4,250—4,650	(*a*) Eosine, bluish ..	3.0	1.5	From 7,200
		(*b*) Carmine blue A. ..	4.0	4.0	
18	4,600—4,800	(*a*) Quinoline yellow ..	2.0	2.0	From 6,500
		(*b*) Gentian violet ..	1.5	3.0	
19	4,700—4,800	(*a*) Quinoline yellow ..	3.0	3.0	Very slight.
		(*b*) Naphthol green ..	2.0	2.0	
		(*c*) Gentian violet ..	2.0	4.0	
20	4,800—5,300	(*a*) Naphthol yellow ..	2.0	2.0	From 6,600
		(*b*) Alkaline blue 6 B ..	1.5	1.5	
21	4,900—5,200	(*a*) Naphthol yellow ..	3.0	3.0	From 6,700
		(*b*) Alkaline blue 6B. ..	2.0	2.0	
22	5,050—5,500	(*a*) Tartrazine	2.0	1.0	From 7,100
		(*b*) Carmine blue ..	3.0	3.0	
23	5,200—5,400	(*a*) Brilliant orange ..	2.0	4.0	
		(*b*) Naphthol green ..	2.0	2.0	
24	5,200—5,700	(*a*) Martius yellow ..	1.0	2.0	From 7,000
		(*b*) Carmine blue ..	1.5	1.5	
24*a*	5,200—5,700	(*a*) Martius yellow ..	1.0	2.0	From 7,000
		(*b*) Brilliant green ..	1.0	2.0	
25	5,400—5,800	(*a*) Brilliant orange ..	1.0	2.0	
		(*b*) Naphthol green ..	1.0	1.0	
		(*b*) Carmine blue ..	1.0	1.0	
26	5,700—6,000	(*a*) Coccine, new ..	2.0	1.0	

Filters transmitting in 200—500 *A.U., continued:*

No.	Region of transmission in Angstrom units.	Dyes employed.	Dye density gms. per sq. m.	Dye sol. per 100 sq. cm. ces.	Transmission in infra red.
		(*b*) Naphthol green ..	1.0	1.0	
		(*b*) Carmine blue ..	0.5	0.5	
27	5,950—6,450	(*a*) Coccine, new ..	4.0	2.0	
		(*b*) Naphthol green ..	1.5	1.5	
28	6,100—6,600	(*a*) Bordeaux red ..	3.0	3.0	
		(*b*) Tartrazine ..	2.0	1.0	
		(*b*) Naphthol green ..	1.0	1.0	
29	6,500—6,800	(*a*) Coccine, new ..	4.0	2.0	
		(*a*) Naphthol green ..	0.75	0.75	
		(*b*) Gentian violet ..	0.5	1.0	
30	6,500–infra-red	(*a*) Coccine, new ..	4.0	2.0	
		(*b*) Hoffmann violet ..	1.0	1.0	
31	6,750–infra-red	(*a*) Solid red D. ..	2.0	2.0	
		(*a*) Tartrazine ..	2.0	1.0	
		(*b*) Methyl green ..	2.0	2.0	
32	6,900–infra-red	(*a*) Solid red D. ..	3.0	3.0	
		(*a*) Tartrazine ..	2.0	1.0	
		(*b*) Carmine blue ..	2.0	2.0	

Filters Nos. 9, 29 and 32 are very dark, absorbing a considerable proportion of the light in the spectral region which they transmit; those of Nos. 10, 17, 28 and 31 are not quite so dark, but still have notable absorption for rays in the transmitted region. Monochromatic filters may be produced by combining suitably chosen pairs of filters in the list, but such combined filters are in every case of great depth of colour.

M. Clerc observes that in the formulation of the filters the attempt does not appear to have been made to obtain complete absorption of ultra-violet. With this object each of the filters, single or compound, could usefully be combined with one of æsculine, containing 1.5 gm. of this substance per sq. metre.

FORTHCOMING EXHIBITIONS.

February 14 and 19.—Leicester and Leicestershire Photographic Society. Particulars from the Hon Secretary, W. Bailey, Cank Street, Leicester.

February 19 to March 5.—Edinburgh Photographic Society. Particulars from the Hon. Secretary, G. Massie, 10, Hart Street, Edinburgh.

February 19 to March 12.—Scottish Salon, Dundee. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

March 16 to 19.—Hackney Photographic Society. Latest date for entries, March 1. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Professional Photographers' Association, at the Photographic Fair, Horticultural Hall, Westminster, S.W. Hon. Secretary. Marcus Adams, 83, White Knights Road, Earley, Reading.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

DEATH OF MR. JOHN R. GRIFFIN.

We much regret to record the death on February 9 of Mr. John Ross Griffin, director of Messrs. John J. Griffin and Sons, Ltd., from pneumonia after a very short illness. Mr. Griffin, who had been connected with the business which bears his name for practically the whole of his life, was the grandson of the founder of the firm, John Joseph Griffin. Though, perhaps, owing to his somewhat retiring disposition, he was less well-known in the photographic trade than many other members of it, he had always taken a close and active interest in the management of the business, both the photographic side of it and that connected with the supply of scientific instruments and materials. As the representative of the firm he was a member of the Council of the British Research Association, and on other committees relating to the photographic industry took a deep interest in matters affecting the welfare of the trade as a whole. By those who knew him, Mr. Griffin was greatly esteemed for his sound judgment and pleasant disposition. At the time of his death he was in his fifty eighth year.

The late John Ross Griffin.

A DEVELOPMENT TIME CHART.

The following note sent to us by Mr. W. B. Stokes, of the Forest Products Laboratories of Canada, McGill University, Montreal, may be recommended to the notice of users of time development who require a simple method of ascertaining the time at one temperature when that at another is known. It is, of course, limited in its application to a plate of one particular development speed and to a developer of one particular temperature co-efficient, and is thus comparable in its information with a table in which temperatures and corresponding times of development are set forth side by side, as has been done by manufacturers of both plates and developers for their products. But Mr. Stokes indicates a graphic means of ascertaining working data without arithmetical computation.

Development by time is the only practical method in scientific and technological work where panchromatic plates are used or uniform results are desired. Some plate makers give times for the development of their plates to certain degrees of contrast (specific values of gamma) at three temperatures, but the times necessary for intermediate temperatures must be guessed at. To guess a value which progresses geometrically and inversely to some other value would require the mathematical genius of a Bidder. By using the method about to be described, such a value would be found by inspection without any mental effort.

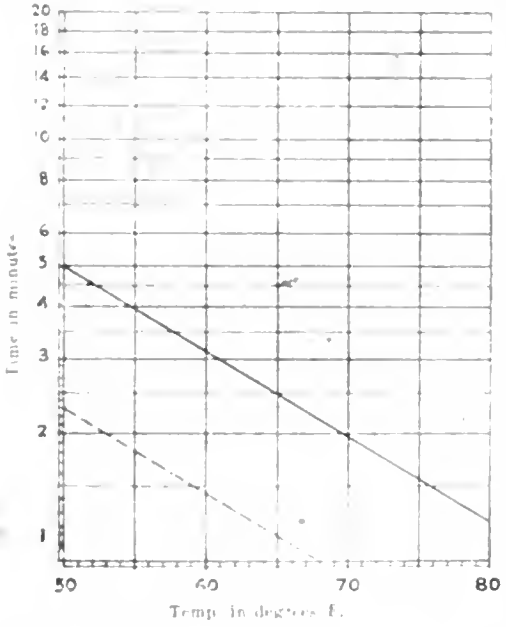
A chart is ruled in co-ordinate fashion so that the abscissæ represent temperatures, and are in equal steps. Any scale will do for this. The ordinates are divided by a logarithmic scale, and represent times of development. A slide rule will provide a series of graduations for the construction of this scale.

The loci of the times of development of a given plate with a given developer at different temperatures lie upon a straight line on such a chart. To draw such a line one needs either two given points or one point and a direction, *i.e.*, either the times for two temperatures or the time for one temperature and the temperature co-efficient. In the example the sloped unbroken line was drawn through two points plotted from the times given for development of certain plates in a certain developer at 50 deg. and 65 deg. F. *The time of development at any other temperature can be found by means of this line.*

Example: The time of development at 60 deg. F. is found by inspection of the line to be about 3.2 minutes and at 70 deg. F. the time would be nearly 2 minutes.

If a greater or smaller degree of contrast be desired the times may be shown by another line above or below the plotted line and parallel to it. If, for instance, by estimation or experiment it is decided that the time of development should be increased one quarter, then a line parallel to the plotted line is made to pass through points corresponding to one and a quarter times the times of development denoted by the plotted line.

That is the advantage of this form of chart. One chart may be used for a variety of plates, degrees of contrast and even different developers. With such a chart the temperature co-efficient is usually only a matter of curiosity, but may be of use when developing other plates, the correct time for one temperature only being known. It is found by drawing a straight line through the intersection of the co-ordinates of 68 deg. and one minute and parallel to the plotted line. This new line cuts the 50 deg. abscissa at a height (2.3) which is the temperature co-efficient, for it indicates the number of times



the time of development is multiplied for a drop in temperature of 18 deg. F. (10 deg. C.).

It is not pretended that the relation between times of development and temperatures is quite as simple as is assumed for the construction of this chart. It is, however, one which has been adopted for practical purposes by such authorities as Watkins, Mees and others, and the establishment of a more exact relation would probably not assist any but the research chemist. The chart, therefore, would appear to be an aid to correct development both as regards exactitude and avoidance of mental effort.

W. B. Stokes.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

The "Pointolite" Lamp in Enlarging.

We have just installed an Ediswan's "Pointolite" lamp in one of our enlarging lanterns, and as it seems to present advantages which are not obtained with any other one lamp, a few notes upon its use may be of advantage to those contemplating a change of light for enlarging.

The lamp is made for use on continuous current, and the one we employ is of 100 c.p. The source of light consists of a small incandescent globule of tungsten about 1/10th of an inch in diameter, and so for all practical purposes is a true point source of light. A special resistance and switchbox are necessary because the arc is struck by first exciting a filament for a few seconds, and then upon opening the exciting switch the arc strikes across to the globule and the lamp goes on them without any attention whatever.

The light is enclosed in a circular bulb very similar to the ordinary small half-watt incandescent filament lamp and can be fixed in a rising and traversing socket for centreing.

Enlarging from a portrait negative on Illingworth bromide paper to a scale of enlargement of two requires an exposure of about a second at *f*/6. With a thin "gaslight" type of negative the exposure to the same scale is simply cap off and on—about half a second. A lantern slide reduced from a half-plate on to an Imperial Special lantern plate necessitates an exposure of a second or two only, so that it can be seen that the lamp is fast enough for anything in the way of enlarging, and with thin negatives enlargements on to gaslight paper can be quite easily made.

And now how does it compare with the arc in use? There are no carbons to adjust and replace, and no spluttering, apparently, ever occurs—the light is as steady as any metallic filament. The spectrum shows a very large proportion of ultra violet, which probably explains its photographic intensity compared with its candle-power. The life of the lamp is given by the makers as between 500 and 1,000 hours, though upon that point I cannot speak. The only thing upon the contra side seems to me to be its cost. The 100 c.p. lamps themselves cost £1 10s., and the switchbox and resistance is priced at £5. The lamp itself consumes 65 watts, to which must be added, of course, that consumed in the resistance, and varying with the voltage of supply, which may be anything from 50 to 250 volts. —Arthur G. Williamson.

Routine in Enlarging.

The best routine when enlarging with a condenser enlarging lantern to various scales of enlargement is as follows:—

1. Insert negative.
2. Rough focus to the size required.
3. Take out negative and obtain an even circle of illumination as described below.
4. Re-insert negative and focus critically to make the exposure.

When two enlargements follow each other to the same scale of enlargement, Nos. 3 and 4 are not necessary, but as soon as a change of scale is made Nos. 1 to 4 must be gone through again.

To carry out No. 3, the following notes will help:—

1. If there is an orange edge to the circle of light the lamp is too far back, so rack lamp forward until a dark patch begins to appear.

2. Dark patch at top indicates the light is too high. Dark patch at bottom shows that the light needs raising. Patch at either side needs the light moving to the opposite side.

To get the most even illumination, stop down the objective somewhat and manipulate the lamp till the disc is even, then open up the aperture as large as possible consistent with obtaining the desired definition.

In the event of the filament of the lamp now being focussed on the easel, a piece of ground glass should be inserted between the lamp and the condenser.—A. G. W.

Photograms of the Year.—The originals of the photographs reproduced in the recently issued volume of "Photograms of the Year," after having been shown at the Northern, are on view at the Camera Club, 17, John Street, Adelphi, London, W.C.2, daily from 11 to 5 until March 12.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, January 31 to February 5.

Camera Attachment.—No. 4,112. Attachment to photographic cameras for production of changing pictures. Move-O-Graphs, Ltd., and A. H. F. Perl.

Changing Pictures.—No. 4,113. Method of producing changing pictures. Move-O-Graphs, Ltd., and A. H. F. Perl.

Photography.—Nos. 3,817 and 3,818. Photography. M. de Sperati.

Flashlight.—No. 4,025. Photographic flash-lamp apparatus. H. Lamplough.

Cinematography.—No. 3,799. Cinematograph apparatus. R. Hodges and T. H. Jones.

Cinematography.—No. 3,798. Cinematographic apparatus. S. S. James.

Cinematography.—No. 3,869. Cinematograph shutters. H. H. and S. H. Moon.

Cinematography.—No. 3,616. Films for use in cinematugraph cameras, etc., lanterns. A. W. Wyatt.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Dye Colour Images.—No. 133,034 (September 20, 1918). The invention relates to the production of coloured photographic pictures, and has for its object to provide a convenient and inexpensive process for the same.

The inventor has found that the finely divided silver in an exposed and developed photographic film has a catalytic effect on the action of reducing agents on certain dyes, which dyes, without this catalyser, can only with difficulty or only at a high temperature be bleached through reducing agents. According to the invention, this circumstance is taken advantage of for producing coloured photographic pictures. In one mode of carrying out the process the picture is developed and the dye bleached in one operation by the same reducing agent.

If, for instance, a gelatino-bromide plate is dyed with the new dye called oxamineechtrosa, manufactured by the Badische Anilin und Soda Fabrik, the plate being either soaked in a solution of this dye or the emulsion coloured before coating, and if such a plate is exposed in a camera, an ordinary black silver picture in a coloured gelatine film is obtained after developing with an ordinary developer and fixing. On subsequent treatment with a powerful reducing agent such as sodium hydrosulphite, stannous chloride, etc., it is found that the dye is bleached in such places of the film on which the silver is deposited, and the degree of bleaching is dependent on the quantity of the silver present, so that a picture with half-tones is obtained. A 1-3 per cent. solution of sodium hydrosulphite may be used. When the bleaching is finished, the silver can be dissolved and removed by known means, such as chromic acid, Farmer's reducer, etc., so that a clear colour picture remains.

Instead of developing the picture with one reducing agent and then bleaching with another reducing agent, the reduction of the silver and the bleaching of the dye can be effected in one operation. The developing and bleaching can, for instance, be effected simultaneously by means of the following solution:—

100 parts of water.
2 parts of sodium hydrosulphite.
2 parts of potassium bromide.

Thereafter the silver as well as the silver bromide can be removed by means of Farmer's reducer.

It should be noted that with some dyes, such as aurophenine,

some ordinary developers, such as amidol, will have a reducing effect when acting for a long time, but for practical purposes a much stronger reducing agent is required, such as hydrosulphite compounds.

These substances have a so great reducing power that a very considerable quantity of a restrainer, such as a bromide, must be used in order to prevent the reduction of the non-exposed parts of the sensitive film.

Instead of oxamineechtrosa, other dyes adapted for the purpose can be used, for instance, the so-called dianilreinblau, aurophenine, congo-reinblau, etc. Most of the dyes adapted for the purpose belong to the so-called dianile dyes. Some dyes, for instance, chicagoblau 6B, give a better result, when the reduced silver, before treatment with the bleaching reducing agent in the known manner, is transformed into another compound, i.e., is toned. The latter dye is thus specially well bleached when the silver picture in the known manner is toned to a prussian blue picture, and when the hydrosulphite solution is made alkaline.

By arranging two or more of the coloured sensitive films on each other or on opposite sides of a celluloid film (which sensitive films may be in a suitable manner sensitised for coloured light and lie directly on each other, or are separated from each other by suitable porous films), it is possible by direct exposure or by printing of a coloured picture, to produce a picture in more colours than one. Thus the method is also adapted for producing colour-prints.

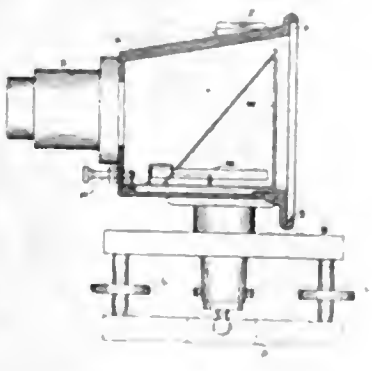
An example of this procedure will now be given:—

If a plate has been coated with a silver bromide emulsion which has been coloured red by oxamineechtrosa, and it is desired to place upon this coating another coating of a differently coloured emulsion, for instance, an emulsion coloured yellow by chrysamine, this cannot be effected without the dyes in the two coatings diffusing somewhat into each other. In order to prevent this, the first coating is coated by a thin porous film of collodion produced by pouring on the first dried coating some collodion containing 2 per cent. of celloidine and 2 per cent. of glycerine. After drying, the second emulsion can be poured on and the collodion film will prevent the dyes from diffusing into each other, but will not prevent the developer from acting upon both emulsions during the development and bleaching.

Some of the dyes used in carrying out the invention colour the gelatine directly and need no mordanting. With others, for instance, chicagoblau, a mordanting is desirable, for instance, by precipitating the dye in the film with metal salts in the known manner.

Chicagoblau can, for instance, be mordanted by soaking the coloured film in a 1 per cent.-containing solution of copper sulphate or in a 2 per cent. containing solution of chrome alum.—Jens Herman Christensen, Villa Sterrehus, Sovejen, Sollerod Holte, Denmark.

PHOTO-SURVEYING CAMERA.—No. 156,956 (November 5, 1919). Angle-measuring devices are dispensed with, the camera consisting of a conical or pyramidical body, fitted with the usual



fiducial means. In the drawing, A represents the body with lens D and plate carrier S. B is the support carried by the levelling screws L, and P is the attachment for tripod. E represents the level bubbles, W is the rectangular frame carrying the four node points, H the handle which moves the frame W on the slide, and M is the transparent vertical circle of the internal compass.—Stephen Mitchell Dixon, 18, Carlyle Mansions, Cheyne Walk, London, S.W. Reference has been directed, in pursuance of Section 7, Sub-section 4, of the Patents and Designs Acts, to Specification No. 14,460 of 1894.

F 2 SIX-LENS ANASTIGMATS.—No. 157,040 (August 14, 1920). The invention relates to an extremely wide aperture lens for photography, cinematography, micrography, and for all purposes for which a lens yielding an extended flat field at a large aperture is required.

It is well-known that the type of lens known as the Gauss lens (fig. 1) is particularly favourable for reducing the so-called spherical zones and is used therefore as a wide aperture telescope objective. Such a type of lens is well adapted for photography by proper choice of glass and of lens curves and thicknesses, whereby the field is flattened consistently with the correction of spherical and chromatic aberration. By the combination of two such lenses (fig. 2) a photographic objective is obtained corrected also for coma and for distortion.

A modification of this type of lens is described in Patent No. 27,635 of 1899, in which either or both of the single meniscus lenses (collective or dispersive) is replaced by a pair of lenses cemented together, of equal or nearly equal refractive index and different dispersions, the object being to achromatise the combination. The complete lens in the example there given had an aperture of *f* 4.

The present invention is an improvement of this type of lens whereby an aperture of *f* 2 is obtained. To attain this aperture great freedom from spherical zones is necessary. Exhaustive research and computation have shown that the desired result can be obtained by the use of dense barium crown glass for the collective components.

The form of present objective is then, two meniscus collective lenses of the dense barium crown glass, the refractive index of which for the D line of the solar spectrum is not less than 1.60 containing between them two meniscus disperative lenses. These disperative lenses are compound, and each consists of a plano, or nearly plano, concave lens of flint glass cemented to a plano, or nearly plano convex lens of the same or similar dense barium crown to that used for the separate collective menisci; where the separating surface is plano or slightly curved in the sense of being slightly collective in effect. It is essential that the components of the compound menisci should differ in refractive

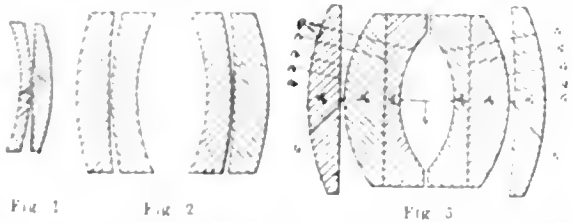


FIG. 1 FIG. 2 FIG. 3

index by an amount of at least .03 for the D line, the disperative lenses having the lower refractive index. The respective dispersions are so chosen as to produce achromatism for the system.

To obtain freedom from coma exact symmetry must be departed from. Calculation shows that the radius of the convex surface of the front compound meniscus, i.e. the one facing the incident light, must be approximately 10 per cent. greater than that of the corresponding surface of the back compound meniscus; also that the back single collective lens must have its shallow surface shallower than that of the front single collective lens, and in fact it is generally flat or only slightly concave.

In Patent No. 27,635 of 1899 mentioned above, use is made of this principle of disymmetry, but different glasses are used, in particular use is not made of dense barium crown glass. In Patent No. 12,329 of 1902, where again a modified type of Gauss lens is described, use is not made of the principle of disymmetry; on the contrary, the correction for coma of one-half

of a symmetrical combination is claimed. Now it is well-known that if two lenses, free from coma, are combined in a symmetrical combination, such a combination will not in general be well corrected for coma, except for unit magnification. To obtain a lens system capable of yielding an aperture of $f/2$ a far higher correction of coma and spherical zone is necessary, which is obtained according to the present invention by the use of dense barium crown glass and the unsymmetric form of the system, as above described.

An example of a lens made according to this invention is shown in fig. 3, of which the following are particulars :—

Equivalent Focal Length 1" Aperture $f/2$ Flat Field 50 Degrees.

			n_D	V.	Chance's Cat. No.
r_1 + .6534					
	d_1	.0836	1.6118	59	4873
r_2 + 3.024					
	s_1	.0139	1.		
r_3 + .4461					
	d_2	.0975	1.6118	59	4873
r_4 ∞					
	d_3	.0418	1.576	41.0	410
r_5 + .2829					
	s_2	.1393	1.		
r_7 − .2869					
	d_4	.0418	1.576	41.0	410
r_7 ∞					
	d_5	.0975	1.6118	59.0	4873
r_8 − .3879					
	s_3	.0139	1.		
r_9 ∞					
	d_6	.0836	1.6118	59	4873
r_{10} − .6884					

(All dimensions in inches).

Radii are marked + when they are convex towards the incident light, and − when they are concave towards the incident light. Taylor, Taylor and Hobson, Ltd., and Horace William Lee, Stoughton Street Works, Leicester.

The following complete specifications are open to public inspection before acceptance.

CINEMATOGRAPHY.—No. 158,211. Portable cinematograph projection apparatus. Petra Akt.-Ges. für Elektromechanik.

CINEMATOGRAPHY.—No. 158,212. Device for stopping the films in cinematograph projection apparatus. Petra Akt.-Ges. für Elektromechanik.

CINEMATOGRAPHY.—No. 158,213. Device for gradually obscuring the film in apparatus for taking cinematograph photographs. Petra Akt.-Ges. für Elektromechanik.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

D.50 (HEXAGON NUT DEVICE).—No. 409,867. A photographic developer. Chemicals and By-Products, Ltd., Rickmansworth Road, Watford, manufacturing and consulting chemists. November 18, 1920.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, FEBRUARY 20.

Southl. London Phot. Soc. Visit to West Wickham and Hayes.

MONDAY, FEBRUARY 21.

Bedford Photographic Society. "Scenes and Stories Along the Yorkshire Coast and in North-East Yorkshire." E. E. Lupton.
Catford, Forest Hill and Sydenham Phot. Soc. "The Manufacture of Anastigmat Lenses."
Cleveland C.C. Demonstration. Methods of Development.
Cripplegate Phot. Soc. "One-Man Show." Alex. Keighley.
Dewsbury Photographic Society. "Photography and Art.—Part II." E. R. Blakeley.
Walthamstow and District Phot. Soc. "Finishing the Print and Mounting." W. H. Reece.
Willesden Photographic Society. "With Allenby Through Palestine with a Watch-Pocket Carbine."

TUESDAY, FEBRUARY 22.

Royal Photographic Society. Ordinary Meeting. "Improvements in Flashlight." D. Charles.
Bournemouth Camera Club. "Ozobrome." Mr. Carter.
Doncaster Camera Club. Members' Lantern Slide Evening.
Exeter Camera Club. Exhibition of Members' Work.
Hackney Phot. Soc. "Pyrenees." M. O. Dell.
Leeds Photographic Society. "Assisi." H. S. Chorley, M.A.
Leith Amateur Phot. Assoc. "With Allenby Through Palestine with a Watch-Pocket Carbine." Messrs. Butcher & Sons.
Manchester Amateur Phot. Soc. Demonstration. "The Development of Panchromatic Plates in Yellow Light." R. E. Crowther and W. Ermen.
Portsmouth Camera Club. "The Production of an Exhibition Picture." Eng.-Comdr. E. J. Mowlam, R.N.
Welfare C.C., Linthouse. "The Town of Strife." W. S. Crockett.

WEDNESDAY, FEBRUARY 23.

Accrington C.C. "The Ribble from Source to Sea." A. Kinder.
Croydon C.C. "Kodak Translerotype Printing Process."
Dennistoun Amateur Phot. Assoc. Federation Portfolio.
Ilford Photographic Society. "Garden Flowers." A. D. Fort.
Partick Camera Club. "Travel Lecture." W. Fraser Smith.
Photo-micrographic Society. Members' Evening.
Rochdale Phot. Soc. "With Allenby in Palestine." W. Butcher and Sons.

THURSDAY, FEBRUARY 24.

Brighouse Phot. Soc. "Lincoln." J. Tremayne Blackshaw.
Camera Club, The. "Our Home Cathedrals and Their Visitors." F. E. Hayward.
Everton and District Phot. Soc. "Carbro." J. F. Russell.
Hammersmith (Hampshire House) Photographic Society. Lecturette on Outing Competition.
Hull Photographic Society. "Holy Trinity Church, Hull." J. V. Saunders, M.A.
Kryn and Lahy (Letchworth) Phot. Soc. "Mounting the Print."
North Middlesex Phot. Soc. Social Evening.

FRIDAY, FEBRUARY 25.

Bedford Camera Club. "On Bridges, or Surveying by Photography." Mr. Jenkins.
Birmingham Phot. Art Club. Midland Federation Slides and Folio.

SATURDAY, FEBRUARY 26.

Edinburgh Photographic Society. Exhibition Lecture—"Spitsbergen." Douglas A. Allan.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, February 15, the president, Dr. G. H. Rodman, in the chair.

An old friend of the Society, and of many of its old members, in the person of Mr. Walter Thomas, delivered a lantern lecture on "Picture Making on the Cornish Coast." Cornwall is old and familiar ground for Mr. Thomas, who, we recollect, was accustomed years ago, when he was chairman of the Affiliation, to find congenial recreation and material for his camera on its picturesque coast. He showed an exceedingly fine series of lantern-slides, and interested a large audience by an informal and matter-of-fact talk on some of the aims and methods of his pictorial work.

On the proposition of the chairman, a most hearty vote of thanks was accorded to him.

CROYDON CAMERA CLUB.

Mr. A. Dordan Pyke paid a return visit last week with an illuminating exposition of "Flashlight Photography," a branch, apart from specialists in the line, hardly relished by photographers in general. Some of the examples of commercial flashlight work, particularly of social functions, such as dinners, are certainly triumphs of technical skill, for inherent difficulties are many. The intensity of the light rapidly diminishes with distance; the orthodox black and white costume of the masculine element could hardly be bettered for the worse; depth of field and rapidity contend vigorously, tempting, or necessitating, the use of a short focus anastigmat, which renders faces at the margins in correct plane perspective with no hope of repeat orders from their owners.

Mr. Pyke's demonstration, intended primarily for the beginner, was complete and practical, and carried through in first-class fashion. It was, however, approached with circumspection and considerable preamble, much in the same way as a fox terrier prior to actual business genially converses about the weather when perambulating around a watchful cat sitting in the open. He spoke sadly of the loss of many friends since he had taken up portraiture; of the peculiarities of various photographic societies, the Croydon Club being the only one with a half-time interval devoted to a specific purpose; of the merits of Ross' lenses; of other things too numerous to mention; and concluded the overture with a dissertation on astronomy. From what he said it is a duty to warn photographers that if they elongate their arms and fool about with the sun's *photosphere* it will take millions and millions of years before they realise they have lost a hand, and then it will be too late. The whole solar system, he added, is advancing at prodigious rate towards the constellation of Hercules. This sounds a bit uncomfortable, but as an important part of the solar system consists of the Croydon Club, some consolation can be derived from the reflection that dear old Hercules may be feeling more so, if he be aware of this fact.

The philanthropic demonstrator having seen to the higher education of his audience, and thus paved a way to a better understanding of what was to follow, then grappled with his subject, and with a measure of success adhered to it for the rest of the evening. A flashlight group of members was taken and a portrait of Mr. Sellors. Both negatives appeared quite good, every detail, including the tobacco smoke, being faithfully recorded. Naturally, Messrs. Johnson and Sons' powder was used, of which there are two sorts, the "ordinary" (for want of a better word) and the "professional." For amateurs the former is, perhaps, to be preferred, as being of more robust constitution; the latter gives a slightly more actinic light, but when mixed will not keep more than a day or two. The other, when mixed, keeps for months. An ingenious pistol-form igniter, supplied by his firm, was employed, and surprisingly little smoke resulted from the two exposures made. Messrs. Johnson issue a very handy table indicating correct exposures for varying subjects, with plates ranging from 200 to 500 H. and D.

In the discussion, Mr. Wadham alluded to a "dust-up with the missus" the morning after a flashlight night before in the drawing room. Mr. Rose wished to know the correct amount of powder for pinhole photography, and drew a blank. Mr. Hibbert had found Johnsons' powder excellent. The "office boy" pointed out that after combustion sufficient of the dust in the air should act as a gentle laxative. In reference to an uninflammable diffuser, Mr. Jobling suggested fine wire netting with interstices filled with aeroplane dope, which, he said, is on the market, though he did not know who supplies it. It costs about one shilling a yard, is flexible, and diffuses slightly less than ground-glass. A most hearty vote of thanks was accorded to the versatile demonstrator for a capital evening. The room was uncomfortably crowded.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Meeting held at 116, Hanover Street, on February 7. Present: Miss Bertram, Messrs. J. B. Johnston, J. Campbell Harper, E. D. Young, Norman Thomson, George Balmain, Fergusson, Swan Watson, Bambrick, and Melrose. Mr E. D. Young in the chair.

The chairman thanked Mr. Fergusson for the diffusing screen which he had given on loan to the lighting and posing class at the College of Art. He also thanked Mr. Ayton for his packet of films, and asked if any members could supply any cabinet or whole-plate heads; it would be of great service to the retouching class.

The question as to what arrangements should be made for the holiday season, 1921, was thereafter discussed, and several members expressed the great advantage which had been gained, both personally and professionally, from the adoption of this scheme. Mr. Bambrick asked his name to be added to those who had already agreed to close on the second fortnight in August. It was resolved to continue the matter until next meeting to give any other members an opportunity of joining the scheme.

The meeting thereafter discussed at considerable length the question of the enlargement prices of portraits. No finding was come to, and it was resolved to discuss the matter further at an informal meeting to be held next week. The meeting was, however, unanimous on the point that where the negative was given up the photographers should certainly make a higher charge.

The meeting next considered the proposal, which was supported by Mr Fergusson, that the Society should approach the Water Trustees and get the water rates payable by photographers put on an equitable basis. Mr. Fergusson pointed out that the majority of photographers in Edinburgh, owing to the position of their premises, could not put in a water meter, and that in these circumstances they were charged a special water-rate according to their rental over and above the water-rate paid thereon. Other photographers, whose premises were self-contained had had water meters placed therein, and their water bill was considerably more in amount than the other photographers. The Society, after considering the matter carefully, decided that it was not a question which they as a Society, could take up, but would leave it to the members affected to negotiate with the Water Trustees themselves.

It was agreed to hold an informal meeting of the Society at the Victory Café, on Tuesday, February 15, at 8 p.m., when the question of the enlargement prices of portraits would be fully and further discussed.

Mr Norman Thomson proposed that the Society should offer their congratulations to Mr. Swan Watson on his being nominated as President elect of the Professional Photographers' Association, London. The chairman associated himself with Mr. Thomson's proposal, which was unanimously agreed to, and the meeting conveyed to Mr Swan Watson their heartiest congratulations and good wishes. Mr Swan Watson, in returning thanks, said that the honour had been unsought by him, but he would do his utmost worthily to maintain the honour and prestige of that Association. It was remarked that this is the second occasion on which an Edinburgh photographer had been chosen to act as President of this Association the late Mr Frank P. Moffat having also attained that honour.

A vote of thanks to the chairman concluded the meeting.

Commercial & Legal Intelligence.

LEGAL NOTICES.—A first and final dividend of 3s. 10d. in the £ has been declared in the case of the Excelsior Photographic Company, Ltd., 49, King Street, Carmarthen. The dividend is obtainable at the Official Receiver's office, 4, Queen Street, Carmarthen.

EASTMAN KODAK COMPANY.—The usual quarterly dividends of 1½ per cent upon the outstanding preferred stock and of 2½ per cent upon the outstanding common stock will be paid on April 1 to stockholders of record at the close of business on February 28.

NEW COMPANIES.

H. G. MOURIN, LTD.—This private company was registered on February 5, with a capital of £5,000 in £1 shares (3,000 prof.). Objects: To carry on the business of opticians, ophthalmic and scientific instrument manufacturers, glass manufacturers and workers, camera and photographic dealers and manufacturers, etc. The first directors are: H. G. Mourin, 23, St. Mary Street, Weymouth, optician; F. Mourin, 29, Rue Mont Kemmel, Ostend, Belgium, optician (managing director), with £500 per annum and a percentage of the profits as remuneration. Registered office: 23, St. Mary Street, Weymouth.

News and Notes.

EMBOSSED SEALS AND LABELS.—Mr. F. G. Clarkson, 88, Charminster Road, Bournemouth, sends us a large variety of the gummed and coloured embossed seals and labels supplied by him for attachment to photographer's mounts, folders and stationery. These imitation seals are of effective design, and may be obtained with any brief wording, and in any shape, size, or colour. Application to Mr. Clarkson will bring a small sample packet of various styles and particulars of prices.

BRITISH LENSES. Dealers who have not already obtained a supply from their wholesalers should see that they have for distribution copies of an 8-page booklet entitled "The Photographic Lens," which contains authoritative opinions from expert and official sources on the superiority of the British-made photographic objective. It is shown that the British optician produces lenses of as high a quality, if not higher, than any made on the Continent, and, moreover, has not now to go to the Continent for his glass.

PHOTO-RECORDS OF FINGER PRINTS.—What has been described as the greatest step forward in the science of criminal identification in recent years is the new process discovered by Detective-Sergeant Fred. G. Sandberg, of the Washington Police Force, writes the "Scientific American." This process makes it possible to make finger prints from transparent objects without the use of a camera and lens. It consists of covering the finger prints with aluminium powder and then making a direct contact print on to a piece of sensitised film or photographic paper. This method has been adopted by the International Association for Identification, which numbers among its members some of the foremost finger-print experts in the world.

PHOTOGRAPHY AT THE LOUVRE.—Official regulations for the taking of photographs at the Louvre Museum and Galleries in Paris have recently been issued by the French Government. From January 1 last a photographic studio and several dark-rooms are placed under the management of a custodian, who is responsible for supervision of the removal of works from the galleries to the studio for photographic purposes, and in other ways is authorised to assist photographers in the copying of the many unique works of art contained in the museum. A maximum fee of 12 francs is charged per work photographed, 10 francs being the charge for permission to photograph and for use of the studio, and 2 francs for the cost of removal from the gallery.

MR. D. CHARLES, photographer to Marconi's Wireless Telegraph Co., Ltd., has some hints on the photographing of such difficult subjects as wireless apparatus, in the current issue of the "Wireless World." Remarking that lighting is of paramount importance, he writes :—"It is useless to stand beside the camera in order to judge of the lighting, or to observe whether surrounding objects are likely to show in the result, and the image on the ground-glass is often hardly brilliant enough to recognise easily all these things. The proper method is, first of all, to get the camera roughly focussed and then to remove the lens and open the focussing-screen, so that one can look right through the camera at the objects to be photographed. A little study will then discover any objectionable details in the lighting. It comes as a surprise sometimes how objects in all sorts of positions will be reflected in polished parts."

EASTMAN KODAK COMPANY.—According to the New York correspondent of the "Times" the Eastman Kodak Company of New Jersey withdrew its appeal to the United States Supreme Court on January 31, from the conviction entered by the District Court at Buffalo in 1915 under the Anti-Trust Act. On the motion of the Company's counsel Chief Justice White issued a mandate ordering the Company to abrogate its alleged illegal monopoly in photographic supplies. In consequence of the withdrawal of the appeal, Judge Hazel at Buffalo has entered a decree directing the dissolution of the Company by the sale and disposal of its Premo and Century plates and certain lines of photographic supplies. The settlement with the Government results in no substantial disruption of organisation, as the company is only required to dispose of about $4,000,000 (approximately £1,000,000) of its assets, which total $90,000,000 (£22,500,000).

Correspondence.

***Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

***We do not undertake responsibility for the opinions expressed by our correspondents.*

WARMING A STUDIO.

To the Editors.

Gentlemen,—I have read with some interest the spirited controversy regarding the most efficient method of warming an average photographic studio, and I quite agree with "Comfort" in his contention that a Ventiheta consuming five cubic feet of gas per hour will not maintain the required temperature of a studio measuring 33 × 21 feet, but I do contend that two Ventihetas, consuming on an average 12 cubic feet of gas per hour, would give an agreeable warmth, plus a healthy and hygienic atmosphere in a studio of the dimensions named.

One fact is taken into consideration, that an ordinary gas fire with eight burners consumes anywhere from 35 to 40 cubic feet of gas per hour, and at the same time consumes to a large extent the oxygen of that studio, rendering it dry and unhealthy to work in, therefore the claims of Mr. F. E. Jones and the Ventiheta are well worth the closest examination.

Some 18 months ago I purchased a residence in the Thames Valley, and in a large reception room which was used as a dancing studio, and is 30 × 16 × 12 feet, with four large French windows facing on to a lawn leading down to the River Thames, one Ventiheta, consuming eight to nine cubic feet of gas per hour, effectively warmed and ventilated this studio in a manner which was not possible by any other means, and at a cost hardly conceivable until actually experienced.

Consequently, I consider the claims of Mr. Jones regarding the Ventiheta are thoroughly justified, as I have personally had experience of two winters in the studio referred to herein, and that the Ventiheta is well worth the very serious consideration of photographic artists as a modern and up-to-date method of giving the necessary warmth and comfort to the sitter.—Yours, faithfully,

HYGIENE.

February 8, 1921.

STORING SENSITIVE MATERIALS IN DAMP PLACES.

To the Editors.

Gentlemen,—I have read with the greatest interest your editorial note (page 74) on damp sensitive materials, and although agreeing with you as to the usefulness of calcium chloride as a damp-absorber, I think photographers might with advantage employ oatmeal for the work. Some years ago I was employed in one of the dampest studios within reach of the Seine floods, and my chief made it a rule to keep either oatmeal or sawdust—preferably the former—in the drawers in which our sensitive plates and papers were stored, and by so doing we never had damp materials to complain about. All the oatmeal was taken out of the drawers each week and dried, either in the sun or in an oven; the sensitive materials not being replaced therein until the oatmeal arrived at the normal temperature. Blotting paper is also very good, especially for packets of paper.

Experiments have proved that oatmeal dried at a fairly high temperature, and exposed in a damp place, will absorb 9 per cent. of its original weight in a week, whereas calcium will take up as much as 29 per cent. The simplicity of the oatmeal treatment, however, has much to recommend it. The common cardboard used for making plate-boxes and for stiffening packets of sensitive paper is a great absorber of damp, and I remember some experiments being made which showed that three half-plate pieces of such cardboard would absorb one-tenth of a grain of water in an hour, even when wrapped round with waxed paper, the ends only of the cardboard sheets being exposed to the atmosphere. The matter was, I believe, fully dealt with at the Croydon Camera Club about seven years ago, but I have no record of the lecture. However, those

who wish to keep their sensitive materials perfectly dry and in a good condition cannot do better than give oatmeal a trial, it being, in my humble opinion, an ideal and fairly cheap damp absorber, and one that will last for a generation if properly dried occasionally.—Yours faithfully,

L. T. W.

THE NORTHERN EXHIBITION.

To the Editors.

Gentlemen,—The criticism of the Northern Exhibition in the "B. J." of February 11, although anonymous, appears to have been written in a fair manner.

There are facts, however, unknown to the critic which materially alter the case.

Briefly, these facts are as follows:—

1. The Liverpool Corporation were obliged to reduce from three weeks to two weeks the time during which the Art Gallery was available prior to the opening of the Exhibition. During this period entries which ran into thousands had to be unpacked, recorded, classified, selected, judged for awards, hung and catalogued.

2. In order to save time, and by arrangement with the judges, a preliminary classification was undertaken by an executive committee—not self-constituted, but elected by the L.A.P.A. Council. It was a condition of this preliminary selection that the judges should have all the exhibits submitted to them and that they should have the right to withdraw or substitute any exhibit that they thought fit.

Every rejected print was seen by the judges.—Yours faithfully,

JOHN MACSYMON,
Chairman Executive Committee.

L.A.P.A., 9, Eberle Street, Liverpool. February 14.

AMALGAMATED PHOTOGRAPHIC MANUFACTURERS, LTD.

To the Editors.

Gentlemen,—We have received a prospectus to-day from the Amalgamated Photographic Manufacturers, Ltd., inviting subscriptions. We note that two directors of the company are to receive each per year £2,250, and to a few others payment will be made at slightly smaller rates per year. We ask professional photographers where is it that the A.P.M., Ltd., expect to get profits to be able to pay men at the rate of £41 per week? There is only one answer, and that is, out of ourselves alone.—Yours faithfully,

19, The Terrace, Penzance. LAWLEY BROS.

FACTORIAL DEVELOPMENT.

To the Editors.

Gentlemen,—Dr. Glover has earned the gratitude of many readers by giving so full a table of factors for various developers for developing bromide prints.

Might I appeal to Mr. A. G. Willis, whose excellent article upon making trials in development appears in your last issue, to favour your readers in the same way with the factors he finds right, also stating developer or developers? It will be noted that he says, "I use the factorial method for all studio work (having various factors for the different types of lighting) and find it ideal."

In further reference to Mr. Hall's difficulty, I overlooked some very exhaustive investigations made by Mr. A. Lockett, whose conclusions are given on page 464, "B.J." for 1906. Mr. Lockett made trials with five persons (three of them novices), observing the "time of appearance." His conclusions (in brief) were that the personal element in observation is of comparatively small importance; that a liberal supply of light in the dark-room is the most important item; that there is practically no greater fear of variable results with a large developing factor than with a small one.—Yours truly,

ALFRED WATKINS.

Hereford, February 12.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent. International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

J. E.—Messrs. Billcliff's address is Richmond Street, Boundary Lane, Manchester.

D. J.—We suggest that you select from the names of the old artists, such as Vandyke, Rembrandt, Rubens, Velasquez, Raphael, Romney, or Reynolds.

C. R.—(1) We expect it was a collodion print which cannot be glossed in this way. (2) Impossible to say what will remove the dirty marks. Probably there is nothing better for the purpose than rubbing with a very soft rubber or with bread crumbs.

E. C.—Probably the Wray lens has a present value of about £1 to a direct purchaser. Some of the Wray single lenses had a somewhat larger aperture of *f*/8. If the lens is of this type its value is about 30s. The Ross doublet is worth, say, from £2 10s. to £3.

G. W.—The Goerz "Hypar" was brought out not very long before the war. The 300 mm. lens is that of 12 inches focal length, of aperture *f*/3.5, and listed to cover a 6 x 4 or cabinet plate. The catalogue price in the latest list we have, one of 1914, is £27 10s.

A. S.—You cannot buy ammonia nitrate of silver, because it is not obtainable in the solid state. It has to be prepared in solution by adding ammonia in small doses to a solution of silver nitrate until the deposit of silver oxide, which is produced by the first additions of ammonia, redissolves, giving a clear solution, as you make further cautious addition of ammonia.

J. W.—In the case of some papers considerable benefit as regards tone is obtained by giving a short preliminary immersion in the sulphide darkening solution, then washing for a short time and then carrying out the ordinary bleach and sulphide process. In the absence of any indication of the kind of improvement you are seeking to make, this is perhaps the best hint we can give you.

C. and E.—The lighting of the groups is fairly satisfactory and the arrangement of blinds is good. A large white reflector (a white background would do) would help to equalise the light on the shadow side. The principal fault seems to be under-exposure. Give at least twice what you now give. We assume that you use the most rapid plates; if you do not, a change of plate may give the desired effect.

T. M.—So far as we can judge, there is no possible objection to your making and selling the attachment for use with a T.P. shutter. There are hosts of instances of the same kind of thing, both in photography and in other trades, for example, fitments for the Ford car. The only question is whether your attachment is an infringement of anybody's patent, but from what we can see that is not likely to be the case.

G. G.—A great many patents are taken out in the course of a month for cinematograph shutters, and most of them claim to reduce flicker. Unless you can ascertain the name of the patentee, or the number of the specification, we do not think you can obtain a copy of the latter. Any specification which is published is obtainable from 25, Southampton Buildings, London, W.C.1, price 1s., but you require to give the number.

M. E.—You are quite right, and have written a very good letter. Presuming that your invoices were in the proper form, that is to say, made it clear that you were charging for the supply of prints from negatives taken, the people have not the slightest ground for now obtaining the negatives. If there is any single thing in the law relating to photographers' dealings with their

customers which is clear, it is the photographer's right to the custody of the negative.

N. E.—(1) Quite reliable in changing. (2) There is a certain liability to static electric markings due to the friction of the films on each other, but in a moist climate like this they are comparatively rare. Certainly not a material objection to the use of the films. (3) We usually develop films like prints in a dish, after having rounded off the corners by snipping them with a curved pair of scissors, but the Kodak Company also supply tanks in which the films are held loop fashion and are very conveniently developed in quantities of a dozen or so.

G. H.—The better lens would be the 7½ inch, provided it covers the plate well to the edges, which probably it will if stopped down to *f*/16. But if there is plenty of space there would be no harm in using the 10½ inch also at *f*/16, and the covering power would probably be better. We should think you would want at least ¼ oz. of powder. You can fire it by laying a small fragment of gun-cotton (from the pharmaceutical chemist) about midway in the train, or you can obtain touch paper from Messrs. Johnsons, 23, Cross Street, Finsbury, London, E.C.2.

E. B.—(1) The aperture is probably somewhere in the neighbourhood of *f*/5.6, if the focal length and diameter of the diaphragm are as you state. It may be a little faster, but would not conceivably be as fast as, say, *f*/5. We say this on the supposition that when you focussed you focussed upon a very distant object. (2) There is no material difference as regards depth of focus between an anastigmat and a portrait lens of the same focal length and aperture. If the subjects are portraits in the studio, the advantage is probably with the portrait lens owing to its curvature of field.

F. E.—When using a large aperture lens, and particularly if there is a substantial distance, say anything above ¼ in. between the blind and the plate, there is both theoretically and practically a decided advantage, as regards efficiency of the exposure, in obtaining a given speed by a wide slit at a higher speed instead of a narrower slit at a lower. The theoretical reasons for this practice have been dealt with in a number of articles, among the most recent of which in our pages is that in the "B.J." of March 14, 1919, which we expect our publishers can still supply, price 5d.

G. M.—(1) We suppose you mean the formula containing mercuric chloride, potass iodide and sodium sulphite. If that is so probably the cause of the yellow deposit, which we expect is mercuric iodide, is insufficiency of sulphite. Your sulphite may be below strength, and therefore more of it required. You may be able to get the deposit to dissolve again by adding further sulphite and shaking, but that is rather doubtful. (2) The print is by rotary photogravure. Quite as good work as the specimen is done in this country, for example, by Messrs. Vandyk Printers, Ltd., Bristol.

H. M.—There are unfortunately no standards of prices for this class of work. For making a whole-plate negative and supplying one print therefrom many photographers at the present time would charge from 15s. to 25s., with perhaps a reduction in the case of a number of negatives taken at the same time, and in some cases plus out-of-pocket expenses. But we think you ought to be able to work out a satisfactory cost on the lines indicated in the article published in the "B.J." of January 21 last, page 30, particularly as regards including a due proportion of cost in respect to your own time and your overhead expenses.

W. G. G.—Ordinary calico or canvas with a coat of white distemper is about the best material for such a reflector as you require. A reflector is not needed above the head, a better arrangement being a sloping diffuser of thin paper or muslin, one edge of which is fastened to the window sash and the other to the ceiling. This gives a certain effect of top lighting. You cannot get over the retouching marks in enlarging except by using a soft focus lens in the enlarger or putting the image very slightly out of focus. It is a common practice to clean off the retouching before enlarging. You can easily do 20 x 16 or larger with an incandescent light unless your negatives are very dense or yellow.

W. D.—We do not know your burnisher by the name given, but it is probably of the ordinary type, a rough roller on top and a polished one below. To use it you must heat the polished roller until it is hot enough to fizzle when touched with a wet finger. The print must be prepared by rubbing with a weak solution of castile soap in methylated spirit, using a bit of clean flannel. You must not use too much soap solution, or the print will have a smoky appearance. Put on plenty of pressure, and pass the prints through three or four times. The prints should be mounted with a wet mountant, as the shellac would probably squeeze out if dry-mounted. This style of burnishing is quite out of date now. A squeeged print dry-mounted will have a much better surface.

J. T.—We find it difficult to discover any explanation of the foggy results from the particulars you give or from the negatives. Both of the latter evidently suffer from chemical fog, due either to bad emulsion or faulty developer. It seems unlikely that a plate of such slow speed could be fogged, and therefore it may be worth while to consider whether the developer is the cause. We think hydroquinone-caustic is, on the whole, the best developer for this type of plate, and the only suggestion we can make is that perhaps the solution may have been wrongly made up as the result of using too much caustic, or from excess of sulphite, or from faulty sulphite. Hydroquinone is somewhat sensitive to sulphite, and too much of the latter will give fog of the kind shown in the negatives.

N. E.—It is a somewhat complicated business, and our first suggestion is to refer you to the article in the "B.J." of January 21 last, page 30, in which we endeavoured to deal, as far as possible in a way to meet individual cases, with the methods of ascertaining the price to charge for such jobs. We think that if you followed the indications there given, particularly as regards the inclusion of charges for your own time and for your overhead expenses in due proportion, you would be able to arrive at a charge which would give you a reasonable profit. There is unfortunately no standard of charges for work of this kind. For taking a whole-plate negative and supplying one print therefrom many photographers would charge from 15s. to 25s. at the present time. Further prints from these negatives, say at Raines's catalogue prices. But unless you have made special contracts to the contrary it is perfectly clear that the negatives remain your property. If you now wish to make a charge for delivery of the negatives to your customers we think you may take it as a fairly reasonable standard that the charge would be about £1 1s. per negative. From what you say, it is evident that you have gone to an enormous lot of trouble to do this work, and if you render your account and cannot obtain payment we should think you would not have any difficulty in recovering the amount in the County Court.

THE BRITISH

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Contents.

SUMMARY.

In a contributed article Mr. P. M. Jones advocates a particular M.Q. formula made up with caustic alkali as a developer which is economical and convenient in use. (P. 107.)

The æsthetic, technical and business aspects of mounting portrait photographs are dealt with in a series of notes by Thermit. (P. 106.)

M. Louis Lumière, in a recent paper before the French Academy of Sciences, has set forth the theory of a process for the photographic representation of solid objects in apparent relief. The process consists in making several positive transparencies which are mounted one behind another and illuminated by transmitted light. (P. 110.)

In a contributed article Mr. H. J. Comley makes a strong plea for more general use of panchromatic plates, in portraiture as well as for photographing furniture, etc., and gives a number of practical hints on their manipulation. (P. 112.)

At the Royal Photographic Society on Tuesday evening last, Mr. D. Charles read a paper, accompanied by demonstrations, of flashlight photography, more particularly in reference to methods of firing the powder and of shaping the flash by appropriate form of the flash pan. (P. 116.)

A Rochester paper adds to the particulars published last week of the judgment in the Baltimore U.S. Federal Court in the action between the Eastman Kodak Company and the United States Government. It is further stated that the parts of the Company concerned in the manufacture of Artura paper and Seed, Stanley and Standard plates are to be separated. (P. 119.)

According to the "Times," progress has been made in the production of a map of London prepared from aerial photographs. (P. 114.)

A recent patent specification describes a more inexpensive construction of the Cooke lens. (P. 115.)

As a supplement to the ordinary field camera an instrument of quarter-plate or 3¼ x 2½ size serves such useful purposes as providing the means of making a duplicate exposure or of undertaking speculative work at a much lower cost. (P. 105.)

A recent query relating to negatives which had been sold by auction prompts us to refer to the very doubtful provision made in the 1911 Copyright Act for the transference of copyright when a negative is sold without written assignment of the reproduction rights in it to one party or the other. (P. 105.)

The usefulness of a vertical stand for the copying camera is experienced in obtaining any background in conjunction with a shadowless lighting. (P. 106.)

The permulphate reducer is at times a useful corrective of negatives taken of a sitter posed against a brightly lighted window. (P. 106.)

Some hints on the trimming of prints to be made with white margins are contained in a paragraph on page 106.

EX CATHEDRA.

The Mood of the Sitter.

Addressing a meeting of photographers, a few months ago, Mr. Pirie MacDonald made a point which is worthy of the consideration of all serious portraitists. He said it was his practice to ascertain for what purpose the portrait was required, and he then endeavoured to depict his sitter in such a way as would produce the desired effect upon the beholder. For example, if the portrait was to be reproduced in a trade or other newspaper, he would aim at a pose and expression which would convey the idea of intellect, energy and, perhaps, a little sternness, while a portrait intended for a fiancée or near relative would receive a softer treatment. We are afraid that the possibility of working on these lines has been overlooked by most photographers, who are content to produce a good average result without reference to its ultimate fate. It should, however, be obvious that the representation of the chairman of a great company as he appears at a public meeting, while suitable for press work, would not be so acceptable to his family as one showing him in a moment of relaxation when the business man gives place to the husband and father. It is worth remembering that Mr. MacDonald makes the portraits of men only.

* * *

Sale of Negatives and Copyright.

Under the Copyright Act of 1862 it was made clear (in Section 1.) that in the case of the transference of a negative the copyright was altogether destroyed, unless there was a written assignment transferring it to the purchaser. This is one of the important points in respect to which the 1911 Act is different: apparently, according to the present Act, nothing can cause the destruction of the copyright except the natural lapse of the time for which the copyright lasts. Apparently also, under the present Act, if a negative is sold without written assignment of the copyright to the purchaser, the copyright does not go with it, but remains in the possession of the vendor. So far as we are aware there has been no judgment in the Courts, since the coming into force of the present Act, which throws light upon this somewhat dark place of photographic copyright. The general intention of the present Act is that copyright in works of fine art, paintings, sculpture, etc., should not pass on sale of the work without special assignment, and it seems probable that the difficulties that must necessarily occur in applying the same principle to photographic negatives, engraved or etched plates, and similar originals have been overlooked. Obviously, the interests of photographers' customers are those which are chiefly involved in this question, but cases sometimes arise in which, for example, negatives are sold by auction, whilst prints from them remain in the possession of their maker by whom the copyrights were previously owned. In the absence of a judicial ruling the present position appears to be that although the original owner has parted with the negatives

he retains the rights in them, and the purchaser therefore is actually infringing those rights by the making of a single print from the negatives he has bought. Clearly a case of imperfect drafting which badly needs clearing up in the Courts.

* * *

Vertical Camera Stands The value of the vertical camera stand is not so generally appreciated as it should be, this appliance being rarely found except in studios devoted to commercial work. It is a great time saver in many classes of work, as it obviates much labour in arranging small articles or even copies, especially from illustrations, in bound volumes. It has also the advantage of enabling "shadowless" photographs of such subjects as flowers, medals and museum specimens to be readily made. In its simplest form it consists of a stout base-board to which is fixed by iron brackets a vertical board, say three-quarters of an inch thick and eight or nine inches wide, having down the centre a long slot to take the ordinary T screw of the camera. At a convenient height from the floor a glass slab or shelf is supported by blocks or boxes, and below the glass a few inches away is placed a card or sheet of paper of suitable tint, to serve as a background. This arrangement is very suitable for making up compositions of views and flowers, such as are used for birthday and local view cards, as no fixing is required. Also, it is much easier to obtain even lighting in this way than when the originals are fixed vertically as in ordinary copying.

* * *

White Margins. With most trimmers it is difficult to cut the white margin of a print to exactly the same width all round, as the margin is entirely covered while the cut is being made. A useful suggestion is to take a large celluloid set square, as made for draughtsmen, and rule one or more lines at a convenient distance from the edges. If this be placed over the corners of the print the desired width of margin can be marked with a fine hard pencil, and if this line be cut off in the trimmer the margin will be just what is wanted at the first trial. A grey or buff margin can be produced by tinting the paper with the Aerograph. The print being protected by a card, the method saves the expense of tint paper, shellac tissue and time. If an Aerograph be not available, chalk or powdered colour may be rubbed in as quickly and, as nearly all prints are now dry-mounted, without risk of shifting the colour. Blocking out the margins can be done quickly by using a drawing pen charged with any of the ordinary opaques for the inner edge and then filling up with the brush. This is a neater method than attaching strips of lantern binding as is commonly done. In any case the blocking out should be done on the film side of the negative, so as to ensure a sharp edge.

* * *

Window Portraits. Some of the most charming effects in portraiture are those in which a brightly-lighted window forms part of the composition. Many praiseworthy attempts in this direction are spoiled by halation, which is not always evident to the untrained eye. For such subjects backed plates or film should always be used. There is a natural tendency in such conditions to under-exposure, with the result that the high-lights are blocked up in the attempt to secure some trace of detail in the shadows, but this may be avoided if means are taken against halation; what is mistaken for over-exposure in a properly-exposed plate is really halation. A fair amount of reflected light is as necessary in this class of work as when working further in the room, although the necessity is not so evident to the eye. In addition, the persulphate reducer may often be used with advantage. Let it be tried on a hard portrait negative in which the sitter is placed with his back to a brightly-lighted window with white lace curtains, viz., a negative which in the print gives the effect of a quite plain white background. After reduction, not only will the pattern of the curtain be visible, but also all the details of the view outside.

THE SMALL CAMERA.

THERE is a very general distrust, on the part of most professionals, of any camera smaller than half-plate. In these notes we wish to put forward the case for the smaller camera as an addition to the general outfit. We do not believe in the practice of taking all negatives on small plates and enlarging them. Some absurd claims have been made for the small camera on these lines, and we cannot uphold them; but as an extra tool in the photographer's equipment the quarter plate or $3\frac{1}{4}$ x $2\frac{1}{2}$ instrument will prove of great utility. Let us briefly discuss some of its many uses.

Perhaps the outstanding advantage of the small camera is the fact that the lens fitted is, naturally, a short focus one. This, by an unalterable law of optics, means that you can get depth of focus with a larger relative aperture than you can with a long-focus lens. For instance, an 8-in. half-plate lens at $f/8$ will give the same depth of focus as a $4\frac{1}{2}$ in. lens at $f/4.5$. The advantage of the latter in speed is one too obvious to need enlarging on. It is particularly useful in interior work, where near and distant objects must be obtained sharp, and yet long exposures cannot be conveniently given.

The small camera is a decided advantage when it becomes necessary to work in unusual and, perhaps, precarious positions, as, for example, from scaffolding, or from a roof. It is easier to carry, does not need such a large spread of tripod, and is not so likely to be blown over. This last alone often makes it worth while to use a small supplementary camera when taking outdoor views in a wind. Often negatives taken with a whole plate outfit will be blurred, while the smaller instrument, offering less surface to the wind, will be quite steady. Another case where a supplementary camera is most useful is in flashlight. The flashlight negative ruined by the light striking the lens, or by some unexpected brilliant reflection, is common, and a small camera standing perhaps only a few feet away may save the situation. It is really no additional trouble to set up, and the expense of the small plates is not great.

Again, a small camera is a very great improvement on a large one for photography of children and of animals, except, of course, when the work is done in the studio; "nerves" are much less likely to cause trouble, and it is more easy to move your outfit from place to place to follow your subject. This often avoids the stiff formality it is so hard to get rid of when the subject is bound to stay on a certain spot.

One more point: With small plates one feels far more justified in taking pictures "on spec." For instance, if there is a factory in your town it is more than likely that the manager would be pleased to pay for a good set of prints of the various rooms and operations; but the chances are he will not promise an order until he has seen the results. By getting permission to take the pictures, and using a small camera, you are able to do this without interfering with the workmen, and the plates cost only a fraction of the cost of whole-plates.

The negatives are enlarged and a set of prints submitted. They will doubtless be taken, and further orders are bound to follow. Works managers can usually appreciate good photographic work. As nearly all small negatives will be enlarged it is necessary to keep them rather thin and soft. Also, we think a non-staining developer is much to be preferred for small negatives, whatever one's practice with larger ones may be. Sharpness is an essential feature, and a good lens costs comparatively little in a small size.

With regard to the camera a quarter plate or $3\frac{1}{4} \times 2\frac{1}{2}$ outfit with a reversing back is best. We are inclined to prefer the smaller size, and find it most generally useful; as the plates cost only 2s. 6d. per dozen it represents a great saving, even on half-plates. Any lens will do, of course, but an anastigmat of not less than *f* 6 aperture will be found a sound investment. A between-lens shutter, and a view finder and scale for focussing, will further extend its scope, by bringing hand-camera work within its range.

THE PROFESSIONAL'S DEVELOPER.

In common with most of those who have studied photography, the writer has long wondered why the professional is still so faithful to pyro. Its disadvantages are many; are there any compensations? There are three directions in which one might look for special advantages: superior quality of negatives, ease of use, and cheapness. Let us look rather deeper into these three things.

Quality of Negatives.

Years ago it was common to hear people say that the pyro negative had a quality superior to that given by any other developer; but one seldom hears it now. The work of the scientific investigators seems to have demonstrated pretty clearly that as regards the quality of results all developers are alike; and, one thing is certain, the image given by a pyro developer with little sulphite (i.e., the brown "stain image," which is the main difference between the pyro negative and others) does not lend itself so well to after-treatment as the clean silver image of the newer developers.

As regards the question of modifying the developer according to the exposure or the results desired, modern practice seems to be drawing further and further away from this idea; but for those who yet hold to it, pyro is still no different to others, except that for this purpose it is best to use a developer of fairly low "Watkins factor," i.e., one where the first image does not rush out too quickly.

Ease of Use.

Here the comparison is all against pyro. Pyro is essentially a two-solution developer, and is difficult to make up in highly concentrated form. It is usually kept in stock at such a strength that the working developer is made by taking equal parts of the two solutions. This involves lifting two Winchesters, and measuring out of each. With the developer recommended below, all that is done is to turn on a tap, and draw off an ounce or two, to be diluted with water in the ratio of about 1 : 15. The exact degree of dilution is unimportant, except when developing by time and temperature.

Then as regards making up the stock. The usual method is to make a batch of pyro about once a week; with the other, the same quantity will last three months. The job of compounding is slightly more troublesome with pyro, as the metabisulphite of potassium has to be dissolved in the cool.

Comparative Cost.

Lastly, as to cost. Once, pyro was the cheapest developer; pyro itself is still the cheapest to buy by the pound, but is that what is wanted? Any developer can be made cheap, if it is watered down enough. To compare prices, one must adopt some standard of strength, and the obvious one is that it shall fully develop a given plate in some definite time at normal temperature. Here the superior energy of other developers scores heavily. Let us compare two well-known developers for which standard figures are obtainable. Mr. Alfred Watkins has given two formulæ, one for pyro-soda and one for M-Q, both of which develop a medium plate in 6½ minutes at 60 deg. F. On working out the cost of 16 gals. of working strength, at present-day wholesale prices, they are:—Pyro, 17s.; M-Q, 12s. 10d. It is not easy to compare the strength of the author's developer with these, as there is no proof that his idea of normal contrast agrees with that of Mr Watkins'; but working to a contrast suitable for enlarging on bromide, this developer costs 10s. 11d. So there is no doubt as to the advantage of M-Q as regards cost.

Other Advantages.

There is one obvious advantage: the M-Q developer is a universal one, and the fewer bottles on the shelf the better. True, those who must have the particular shade of black on bromides which is given by amidol will not get this advantage; but is amidol really better than M-Q? There was a legend that it gave better sulphide tones, better bromoils, etc., but the writer is not yet convinced.

Another enormous advantage is—no stains. For a studio where the operator does his own developing, it will be as great a relief for him as for his sitters when he need no longer feel ashamed to show his hands. Further, there is less chance of undesired stains on the negatives.

The Designing of the Developer.

When, about six years ago, the writer decided to adopt a single-solution universal developer, he expended considerable thought on the formula for it. It was necessary that it should be obtainable anywhere, so he made no attempt to invent a fancy reducing agent. As, of all the easily obtainable ones, metol *plus* hydroquinone (quinol) had the greatest energy, i.e., developing power per ounce, and as it had only one disadvantage it was obviously the one to be adopted. The one disadvantage, metol poisoning, did not bother the writer. For those who suffer from it, it will be found that the substitution of paramidophenol for metol, in equal quantities, will give an almost exactly similar developer, but slightly less powerful at the same dilution.

Proportion of Metol to Hydroquinone.

Hydroquinone being cheaper than metol, one is inclined to use a larger amount of it. But it is to be remembered that the "convenience" of the developer in use, as also its extreme energy, is due to the metol bringing out very quickly a weak image, on which the hydroquinone builds up the density; further, one must remember that in the cold the hydroquinone loses power rather quickly. These considerations, together with some experiments, led the writer to adopt finally a ratio of one part metol to two parts hydroquinone.

The Amount of Sulphite.

This was entirely a matter of experiment, and the result was to the effect that the sulphite should be about six times the reducing agent. This is sufficient to keep the concentrated developer good for a long time; but if it is proposed to leave dilute developer exposed for more than half an hour or so, it must be increased

Proportion of Alkali.

As regards alkali, the writer breaks away from the usual type of M-Q developer: caustic soda is used. From all that could be gathered by reading on the subject, the sole object of the alkali appeared to be its alkaline reaction. Why, then, not use a small quantity of a strong one rather than much of a weak one? There are two advantages: the caustic soda is itself a solvent of the reducing agent, and only one-twelfth as much caustic as carbonate is needed. The net result is a concentrated developer, and on experimenting it was found to result in a considerable increase in the energy, thereby giving an even greater effective concentration.

Sheppard and Mees show that there is a definite proportion of alkali that gives the most chemically efficient developer, but, curiously enough, this is not the cheapest. A slight increase of soda and decrease of reducer cause a very slight decrease of speed, and a very much greater decrease of cost. The proportion ultimately found best is that given.

The Final Formula.

When the proportions were all worked out it was realised that it needed a wide variation from the theoretical best before any ill-effect was found, so the proportions were rounded off to give a formula which could be easily remembered, and which could to a large extent be made up from chemicals in packages as bought without weighing. The final formula was:—

Metol	¼ lb.
Hydroquinone	½ lb.
Soda sulphite	2 lbs.
Soda hydroxide (caustic soda)	1 lb.
Water	to 2 gals. (320 ozs.)

Dilute one part with 10 to 15 water.

NOTE.—There is no need to pay fancy prices for "stick" caustic soda; at least one London house supplies chip soda, guaranteed 98 per cent. pure, at a very low price.

For those who use thermo, or factorial development, the following may be useful. They refer to medium contrast, and should probably be diminished somewhat for portraits:—

Watkins factor.—12 to 15.

Thermo development.—Develops a plate given by Watkins as Class "M" for development speed in six minutes at 60 deg. F., when diluted 1 in 12. Temperature coefficient, 1.9 (approximate).

Time for other dilutions, multiply by:—

Strength...	1 in 6.	1 in 8.	1 in 12.	1 in 16.	1 in 24.
	2/5	4/7	1	1½	2½

Keeping the Developer.

The best way to keep the developer is to get a 2-gallon glass bottle with "tubulure," as used by chemists, i.e., with a second neck at the bottom, to be fitted with a tap. These are often known as "aspirators." To keep the developer from oxidising, the cork is fitted with a glass tube, which should lead to a gas tap provided for it, which is always kept turned on. Under these conditions the developer as drawn off is replaced by gas instead of air, and the stock will remain unoxidised and unchanged for a year or more.

If gas is not available, the cork should be connected to an "oxygen trap," which consists of a 4-oz. "wash-bottle," which any chemist will supply, half-filled with full strength developer *with no sulphite*. This will become oxidised, but will protect the rest of the developer (or, more simply, bottle in lots of, say, 10 ozs.—EDS. "B.J.")

The writer fully realises that the professional cannot lightly make changes in important operations; but it is claimed that the enormous gain in convenience by using the above developer, and keeping it as suggested, makes the proposition worthy of serious consideration by the professional.

P. M. JONES.

NOTES ON MOUNTING.

To an onlooker, the mounting of a photograph might seem too simple to need instructions and too trivial to merit discussion, but anyone who has had years of close connection with photography will agree that there is much more in mounting than "sticking a print on to a piece of cardboard."

Mounting, to be good, requires considering from at least two sides, the artistic and the technical, and unless we happen to be wealthy amateurs, we must also remember the £ s. d. standpoint.

The Artistic Side.

For every photograph a mount can be made or bought that will, by reason of its colour and design, show up the particular photograph to best advantage. And mounts innumerable can be made and bought that can do neither credit nor justice to the same picture.

Should mounts be bought ready made, or is it better to build up one's own? There are certain advantages either way. The mount manufacturer has resources at his command that make it impossible for the photographer to imitate his products; and if our work is in a definite and regular style, with a constant quality and tone, we are certain to find something on the market that is superior and more suitable than anything we could make ourselves. But for work that varies in contrast, key or tone, there is much to be said for built-up mounts designed deliberately for individual photographs or orders.

There are no universal rules determining what colours or shades can or cannot be used on a mounting job. Some workers restrict themselves to the use of tints which are in agreement with the print, and for a cold black and white would not touch anything outside of black, white, green and bluey greys. For warm black and sepia work this school would only use white, buff, cream and brown. Others will combine cold and warm tints in the same mount for either a black or brown picture, often with excellent results, but where there is any doubt the first mentioned system is the safer. With prints that need no improvement, either in depth, contrast or colour, there is a greater choice of mount shades than with work that is not quite all that it might be.

A faulty picture can be made to look much better—or much worse—than it is by its mount. To render a fault inconspicuous, or to make poor quality appear to be quite "the thing," the usual plan is to "go one worse" with the mount. For examples:—A certain print has extremely black blacks; it would have been more to our liking with warmer blacks. We mount it on blue-black against which it appears warm in comparison. To put it on anything warm would only enhance its cold blackness and so make it worse. A sepia is "mustardy." Mount it on pale brown, buff, cream or coffee and it will probably appear all right, but to put it against a rich vandyke brown will convict it on the spot. Exceptionally disagreeable tones can sometimes be made to look exceptionally artistic by mounting on the same (exact) shade. A photograph that is dark should be put on a darker mount. On a white one such a print would seem darker again than it really is. The same principle applies to a pale picture, which requires a pale mount if it is not to appear bleached or faded. A soot and chalk type of print needs a contrasty mount, e.g., white with black tint, and a soft or flat print will go best on a combination of very near tints, e.g., deep cream and buff or light grey and medium grey.

Pencil and brush can be useful in mount making, but they are not taken any great advantage of. For good work where the design of a mount is not required to bolster up the print, very natty effects are obtainable by lines in pencil, ink and water colour. A fine border, if done neatly and accurately, is often more effective than any tinting scheme. Fine border lines in gold paint on a rich brown are very attractive.

The most suitable size for a mount is best found by experiment, particularly if the picture is long in comparison with its width or of an oval or circular shape. For standard-sized pictures the sizes favoured by manufacturers are quite suitable for all but exceptional orders. The position of the picture should always be slightly above the true centre if the mounted result is not to appear pushed down or squat. It is a general rule to have the side spaces precisely equal, but if the subject is such that a print looks well placed when decidedly to one side there can be no objection to mounting it so. But such a departure must be definite. There must be no suggestion that the result is merely due to crooked sight on the mounter's part. I have known an odd occasion when a head portrait looking towards the bottom right-hand corner of the print, was advantageously mounted in the top left corner of the mount, the tint showing slightly wider on the right and bottom sides.

I am not an advocate of plate marks, but for those who like them there is a fairly simple way of making any desired size. The requirements are two pieces of thin mounting board (4 to 6 sheet) slightly larger than the size of mount to be marked, and some *paste-portout* binding. With a mount placed between them, the two cards are bound along one edge. When the binding is set the inner face of one card is marked in pencil with the desired size for the plate mark, and after making sure that the corners are square and that the mark is central, the lines are gone over with a very sharp knife guided by a straight-edge. When the piece has been cut cleanly out, a few drops of seccotine are rubbed on to it (without removing it), and the other card is folded over and the whole left under a weight until the adhesive has set. The centre square will now be attached to the top card and will lift out of its original opening when the cards are opened. A mount placed between the two and pressed in the dry-mounting machine for a few seconds will be neatly plate-marked. If there is no machine available the effect can be got—but not so quickly—by pressure under a gross or so of large mounts or other large flat weight.

Cut-out and flush bevel mounts are applicable to a large variety of photographs, and have their points. The former, particularly in delicate shades, give quite a distinctive appearance to good pictures of any size. Rectangular cut-outs are done by hand with the knife, but are not difficult if a good edge is kept. Ovals and circles require much more care and patience; but for these, machines can be obtained that eliminate the factor of manual dexterity. Bevel mounts can be cut on a special board or in the same way as square cut-outs. They are perhaps the simplest mounts of all, as they merely add stiffness, substance and finish to a picture without effecting its spectacular quality.

The Technical Side.

The substances that can be used for attaching a photograph to its mount are numerous. I will deal only with the most important, which are starch paste, proprietary pastes, gelatine, Seccotine, gum arabic, and shellac. Starch paste, if properly made, is a strong, clean and safe mountant which sets into a hard and durable binding. Provided that no traces are allowed to dry on the face of the print or mount, starch is quite satisfactory as a mounting agent. Prints can be mounted with it in a dry or wet state, the latter being the easiest and most usual way. Proprietary pastes of good makes are very similar to starch, and can be used with confidence. Gelatine, made in a thick, warm solution, is a very strong mountant that can be used on dry prints. It can be prepared by dissolving gelatine in warm water to get a thick syrupy liquor which is thinned down sufficiently for use by heating without the addition of water. "Seccotine," let down with water, makes a clean mountant. Whether it is liable to produce any after effects I cannot say. I have used it myself without so far coming across any symptoms. Used as it comes from the tube, it will mount thick papers if spread thinly along the edges of the dry prints. Gum arabic, prepared by hanging a bag of crystals or dust in a bottle of cold water until sufficient has dissolved to make a thick gum, can be used on dry or wet prints, but does not stick so readily as gelatine or "Seccotine."

Shellac dissolved in methylated spirit will mount dry prints cold or hot. In its well-known form of tissue it provides what is probably the most popular system of mounting at the present time. When using tissue, the right temperature is of paramount importance. This varies with different batches, and the correct degree should be found by experiment when starting on a fresh lot. By keeping a small thermometer on the dry-mounting machine, work is greatly facilitated, once the best temperature for the tissue in use is known. After using large quantities of present-day tissue, I am of the opinion that it is not as good in the aggregate as other photographic products. Perhaps I am too exacting, but in any case tissue has the advantages of being clean and dry to handle and innocuous and protective to the print. Dry-mounting can be done with a large flat iron where no machine is available.

With dry or wet mounting, the actual degree of humidity of the print is a matter of some importance. In the first case prints must be really dry to avoid risk of the surface sticking to the zinc plate or blotting paper, whichever is used to cover. If there is any doubt on the point, a print can be put in the mounter, or under the flat iron and given a momentary press, which will remove any dampness before there is time for sticking. In wet mounting prints must be thoroughly and evenly wet. If they are not properly soaked the expansion due to wetting will be uneven, and they may dry up not truly square. Some workers trim their prints wet to avoid this, but there is no necessity to take the extra risk if care is taken to soak prints thoroughly before wet-mounting. At the moment of pasting, however, there should be no surplus moisture. A print that is pasted while covered with water is not likely to stick well, as the paste will be greatly diluted. Another thing, the paste and water will be apt to roll out under pressure and deface the mount. When rolled down quite flat, mounted prints should be left under pressure for some little time unless the adhesive is known to be very strong, when they can be safely left exposed to the air, in which condition they will dry more rapidly. In either case pressure or restraint of some kind is wanted *on the mount* to prevent cockling, which is the bugbear of wet-mounting.

The keeping qualities of mountants are uncertain properties. Pastes are best when freshly made, but will keep for long periods if a preservative is present. I have used chloroform and chloroform water for preserving pastes with good results. Proprietary pastes always contain preservative, and should keep for a reasonable time. Dry-mounting tissue is said by some to be subject to the air, and to lose its adhesive properties if left lying about or in uncovered boxes. Whilst I cannot corroborate this from experience, it sounds feasible, but the remedy—or prevention—is obvious and simple.

The Business Point of View.

When mounting is done on a large scale, and particularly if done for profit, i.e., professionally, the £ s. d. point of view is important. By studying different manufacturers' catalogues it will be found that a style or variety of mounting may be carried out at different figures. It will also become apparent that certain styles of made mounts will prove cheaper or dearer than similar or equally serviceable styles made up from boards and tints. With cut-outs and bevels we have to take into consideration time and labour on one hand, and the advantage of buying quantities of large boards and the possibilities of economical cutting on the other. For example, a 15×12 cut-out may take up a little time and necessitate some skill to cut, but it may be made from comparatively

cheap board and still be effective, and the centre-piece will make another mount for a smaller picture. To have a substantial result, the prints should first be rough-mounted, of course, but this can be done on waste mounts or thin cardboard or thick tint board, and need not add very much to the cost. For two cut-outs, one 15×12 and the other 10×8 we would require one piece of board about 24×18, two old mounts or pieces of thick tint about 16×13 and 11×10, two sheets of dry-mounting tissue, 15×12 and 10×8, about threepennyworth of "Seccotine," and the necessary labour and time. For good work we can add brown paper and a trace more "Seccotine" to back the mounts. To work out the cost of such a job from a wholesale price-list of mounts, and then compare it with the cost when using various made mounts, keeping in mind the artistic side of the question, would provide a good example of how useful business methods may be. It must always be remembered though that to buy consistently in the cheapest markets is risky, and to sacrifice artistic quality to cost may prove the dearer way in the end. To maintain technical and artistic excellence without unnecessary outlay should be the aim of anyone undertaking mounting on a business scale.

THERMIT.

PHOTO-STEREO-SYNTHESIS: THE PHOTOGRAPHIC REPRESENTATION OF A SOLID OBJECT.

[Students of photography have been so accustomed to associate the names of the brothers Lumière with chemical investigations into photographic processes that it is perhaps overlooked that MM. Lumière have long taken an interest in the optical side of photography. Their share in the origination of the cinematograph projector is their most notable contribution to this branch of photography: another piece of original work which has proved less fruitful is the stereo-photo-diorama, devised by them some years ago. In the following paper by M. Louis Lumière, contributed to the Academy of Sciences and recently published in "Comptes Rendus," the theory and practice of a method of producing a single photographic representation of a solid object are described. The result obtained by the method which is here set forth consists of several positive transparencies representing successive planes of the subject, and mounted one behind another at intervals proportional to their separation in the subject and to the scale of reproduction. The set of transparencies, when viewed by a strong transmitted light from a chosen standpoint, produces the sensation of solidity in a striking manner.—Eds. "B.J."]

If photographic negatives are taken, on a fixed scale of reproduction, of a series of parallel planes (equidistant or otherwise) of an object, whilst fulfilling the condition that each image represents only the intersection of the object by the corresponding plane, it will be possible, by superimposing the positive images made from the negatives obtained in this way, to re-form in space the appearance of the object photographed. For this it is sufficient that the distances of the positive images are equal to those of the planes photographed modified by a coefficient corresponding with the scale employed.

For a theoretically perfect reproduction it would be necessary to superimpose an infinite number of images differing from each other to an infinitesimal degree, but experiment has shown that this condition, which obviously cannot be fulfilled in practice, is not necessary in order to convey to the eye the impression of continuity: a small number of elements is sufficient if, within certain limits, each image corresponds not with a plane, which likewise cannot be done in practice, but with a given focal volume. This focal volume should, however, be fairly small if it is desired to avoid parallax effects.

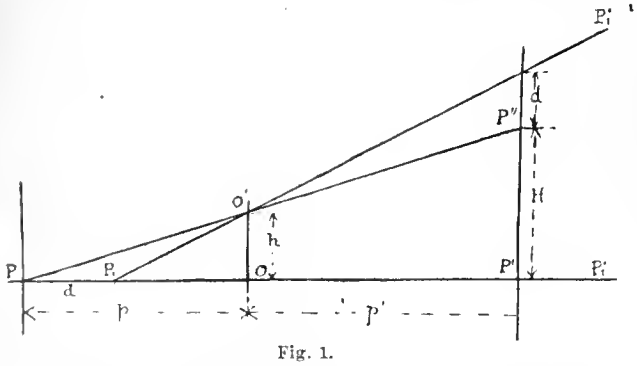


Fig. 1.

If the attempt is made to effect this reproduction by means of a lens possessing the maximum relative aperture which is possible, it is found that the depth of field is still much too great.

In order to obtain the necessary reduction of the focal volume, I have devised two methods, based upon the following considerations:—

(1) In fig. 1 let O be a lens of flat field producing an image P′ of a point P situated on the principal axis. If the lens be displaced so that its axis remains parallel to itself to a distance h and so that its principal planes remain in the same position in space, the image P′ will come into the position P″, situated in the image plane conjugate to the object plane which contains the point P.

If, at the same time, the image plane be moved in the same direction and without rotation on itself through a distance H such that

$$\frac{h}{H} = \frac{p}{p+p}$$

the position of the image of the point P will not have changed relatively to the limits of this plane. It can be easily shown that this will be the case also with every point situated in the object plane conjugate to the image plane.

It will, however, not be the case with points such as P, situated nearer to or further from the object plane. At each distance d of this plane there will be a corresponding displacement d' of the curve of the secondary axis corresponding on the image plane, and the value of d' will be given by the formula—

$$d' = \frac{h\,p'}{p-d} - H - h$$

The image of the point P will thus yield on the sensitive surface a curve of length d'.

It is easy to see that there is an advantage in making the ratio $p : p'$ as small as possible, in making h on the other hand of as high a value as possible and in selecting a very small value for f. But the conditions of reproduction in practice limit the choice of these factors. Unless a sensitive surface of enormous dimensions be employed, there is the necessity of adopting a value of $p : p'$ of less than 1, whilst f cannot be less than about 20 cm.

(2) In fig. 2, O is the lens provided with a reversing prism and forming the image P′ of the point P, p and p' being necessarily equal, having regard to the prolongation arising from the interposition of the prism.

If this lens be subjected to displacement of any amplitude whilst taking the precaution to effect the displacement in the plane of the principal section of the prism, and if this plane,

as well as the principal planes of the lens, remains unaltered in position in space, the position P′ of the image of the point P will not undergo alteration. On the other hand, the image of any point nearer to or further from the image plane will undergo displacements in accordance with the formula already set forth. Thus, for reduction of the focal volume, it will be sufficient to provide the lens with two reversing prisms, the principal sections of which are at an angle of 90 deg., and

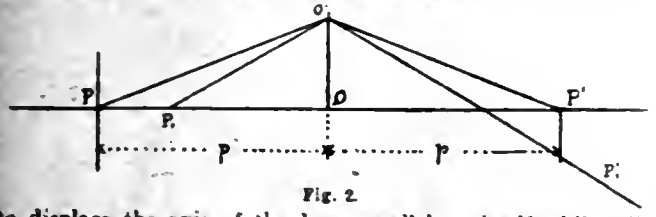


Fig. 2.

to displace the axis of the lens parallel to itself whilst likewise keeping the principal sections parallel to themselves during displacement.*

For the application of these theoretical principles I first constructed an apparatus on the lines of (2), which appeared to me most susceptible of a practical form.

A board A (fig. 3), capable of sliding in its own plane on the front of a photographic camera, is caused to move so that

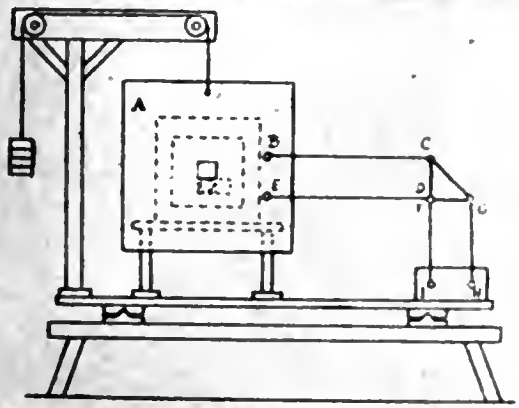


Fig. 3.

its sides remain constantly parallel to themselves by the operation of the linked system B C D E and F G H I. It carries at its centre a lens fitted with two Porro prisms arranged relatively to each other as shown in fig. 4, the principal section of the front prism being perpendicular to that of the rear prism, and the extension of the camera, which completes the apparatus, being such that the condition $p=p'$ is fulfilled. The whole apparatus is mounted on rails which allow of it

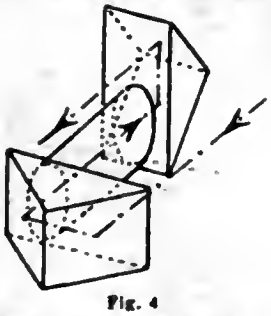


Fig. 4

being moved towards or away from the object to be photographed for the purpose of placing it in the successive positions corresponding with the series of planes chosen for the making of the negatives.

By moving the lens board during the exposure the definition of points not corresponding with the condition $p=p'$ is affected.

In default of prisms cut in the required manner, the images which I obtained were not altogether satisfactory, and I therefore constructed the apparatus represented in fig. 3, which is on the lines of (1) above.

Two frames, each affording a large opening, are connected by cross bars, not shown in the drawing.

These frames permit of the passage of four spindles A B C D, each of which is provided at its extremity with a crank piece. To each of these cranks is fitted a pivot, and the ratio of the lengths of the arms of the front and rear crank is equal to

$$\frac{p}{p+p'}$$

The four front pivots engage in sockets fixed in the lens board, and, similarly, the four rear pivots support a second board to which is attached the back body of the camera. The two boards are connected by a bellows which fits light-tight at each end. Lastly, one of the spindles carries a pulley, by means of which, during the exposure, a rotating movement may be given to the whole system by the device shown in the drawing.

From the considerations which have already been set forth, it will be clear that every point beyond the object plane conjugate to the image plane corresponding with the ratio $p:p'$

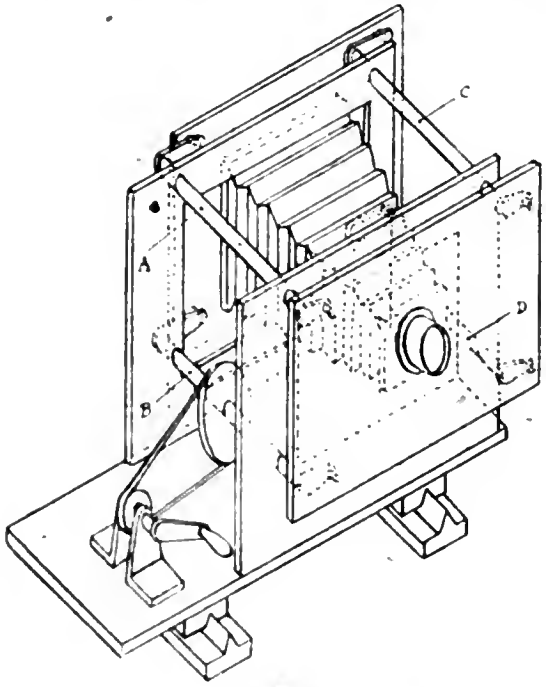


Fig. 5.

yields on the sensitive plate a circular curve, the diameter of which is greater in proportion as the point is at a greater distance from the object plane. Moreover, the circle of confusion corresponding with the aperture of the lens adds its effect in diffusing the definition of this point. Only the points situated in the image plane conjugate to the object plane are sharply rendered.

The angular aperture of the lenses which can be used, by taking a high value for h, would permit of limiting the depth of definition to a small volume, but experience shows that it is scarcely possible to exceed, for the circumference described by the lens, a diameter greater than 80 mm., otherwise, on synthesis of the positive images there is produced a species of conical anamorphosis which completely alters the appearance of the result obtained. This effect appears to be due to the fact that for a given definition the focal volume is greater for points situated beyond the object plane than for those on the near side of this plane.

Whether this is so or not, by choosing suitable values for the different factors and by using a lens of large relative aperture, the apparatus permits of the production of practical results.

LOUIS LUMIÈRE.

*It follows from this arrangement that it is possible to photograph a surface of any given extent by means of a lens of any focal length, e.g., of very small focal length relatively to the dimensions of the surface.

THE PANCHROMATIC PLATE.

It is now about fourteen years since Messrs. Wratten & Wainwright offered to photographers their first panchromatic plates, and gave to the world an improved material which may be regarded as one of the most important advances in photographic science since the advent of the dry-plate. So important, indeed, has this type of plate proved itself to be that it has been the means of opening up new departments of photographic industry, and giving to the printing world a revolutionary advance in the art of colour reproduction. To the professional photographer it has offered golden opportunities, but, unfortunately, his proverbial conservatism has caused him to neglect its general use to such an extent that one is led to ask the reason why?

The answers will necessarily vary with conditions. One will say, "I so rarely have any paintings to copy or valuable furniture to photograph that it is not worth while putting in a safelight for panchromatic work." To such I would reply, you do not require a safelight. Total darkness is cheaper and much more reliable, if not so convenient, but for casual, infrequent use a safelight is quite unnecessary, as will later be observed. Another will say, "My business deals entirely with portraiture, and therefore I have no use for panchromatic plates." In portraiture these plates are eminently successful and useful! Their rapidity has been increased so enormously that quite short exposures are now possible even with a light-filter, so that the chief practical objection to their use no longer exists. A frequent excuse is failure to obtain uniform results, the negatives being often so dense that reduction has been necessary, and the printing quality has not then been up to the standard requirements. The remedy for this is a closer acquaintance with methods of development, and the strict adherence to a method which found to fulfil the condition desired. It is only reasonable to expect that minor difficulties will sometimes arise in every one's early experience in panchromatic as in other photographic work, but in general practice they are rarely repeated; if they should be, the cause is generally obvious and easily remedied, never being of a nature which would disturb the equanimity of an expert photographer for a moment.

There is one thing which is more than a certainty, and it is this: if photographers would only give panchromatic plates the fair trial which they have the right to claim, not one of them would return to the general use of ordinary plates. They can be used for practically every purpose for which ordinary non-colour-sensitive plates are now employed, and for many purposes for which those plates are either absolutely useless or so totally unsuitable that a comparison of the results obtained would always give the first choice to those taken on the pan' plates. This adaptability is so unquestionable as to deserve serious consideration. In the hands of an expert they so increase the commercial value of his capacity and ability as a photographer that his work becomes Photography in capital letters. In the portrait studio the manner in which they reproduce the subtle differences of tints and shades of the various colours of drapery, and the delightful way in which flesh tones are rendered, even without the intervention of a light-filter, makes their use a real pleasure to the photographer who is discriminating in these matters; but, still further, their employment with a suitable light-filter, one specially selected for the requirements of the moment, produce results which appear truly remarkable to the ordinary plate worker.

Here we have a fair sitter who is deeply sunburned after her seaside holiday. Her face and arms are freckled. Her hands and portions of her neck and chest are patchy in shades of reddish brown from continued exposure to sun and breeze. Her hair is rich auburn in colour. Her dress is delicate shade of blue. We all know what an ordinary plate negative of her will appear like, and extend our sympathies to the poor individual who has of necessity to remove laboriously those thousand and one freckles, and work out by tedious retouching those dark, disfiguring patches, to say nothing of the risk of losing the likeness in the process. But here is a negative of the same sitter taken upon a pan' plate with a suitable light-filter. There are no freckles or dark patches here. Her auburn hair is full of detail and sheen. The general tone of the image is soft and delicate, and the work for the retoucher is practically *nil*. The soft folds of her blue dress are not represented as if composed of white calico, but by a scale of rich, subtle tones, with here and there a pleasing high-light, which must be seen to be appreciated. A child dressed in a scarlet cloak or a small boy in a suit of claret-coloured velvet photographed upon an ordinary plate makes a picture which is anything but pleasing. So deep are the tones of the clothing that any little detail which may be there is swallowed up in blackness. How differently a panchromatic plate reproduces these rich colours, and with what a wealth of detail. The old-time advice that children and young ladies should be photographed in white or light-coloured attire is superfluous when pan' plates are used for studio portraiture; and the same remark will, of course, apply also to outdoor groups. In landscape work, in the photographing of garden scenes, conservatories and other places where the infinite variety of rich colouring in flower and foliage presents such a gorgeous display to the eye; to all this brilliance the ordinary plate is blind; while the panchromatic, with a suitably selected filter, will see it and record the effect with all the vividness which gives such pleasure to the observer. In interior work in the homes of the wealthy, where noble pictures and tapestries line the walls, where choice furniture, rich upholstery and carpets of wonderful colouring and design furnish the rooms, the pan' plate alone can satisfy the requirements of the discriminating and give a rendering of colour and detail which will be approximative to the effect which the actual scene has upon the minds of those who use these apartments daily, and who are therefore likely to severely criticise, if not reject, photographs which do not reprodnce these effects faithfully and correctly.

The value of the panchromatic plate in the photographing of furniture, artistic china and bric-à-brac cannot be overestimated. Take, for instance, a piece composed of maple wood or burr walnut, with their wonderful grains, or of Honduras mahogany, for which the ordinary plate is absolutely useless. One trial exposure on a piece of furniture made in any of these woods upon a pan' plate will convert the most conservative worker, and show him that he will be hopelessly out of the running if he expects to retain his reputation for clever photography by the sole use of ordinary colour-blind plates. In copying coloured or stained prints or engravings, red toned photographs in silver or carbon, nothing can equal the result which is to be obtained on panchromatic plates. So that it will be clear, even to the most casual mind, that this variety of plate can do everything for which ordinary plates are usually employed, and at the same time do it better than the ordinary plate; and, further, that it can do many things which the ordinary plate could not possibly accomplish under any circumstances. This being so, the question arises: why use any but panchromatic plates? For some special work, certainly, transparency plates will be necessary, and when copying drawings or plans in pencil or ink a required hardness of contrast can only be obtained on a slow process plate, but for practically every other purpose panchromatic plates will fulfil every condition which a photographer may expect from a dry-plate, and, generally speaking, it is calculated to give a better negative, requiring less after treatment, and in portraiture infinitely less retouching, yielding a richer contact print than ordinary plate negatives, and an unequalled result by enlargement, owing to the high quality of the emulsion with which these plates are invariably coated.

A brief *résumé* of the practical manipulation of these plates

will probably be of interest to many who have not yet used them, and may possibly be helpful to some who have not been as successful in their use as they would naturally desire. Perfection can only be obtained by experience, but one may be helped toward its attainment by the suggestions of those who have gained a measure of success. Now in order to get the full value out of the employment of panchromatic plates it is first necessary to give a litle thought to light-filters. As a means of correcting such colours as blue, green and yellow, the K filters of commerce are too well known to be more than mentioned here; but for general all-round work other filters will be necessary, such as a brilliant yellow, two or three shades of red-orange. A good red and a couple of tints of green are also useful, particularly in the copying of some much discoloured paintings or tapestries, in which a false colour rendering is often the only means by which the detail can be made to appear. The red filter will also prove useful in rendering the grain of dark coloured woods such as polished Honduras mahogany or walnut. In some instances the deeper shades of K filters will fill most of these requirements, but in the writer's experience a full range of practical colours and tints should be available for a general practice.

In portraiture a pink-orange filter will give cleaner flesh and a more acceptable result when photographing a very florid complexioned person, and with less exposure than would be necessary with a filter of the K variety deep enough to give the amount of correction desired. This tint of filter will also render red hair much more satisfactorily. Of course, the amount of red in the filter must be very little when used for a normal complexioned person with red hair, otherwise the flesh will appear anæmic and pasty. Experience in such matters as this is the only safe guide. One should be able to make one's own special filters in order to meet individual requirements. A few careful experiments will make the value of this suggestion obvious. I have said that pan' plates may be used without a light-filter, and in many instances sufficient colour correction will be obtained in this way, but a filter, however pale in tint, will naturally give a better correction. The question of employing very pale tinted filters applies only to portraiture. For general colour rendering there is a minimum of correction below which it is naturally inadvisable to work; the standard K1 filter being a good minimum depth of tint upon which to base any experiments in the direction of filter making in other colours; but to consider maximum depths of colour one would refer to the filters employed in three-colour work, which the writer has constantly used for commercial photography in monochrome.

The exposure of panchromatic plates under various conditions of light will not at first be as simple for all purposes as one would wish; but here again experience and a careful observation of conditions will soon enable the worker to overcome any difficulties in this respect. It must be remembered that when working in the daylight of autumn or winter time the colour of the light varies between blue, yellow and red, according to the time of the day and the state of the atmosphere. In the spring and summer time the prevailing rays in the light are the blue ones, except toward the closing hours of daylight, when the yellow and red rays will more and more assert themselves. Here we have the principal reason why ordinary plates require such long exposures under adverse conditions of daylight, to the colour of which they are insensitive, and here it is that the panchromatic plate naturally scores, because it is sensitive to these colours, and a comparatively short exposure can be given, no light-filter being necessary, say, for outdoor groups or animals when it is required to take such subjects in waning or bad coloured daylight. Nothing but practice and observation will, however, enable one to arrive at correct exposures under all lighting conditions, but no operator of experience will anticipate great difficulty in so familiar surroundings, remembering that these plates are sensitive to colour other than blue. I wish to make it clear to the inexperienced that the principles involved in the manipulation of pan' plates are no more difficult to grasp and apply than those which govern ordinary colour-blind photography, but it must be remarked that at first the element of uncertainty of the correct amount of exposure necessary, say, in the copying of old paintings or the photographing of dark, richly coloured interiors, is almost as great to the novice in pan' work as ordinary photography, minus a light-meter, is to the merest tyro.

The dark-room and the work in it now demand consideration. It will be readily understood that our old-time friend, the ruby lamp, is quite useless for dark-room illumination with panchromatic plates. So sensitive are they to this light that it is possible to take a photograph in light of the old familiar ruby colour. When it is necessary to employ a light in the dark-room during development it must naturally be one to which the pan' plate is least sensitive. So-called safe lights are procurable from any good dealer or trade house which are quite reliable for the purpose of locating objects in the room, but under no circumstances should rapid panchromatic plates be exposed even to these subdued and comparatively non-actinic rays. There are no rays of actual visible light to which these plates are not highly sensitive. Hence it is essential that all laboratory work shall be carried out in practical darkness. Dark slides should always be filled in total darkness.

The section of the dark-room which is devoted to developing operations must be screened even from a "safelight," so that the plate which is being developed is continually in total darkness until fixation is complete, or fog veiling will almost inevitably be observable in the fixed negative. A sufficient quantity of developer must be used which will ensure that the plate is completely covered without it being necessary to make any kind of examination in order to satisfy one's mind in this respect.

It is often said that it is unfair to the manufacturers of plates, and other material requiring development, if the formulæ and instructions which they publish for the development of their products are not accepted as most suitable and undeviatingly employed in order to obtain successful results. Admitted that dry-plate makers put themselves to considerable trouble and expense in order to arrive at the conclusions which their published data for development express, yet I think that their responsible chemist would be the last to claim a knowledge of the idiosyncrasies discoverable in the productions of their firm which would be superior to that of a man who employs those products in constant daily practice. Many years of experience in practical photography tends to make one independent of published formulæ. Liberty of action is the acme of true freedom, but in a photographic sense this desire for liberty may often become a snare, and unless one has some practical knowledge of chemical action and reaction it is always advisable to follow implicitly the makers' instructions for development. At the same time I will venture to suggest a development method which has been proved to be eminently successful with "Wratten" plates. It is not claimed that the method is unique or distinctive, but it is calculated to give a uniformity of result which is rarely seen by any other method. It must be remembered that one is unable to examine the progress of development of pan' plates, and that it is necessary to develop a faith in the means which it is proposed to employ before commencing operations.

Metol-hydroquinone-soda is a developing combination not particularly favoured by professional photographers, but it is one which the writer has used with Wratten plates for many years with success. The formula is as follows:—

(1)	Metol or substitute	90 grs.
	Sodium sulphite	2 ozs.
	Warm water	20 ozs.
(2)	Hydroquinone	20 grs.
	Sodium sulphite	1 oz.
	Water	20 ozs.
(3)	Sodium carbonate	540 grs.
	Sodium sulphite	1½ ozs.
	Water	20 ozs.

For portraiture, still life studies, interiors, etc., where a

soft negative is desired, mix together equal quantities of Nos. 1, 2 and 3, and to every 2 ozs. of developer add 1 oz. of water hot enough to raise the temperature of the developer to 70 deg. F. Meanwhile, the developing dish should have been warmed by having water of 80 deg. F. poured into it. Being now ready to develop, and having poured the warm water out of the developing dish and placed the exposed plate in the dish in total darkness, pour on the developer and develop for five minutes, timing the same by means of a dark-room clock or, preferably and more conveniently, by means of a Radiolite wrist watch. Having rinsed the plate in cold water and wiped off with a dry cloth the backing material (if backed plates are being used), transfer the negative to the fixing bath.

Hypo, 4 ozs. Water, 20 ozs.

The fixing bath should be shielded from light until fixation is complete.

For developing negatives of landscapes or other subjects where a greater density and contrast is desired, mix together 1 part of No. 1, 1½ parts of No. 2, 1 part of No. 3, adding hot water as before, and 1 drop of 10 per cent. potassium bromide to each ounce of developer, proceeding as before suggested, but continuing development for six minutes.

It has been found that samples of hydroquinone vary in their desity-giving qualities. This is one of the objections to its use. Should there be excessive contrast in a negative, reduce the amount of hydroquinone and bromide. If it is merely dense, reduce the time of development. This developer is a very useful one when one has become accustomed to its use, because any degree of softness or contrast is obtainable at will, and having decided upon a mixture and time of development suited to our requirements, and given correctly exposed plates, the quality and strength of the resulting negatives will be remarkably uniform.

The following notes should be remembered. It is always advisable to use backed plates.

New plates will always be more colour-sensitive than stale ones. It is a good practice to write the date of purchase upon each box of plates as they are delivered. This will often obviate disappointment. Stale plates should be reserved for copying purposes or for landscape work if they have not been kept too long.

A single plate should not be repacked with the film in contact with the packing paper, otherwise it will soon become useless. In order to avoid this, keep an undeveloped plate of doubtful character always to hand, so that it may be used to pack film to film with the pan' plate. Stick a piece of paper on the back of the dud plate for identification, and see that it is free from dust before using. Though it may have lost its own reputation for the purpose for which it was originally intended, it may be the means of keeping many plates of good character from losing their reputation.

Do not use a developer more than once if you wish to make negatives of a uniform quality. The developer suggested contains so small a quantity of developing material that it becomes practically exhausted by once being used. A second negative developed in a warmed-up developer requires a longer time to acquire density.

Use a dairy thermometer for testing the temperature of water and developer. It is sold in wooden cases by people who supply farmers and dairymen with their utensils, and is quite a low-priced article.

Keep the fingers off the developed film until it is dry. The warm developer softens it and makes it very liable to damage.

Do not be tempted to examine a plate, even by a safelight, during development. Failure comes that way.

Panchromatic plates give a fair amount of latitude in exposure, but they do best with a full minimum exposure rather than an over-exposure. This latter should be avoided.

It will be seen that there is something new to learn, new reasons why to consider, new methods to employ, and new ground to cover; but it will always be worth while, because it will bring new business and increased emolument, considerations which will certainly appeal to all professional photographers, both employer and assistant.

HENRY J. COMLEY.

FORTHCOMING EXHIBITIONS.

February 19 to March 5.—Edinburgh Photographic Society. Particulars from the Hon. Secretary, G. Massie, 10, Hart Street, Edinburgh.

February 19 to March 12.—Scottish Salon, Dundee. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

March 16 to 19.—Hackney Photographic Society. Latest date for entries, March 1. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Professional Photographers' Association, at the Photographic Fair, Horticultural Hall, Westminster, S.W. Hon. Secretary. Marcus Adams, 83, White Knights Road, Earley, Reading.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

AERIAL PHOTOGRAPHIC MAP OF LONDON.—According to an aeronautical correspondent of "The Times," the project for a photographic map of the whole of London, taken from the air, has now advanced sufficiently for a series of test sections to have been photographed from D.H. aeroplanes, flying between 5,000 and 6,000 feet high. The prints so obtained have been dovetailed together in a mosaic. One completed section stretches eastward from the Bank. A number of separate prints have been employed to prepare this strip, pieced together so accurately that it is impossible to see where one ends and the other begins.

In making the complete map, which, when constructed, will be some 20 ft. square and will cover an area of approximately 300 miles, it will be necessary to employ three aeroplanes, each communicating with the others by means of the wireless telephone, and all manœuvring precisely together according to an agreed plan. The cameras used will be improved machines of an automatic kind, exposing plates at intervals of a few seconds, and the pilots of the three aeroplanes, maintaining formation three abreast as they cross and recross above the City, will so steer their machines that the sideway field of one camera overlaps slightly that of the one in the aeroplane flying next to it. In this way, flying to and fro on given lines, the three aeroplane will cover London in a series of broad bands. When all the photographs have been taken—and some sections may have to be photographed several times owing to the existence of low-lying clouds or mist—it will be a task of great delicacy and skill to piece together all the prints, which are expected to number about 10,000.

The completed section is very clear; a landmark such as the convergence of thoroughfares at the Bank, or the roof of a big station like Cannon Street, is seen at once. A tiny photograph of each separate building is obtained, while through a magnifiying glass can be seen minute pictures of the omnibuses and other vehicles in the streets.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, February 7 to 12.

COLOUR PHOTOGRAPHY.—No. 4,620 Colour photography. S. M. Procondine-Gorsky.

PRINTING.—No. 4,502. Photographic printing apparatus. R. N. Kerr and F. W. Tassell.

LENSES.—No. 4,541. Photographic lenses. Optische Anstalt C. P. Goerz Akt.-Ges

STEREOSCOPY.—No. 4,988. Means for imparting stereoscopic effect to photographic negatives, prints and projections. F. G. and J. McKim and H. Newbold.

PASSE-PARTOUT FRAMES.—No 4,756. Passe-partout frames for photographs. H. C. F. Waghorn

CINEMATOGRAPHY.—No. 4,543 Cinematographic apparatus. Carey-Gavey Syndicate, Ltd., and K. Higginson.

CINEMATOGRAPHY.—No. 4,489. Moving-picture projection apparatus. J. M. Carruthers and A. E. Cox.

CINEMATOGRAPHY.—No. 4,503. Cinematograph machines. J. A. Cockett.

CINEMATOGRAPHY.—No 4,367 Shutters for cinematograph projecting apparatus. E. A. W. Gates and J. Goldberg.

COLOUR CINEMATOGRAPHY.—No. 4,437. Method for producing cinematograph pictures in natural colours R. Killick and H. Stewart.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

THREE-LENS ANASTIGMATS.—No. 157,037 (July 13, 1920). The invention relates to a lens of the Cooke type, i.e., a lens which consists of three members separated by air spaces, the middle member being a simple negative or divergent lens, and the front and back members, both being simple positive or convergent lenses.

The object of the invention is to provide a cheaper construction of such lenses without sacrifice of quality. This is achieved by the use of a glass of low refractive index for one of the positive lenses in a particular and novel combination of constructional elements.

Throughout this specification the term "positive lens" is used to describe a convergent lens, and the term "negative lens" to describe a divergent lens.

The terms "focal length" and "power" referring to a simple lens are used in the usual approximate sense defined by the equations :—

$$\text{Power} = \frac{1}{\text{focal length}} = (n_D - 1)\left(\frac{1}{r_1} - \frac{1}{r_2}\right)$$

where r_1 and r_2 are the radii of curvature of the first and second surfaces of the lens and n_D the refractive index of the material; that is to say, in assessing the two quantities, power and focal length, of an element of the construction, the convention of ignoring the thickness of the element is adopted.

It is found that good definition over an angular field 60 degrees in extent can be obtained from a three separate component lens using shallow curves under the following conditions :—

1. The refractive index for sodium light of the glass of the negative lens is to lie substantially between the limits 1.542 and 1.576.

2. The negative lens must be unsymmetrically double concave; it must present its face of deeper curvature (*i.e.*, shorter radius) towards the incident light, and must have a focal length substantially less than 30 per cent. of the equivalent focal length of the combination

3. The positive lenses must be decidedly different from one another in focal length in order to secure a short overall length of the combination. It is found that the best results require that the focal length of the weaker positive (front) lens should differ from the equivalent focal length of the combination by not more than 18 per cent.

4. The refractive index for sodium light of the glass of the stronger positive (back) lens should be not less than 1.57.

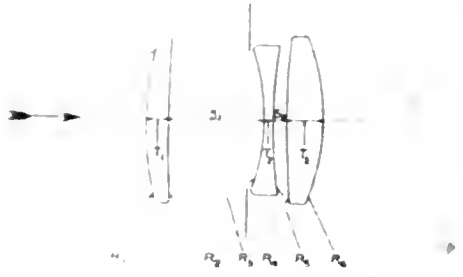
5. The stronger positive lens must be unsymmetrically double convex; it must lie behind the negative lens viewed from the direction of the incident light, and must present its face of longer radius towards the negative lens. The air space separating the stronger positive lens from the negative must not exceed 2½ per cent. of the equivalent local length of the combination, and it must have the shape of a positive meniscus lens.

6. The weaker positive lens must be of boldly pronounced meniscus shape, its concave side having a radius of curvature, which is not greater than twice the equivalent focal length of the combination. It must have a refractive index less than 1.535. It must present its convex side towards the incident light, and its concave side towards the negative; and it must lie in front of the negative lens as viewed from the direction of the incident light. The air space separating the weaker positive lens from the negative must be substantially greater than 5 per cent. of the equivalent focal length of the combination, and it must have the shape of a double convex lens. Reference is made to the following specifications :—Nos. 22,157 of 1910, 3,399 of 1911, and 6,328 of 1913.

A numerical example of the improved construction will now be described :—

The radii of the successive surfaces are numbered R_1, R_2 and so on, counting from the front as shown in the figure.

The sign convention adopted here is the + attached to a



radius means that the corresponding surface is convex towards the incident light, and − attached to it means that it is concave towards the incident light.

The glasses are specified by the refractive index for sodium light, n_D, and the nu value.

The thicknesses of the three lenses are denoted by T_1, T_2 and T_3 and the air spaces by S_1 and S_2 as shown in fig. 1.

All the linear dimensions are in inches.

Equivalent focal length, 10 in			n_D
$R_1 + 3.862$	T_1 .177		1.5149
$R_2 + 13.74$	S_1 .75		
$R_3 - 1.699$	T_2 .066		1.5531
$R_4 + 4.044$	S_2 .110		
$R_5 + 7.170$	T_3 .290		1.6168
$R_6 - 1.768$			

Diaphragm to be .15 in front of the vertex of R_3.

Power of strongest lens (the negative).

$$.5534 \left(\frac{1}{1.699} - \frac{1}{4.044}\right)$$

$$= .0625$$

Focal length 2.162 21.6 per cent. of focal length of combination.

Power of weaker positive lens (the front)

$$.5149 \left(\frac{1}{3.862} - \frac{1}{13.74}\right)$$

$$= .0958$$

Focal length = 10.44 = 4.4 per cent. different from focal length of combination.

Relative aperture f/7.7.

nn-value	Type Nos. of glass in Chance's catalogue
58.0	1066
46.1	7983
59.0	4873

It is seen that the deepest curve in this example of the construction is of radius 1.699 in. The corresponding curve of the Cooke series V lens of the same relative aperture $f/7.7$ described in specification No. 15,107 of 1895, is of radius 1.327 in. As the diameters are the same, it is seen that substantially shallower curves are used, and that therefore the new combination is cheaper for manufacturing purposes.—Taylor, Taylor and Hobson, Ltd., and Arthur Warmisham, Stoughton Street Works, Leicester.

The following complete specifications are open to public inspection before acceptance:—

COLOUR PHOTOGRAPHY.—No. 158,511. Colour photography. A. Keller-Dorian.

REPRODUCTION METHOD.—No. 158,552. Photographic method for the pictorial reproduction of a solid. L. Lumière.

PLATE-HOLDERS.—No. 158,514. Plate-holders for taking Röntgen photographs. G. Bucky.

CINEMATOOGRAPHY.—No. 158,526. Cinematograph projection apparatus. Petra Akt.-Ges. für Elektromechanik.

CINEMATOGRAPHY.—No. 158,529. Process for renovating cinematographic films. A. Meissner.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, FEBRUARY 28.

Bradford Phot. Soc. "Maxecon Paper Negative." Bernal Riley.
Cleveland C.C. "Home Portraiture." Robert Chalmer.
Cripplegate Phot. Soc. "Flashlight Photography." A. Dordan-Pyke.
Dewsbury Photographic Society. "York." A. Taylor Dawson.
South London Photographic Society. "Some Continental Recollections." F. G. Newmarch.
Willesden Phot. Soc. "Composition in Landscape." R. H. Lawton.

TUESDAY, MARCH 1.

Royal Photographic Society. Lantern Meeting. "A Plain Traveller's Tale, Rome to Naples." J. Dudley Johnston.
Birmingham Phot. Soc. General Discussion Night.
Bournemouth Camera Club. Mr. R. Kearton, at St. Peter's Hall, afternoon and evening.
Hackney Phot. Soc. Members' Lantern Slides.
Leeds Photographic Society. Members' Competition Evening.
Manchester Amateur Phot. Soc. Auction Sale.
Portsmouth Camera Club. H. E. Wood's Portfolio.
Stalybridge Phot. Soc. "Bromide Toning." W. Harwood.
Walthamstow and District Phot. Soc. "Stereoscopic Photography." H. A. Miles.

WEDNESDAY, MARCH 2.

Accrington Camera Club. "Raydex Colour Photography on Paper." H. Duxbury.
Borough Polytechnic Phot. Soc. "Telephotography." T. W. Derrington.
Croydon Camera Club. "Some Sea Birds." F. R. D. Onslow.
Dennistoun Amateur Photographic Association. Annual Meeting.
Edinburgh Photographic Society. "The Camera and the Bicycle." Dr. Struthers Stuart.
Exeter Camera Club. "Photography as an Aid to the Microscopist." Frederic G. Tutton.
Halifax Scientific Society. "The Carbon Process." C. Thomas.
Ilford Phot. Soc. "The Spirit of East Anglia." T. H. B. Scott.
Partick Camera Club. "Holiday Snaps." H. Laing.
Rochdale Phot. Soc. "Colour." A. Wilson.
Woodford Phot. Soc. "Some Colour Slides." J. P. W. Goodwin.

THURSDAY, MARCH 3.

Birmingham Phot. Soc. "Passe-Partout Framing." N. G. Breeze.
Brighouse Photographic Society. "Bromoil." O. Hingley.
Camera Club, The. "On Service with a V.P.K. (France, Salonika and Palestine)." P. C. Wootton.
Everton and Dist. Phot. Soc. L. and C.P.U. Folio of Prints.
Gateshead and District Camera Club. "Tone Values from an Art Point of View." H. Wilkinson.
Hammersmith (Hampshire House) Photographic Society. "Miniature Art." Cecil Thomas.
Hull Phot. Soc. "With Allenby in Palestine." J. A. Lamb.
North Middlesex Phot. Soc. Competitions. Members' Queries.
Rotherham Phot. Soc. "Colour Photography." F. J. Edwards.

FRIDAY, MARCH 4.

R.P.S. Pictorial Group. "Chiffon: Its Use and Abuse." R. H. Lawton.
Bedford Camera Club. "Dark Room Dodges."
Birmingham Photographic Art Club. "Exposure and Development." E. A. Bierman.

SATURDAY, MARCH 5.

Accrington Camera Club. "Norfolk Broads." H. Hardaker.
Edinburgh Photographic Society. "Scotland's Historic Monuments." J. Wilson Paterson, A.R.I.B.A.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, February 22, the president, Dr. G. H. Rodman, in the chair.

Mr. D. Charles read a paper on "Improvements in Flashlight," illustrated by flash lamps of his design embodying different systems of ignition. He laid special stress upon the importance of a method of ignition which was certain in its action, could be operated in an instant, and did not call attention to itself. Since flashlight was largely used for living subjects, it was very disadvantageous that the sitter should be aware that the flash was about to be fired; his knowledge caused a strained expression. Mr. Charles showed first a pattern of igniter in which a small steel pin is kept red hot in a Bunsen flame, and is pulled forward to enter the pile of flash powder contained in the pan.

Turning to methods of ignition by percussion caps, he said that the essentials for their efficient use were the employment of a holder for the cap by which the hammer, which fired it, could be brought on to it with great accuracy, and, secondly, the delivery of a sharp blow. A wax vesta served as well as a cap. Mr. Charles likewise showed a method of firing a flash by a high-tension electric spark operated by a self-contained battery and coil. This system was the only one he knew for satisfactory firing of a number of flashes at the same moment.

Mr. Charles devoted special attention to the spread of the flash by means of a suitable shape of flash pan. If flash powder were fired in an open pan, like a saucer, the flame of the powder moved in all directions, so that there was a large area which produced illumination in a vertical upward direction, and was useless. By making the pan in the shape of a trough with somewhat high sides relatively to the width, the flash was spread out into a sheet which, with a small charge of powder, would be, say, 30 x 20 inches in size, and with a large charge of as great an area as 5 x 3 feet. For measuring the powder he had designed a small device consisting of two thin metal discs of unequal sizes fixed to each end of a rod of about 3 inches length. The larger disc, when dipped into the powder took up twice as much as the smaller; and he had drawn up a table of powder quantities required for various subjects according to the working F number of the lens and the distance of the subject from the flash. He showed a number of lantern-slides of difficult subjects taken by flashlight, which exhibited the qualities of soft shadows and detail in the shadows characteristic of daylight work.

In the discussion, Mr. Walter Thomas strongly advocated the use of a diffuser in front of the flash, as, for example, the folding flash bags. He very strongly emphasised the degree to which photographers in America and other countries were in advance of those here in the use of flashlight, which possessed immense possibilities for home portraiture.

Mr. Warburg said that if the flash was spread to a large area by the pan, as shown by Mr. Charles, it was not necessary to use a diffuser. He inquired if the strong light of a flash was found to

cause any injury to the retina of the eye, as was found to be the case with some of the extremely powerful arc lamps now used in cinema producing studios.

Mr. Wratten thought that flashlight had been in use for a sufficient number of years for any cases of injury to the eyes to have arisen, but he had never heard of one.

Mr. K. Hickman urged that flashlight photographers instead of regarding the smoke as an evil should consider it a blessing, inasmuch as the major portion of the illuminating effect of the flash was produced, not from the flame of the burning material but by light (from a small flame) reflected from the smoke produced from powder burnt at an earlier moment of the explosion.

Mr. Banfield, from a long experience of methods of firing flash powder, said that the only certain method was with a piece of "quicklight," or with a spark from a disc of pyrophorous metal. In the past he had used with perfect satisfaction a series of Abel fuses for simultaneous ignition of a number of flashes, but the fuses were no longer obtainable.

Mr. Charles, in his replies, referred particularly to photographs he had taken, which made it perfectly clear that the light was produced by the flame and not by illumination of the smoke. His objection to many methods of ignition was that they were not instantaneous; even the sparking disc gave a burring sound before the flash was ignited.

On the proposition of the Chairman a most hearty vote of thanks was accorded to the lecturer.

CROYDON CAMERA CLUB.

Mr. R. H. Lawton, F.R.P.S., demonstrated "Enlarged Negative Making." An expert worker, he has also the knack of combining instruction with amusement, though to the pure heart, unsoiled with fake, he is yet another glaring example of pictorial lawlessness.

At the present price of dry plates expansive ideas can hardly be expected to be popular, and to meet the case last week he confined himself to enlarged negatives on paper.

His method of making enlarged negatives on dry-plates (briefly alluded to by him) is to start with a bromide enlargement. This is worked on with pencil, blacklead, and stump, and modified, if necessary, in many directions, even to the introduction of figures and other accessories. It is then copied in the camera, and as a matter of course a medal in due course follows, provided the judges know their business. He claims that no loss of quality arises, and judging from the results he has shown in the past this procedure has many strong points for much pictorial work. It also presents the advantage that more alterations and additions are possible on a large print than on a small transparency.

Naturally a certain amount of granularity may be anticipated, but correct illumination of the copy reduces this to a minimum, and any slight diffusing device practically eliminates grain.

The cheaper alternative of making a contact transparency, and from that an enlarged negative on bromide paper, was carried through by him with complete success. The dry-plate transparency is obtained by exposing to a candle-flame at the distance of 4 feet, which is determined by a piece of string. With all negatives identical exposures are given, and if perfect results do no materialise the string should be suspected. An inquiry by a member as to whether it was lengthened and shortened to meet the case of negatives of varying density, elicited the information that Mr. Lawton invariably produces negatives of constant high-light density required to be recorded in the transparency. "You are either a very clever worker, or something else," politely observed the questioner.

For the enlarged negative he had tried many bromide papers and most were satisfactory, particularly Wellington's single-weight "ordinary" surface. Exposure should be about three times that required for a print, and, all important, development should be pushed to the stage when action ceases, no matter if the image appears hopelessly buried. With a good, dense deposit there is no evidence of grain. For the transparency he employs Azol 1 in 32, and double this strength for the negative occasionally with a little bromide. The negative is susceptible to great control; parts may be rendered more translucent with canada balsam local reduction is feasible, and handwork easy.

It was unfortunate that the talented demonstrator had to catch a comparatively early train, for at the conclusion of his exposition little more than according a hearty vote of thanks for a really first-class evening was possible. The discussion, however, continued after he had left. Mr. Salt said that articles on paper negatives which appeared from time to time, might well lead a beginner to infer they were equal to dry-plate negatives. Granting this might be true for some work, it was equally true to say that a print of perfect photographic technique with a long range of gradation, such as might be seen in professional portrait and architectural studies, was never pulled from a bromide paper negative.

Mr. Harpur, who carries much weight, which occasionally invades his remarks, agreed. Paper negatives afforded a limited range of tones; if the picture fell within them, well and good, if not, nobody cared. The sloshy Bromoil splodger had a lot to answer for in his disregard of technique. "I am with you there," cordially endorsed Mr. Hibbert. Mr. President Keane (*genus splodger*) modestly alleged his pictures were always the products of perfect negatives, and urged Mr. Harpur to consider the matter in a more sanitary frame of mind. Mr. Purkis thought if a bromide print was wanted, a bromide paper negative should give a sufficient range of tones, a dictum affording no clue as to whether he spoke as scientist, technician or artist. Mr. Catharine pointed out that the range of tones might be sufficient, but a gentle range of gradation from one tone to another, in his opinion, was largely absent. Mr. Berry saw no reason why perfect technique and a long range of beautiful gradation should not run hand-in-hand with the highest artistic treatment, a remark to which no one could find reasonable objection.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held at 35, Russell Square, W.C., on Friday, Febuary 11, 1921.

Present: Messrs. Marcus Adams, Alf. Ellis, A. B. Basil, Frank Brown, W. B. Chaplin, A. H. Chapman, Gordon Chase, Alex. Corbett, C. F. Dickinson, S. H. Fry, W. E. Gray, Reg. Haines, G. Hana, W. Illingworth, H. Lambert, R. N. Speaight, H. C. Spink, and F. G. Wakefield, and Lang Sims (Secretary).

Letters of apology for non-attendance were read from Messrs. F. Read, H. St. George, Swan Watson and H. Wheeler.

The minutes of the last meeting were read and confirmed.

Arising out of the minutes, Mr. Speaight said that on the matter of fees for Press reproduction, his agent had informed him that the new scale was working well, and he had never come across any case of refusal to pay the increases. In a few cases the new scale had been mixed up with that of the Press photographers, but these had been adjusted.

The report of the Finance Committee was adopted. It recommended payment of a few accounts amounting to the sum of £13 7s. 2d.

Mr. Speaight reported that there had been no meeting of the Congress Committee during the month, chiefly because he had been abroad. Mr. Marcus Adams had kindly offered to act as Secretary of the Exhibition part of the Congress. The question of securing a lecture from a Continental photographer had been considered.

The Secretary read letters which had been received from Mr. Abel, of *Abel's Photographic Weekly*, New York, and the National Photographic Association of America. Mr. Abel gave many interesting facts with regard to photographic conventions held in America, and mentioned names of the gentlemen who might be asked to address the British Congress. He suggested that the American and British Associations might exchange reports and portraits taken by their members.

Mr. Lambert thought these cordial letters, in which there were great possibilities, should not be allowed to lie on the table.

Some members referred to the announcement that Mr. Pirie McDonald was coming to Edinburgh in June, and suggested that he might possibly come earlier. It was agreed to await a further recommendation from Mr. Abel on the matter.

Mr. Adams submitted the report of the Exhibition Committee, which stated that the entrance fee was raised from 3s. 6d. to 5s.

The Committee had decided to send the entrance form to all members of the Association in order to make the Exhibition known as widely as possible to those engaged in technical photography as well as in portraiture. It was decided to ask the Council for a grant not exceeding £60, as last year. Arrangements had been made for a wide passage beyond the exhibition room to be used as part of the exhibition. With regard to the letter from Mr. Abel, it was hoped to do something in the way of exchanging prints.

The Finance Committee having reported its agreement as to the grant, the report of the Exhibition Committee was adopted without further discussion.

Mr. Hana reported that the question of the new "Circular" had been carefully considered. It had been unanimously decided by the Committee, to which this matter was referred, that advertisements should be accepted. It was agreed also that the title of the new paper should be "The P.P.A. Record." The cost of printing, etc., had been gone into, but no detailed statement was yet ready, and expert judgment was needed. Advertisers had not yet been approached, but it was generally felt that it would be a valuable advertising medium.

It was agreed that the matter should be left in the hands of Mr. Hana and his committee.

Mr. Hana said, in reply to a member, that it was not proposed that the periodical should be sold, but that it should be given as part of the value of membership. In answer to further questions, he said that it was hoped that, including the editorial expenses, the journal would be made self-supporting. It was agreed to defer further discussion until the more detailed scheme was received.

The Secretary read the draft of the annual report, and on the motion of Mr. Frank Brown, the Secretary was heartily congratulated upon his report, which it was agreed should be duly published.

Mr. Fry, in submitting the balance-sheet, said that the accounts had been duly audited. He called attention to the fact that the number of subscriptions, totalling 1,073, was greater than ever before. The amount received from that source was £497 15s., to which was to be added £26 for subscriptions that had been paid in advance. Commissions on insurance amounted to £20 10s. 3d. —a larger sum than had ever been received—and dividends and bank interest to £42 10s. 10d., also the largest amount ever received. The total amount received in connection with the Congress was £242 3s., and the expenditure was £198, so that the Congress paid its way. It was felt that the money spent in reporting the minutes of the Council meeting was well expended, the work being accurately performed. The four issues of the "P.P.A. Circular" cost £132, a little more than the Council thought it would be, owing to the higher cost of printing, etc. Mr. Fry added that it was exceedingly gratifying to be able to report a balance on the right side of £132 4s. 9d. They also had £475 in War Loan, £100 in National War Bonds, £300 on deposit at the bank, and £90 on current account, making a total of £965 as their actual liquid assets. This was not very far short of the £1,000 he had hoped for.

The financial statement was received with loud applause, and on the motion of Mr. Frank Brown a formal vote of appreciation and congratulation to Mr. Fry was accorded.

The Chairman said that he had been looking over the Rules, and found that several slight alterations were required.

In Rule 6 he suggested that the words "shall be held on the second Friday in October and January, and the Council may call extra meetings when it is thought desirable" should be deleted.

In Rule 7 the word "honorary" should be deleted.

In Rule 12, which was more important, the first part should read as follows:—

"That at every annual general meeting of the Association the President and four London and four country members who have served three years on the Council since their last election shall retire from office. The retiring members shall be eligible for re-election. Any member of the Association, by letter sent to the Secretary not later than the second Friday in January, may nominate a President and not more than eight members of Council."

By this means the Council would be saved the trouble of nominating a President and 24 members of the Council every year.

The suggested alterations were approved as a recommendation of the Council, to be moved by the Chairman at the annual meeting.

Mr. Fry thought it would be advisable to have a new rule giving the Council power to co-opt a member, instead of being limited to 24 members.

The Secretary reported that applications for membership during the month numbered ten, and all were approved.

Mr. Fry suggested that the Council should consider the desirability of circularising every photographer in the country for the purpose of making known the Association's aims, and securing new members.

The Secretary reported that an American in Ohio, Mr. Walter G. Keller, had written asking if he was eligible for membership. He had replied, sending him an application form, and saying that they would be only too pleased to receive him.

He also reported the receipt of a letter from a member asking for advice in regard to an alleged breach of faith concerning the use of negatives for the purposes other than those stipulated for where no extension of use had been provided for. Having considered the correspondence concerning the transaction in question, the Council agreed that the applicant should be advised that in their opinion he had no claim.

The Secretary reported that he had been nominated for the Council of the Royal Photographic Society, and that he would be glad of votes.

Mr. Basil remarked that he hoped those members of the Association who were also members of the Royal Photographic Society would use their influence to secure Mr. Lang Sim's return.

The Secretary mentioned the interesting correspondence on key industries in the "British Journal of Photography"; it was agreed that discussion on this matter should be deferred.

Mr. Wakefield raised the question of the definition of "technical" photography for exhibition purposes. Several members pointed out that this might include machinery, etc. Mr. Adams gave the definition: Anything but portraiture.

The next meeting of the Council will be held on March 11.

News and Notes.

CASCADE WASHERS.—In reference to our paragraph last week, Messrs. David Allan, Whitfield Works, 107, Mansfield Road, Kingsland Road, London, E.2, call our attention to the fact that they have been making these washers for some time past, and have recently put on the market all sizes, from ¼-plate to 15 by 12. Larger sizes are made specially to order.

PORTRAIT MOUNTS.—Messrs. Houghtons, Ltd., send us one of the sets of mounts illustrating their manufacture of these requisites, which they are offering to professional photographers for 2s. 6d. The mounts are nearly all of them of the ever-popular folder pattern, and are, without exception, most tasteful examples of the mount-maker's art. We are glad to notice the refined sense of what is needed in a photographic mount. Mount-makers have been a long time in getting rid of unnecessary and disturbing embellishments, but now it seems impossible that there can be anything in better taste or with a more appropriate quiet degree of decoration than the examples before us. The materials themselves are a pleasure to the eye—mounting boards and papers of agreeable texture and in soft tints of brown and grey. The set includes also a fair proportion of white mounts admirably suited to various styles and sizes of sketch portrait. We are quite sure that the photographer who examines one of these sets will find in it styles which he will be glad to adopt with advantage to his own productions.

BRITISH INDUSTRIES FAIR.—The London Fair, organised by the Department of Overseas Trade, is held this year at the White City, Shepherd's Bush, London, W.12, and includes seven large groups of trades. Photographic exhibits are included chiefly in division 4, which has its place right and left of the main entrance to the Fair in Wood Lane. Cameras and other photographic apparatus are represented by the exhibits of Messrs. Houghtons, Ltd., W. Butcher

and Sons, Ltd., Thornton-Pickard Manufacturing Co., Ltd., and Holmes Bros. (London), Ltd. Only one lens maker is an exhibitor, namely, Messrs. J. H. Dallmeyer, Ltd. The photo-material trade is, however, represented by several leading firms, namely, Messrs. Kosmos, Ltd., Leto Photo Materials Co., Ltd., and Wellington and Ward. Messrs. Johnsons show a full range of their manufactures in developers and other photographic chemicals, and Messrs. E. B. Fry, Ltd., have a stand containing their many specialities for passe-partout framing, lantern-slides, etc. According to the plan of the Fair, mounts and albums and frames are placed in other divisions. Mounts are shown by Messrs. Bartons', of Birmingham, Messrs William Johnson and Sons, and Messrs. D. A. Lowthime and Co., while frames for photographs of all descriptions form the exhibit of Messrs. Marion and Foulger, Ltd. A whole day can easily be spent making a tour of the many avenues of stands in the exhibition, which is a triumph of organisation, so positive a trimmph, in fact, that it is not easy to ascribe its existence to a Government Department. But then the Department of Overseas Trade has a way of its own.

Eastman Kodak Co.—A copy of the "Rochester Times-Union," of February 1, contains more detailed particulars of the judgment by the Federal Court of Buffalo on that day in reference to the protracted dispute between the Eastman Kodak Co. and the United States Government, under the Sherman Anti-Trust Act. The particulars contained in the Rochester newspaper correct those telegraphed to "The Times," which we quoted in our issue of February 18 last, p. 102. It is now reported the judgment directs the Eastman Kodak Co. "to sell and dispose of certain factories and certain lines of photographic goods." These factories and lines represent a total investment of approximately $3,786,000.

According to the decree the following are to be disposed of: Premo factory, South Street, Rochester; Century and Folmer and Schwing Divisions, Caledonia Avenue, Rochester; together with every line of cameras and accessories now manufactured in these plants.

Artura brand of photographic paper; Seed, Stanley and Standard brand of photographic dry plates, which are to be offered either with or without the so-called Aristo plant.

Judge Hazel decrees that the dissolution must take place within two years, under governmental supervision and to independent parties. The formulæ must be given to the purchasers who will get exclusive rights to them. If the sale of the above mentioned factories and lines is not made by the Eastman company within two years they will be sold at public auction.

In the decree no reference is made to the film business. This film business was developed by the Eastman Co. and control of it is not held to be the result of a combination of competing companies.

It is stated that the price of ordinary share capital in the Eastman Kodak Co., advanced more than 100 points in the stock market within the ten days preceding the delivery of the judgment.

Correspondence.

***Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

MATT GROUND PLATES.

To the Editors.

Gentlemen,—In your issue of January 4, p. 70, we have noticed the inquiry of M. H. Green in respect to matt plates. We should like to ask M. Green if he refers to transparency or negative plates. If to the former, we may be allowed to inform him that we have manufactured these plates for many years, and shall be happy to let him have samples of them. If to negative plates, we are willing to make these latter if M. Green would kindly supply particulars of the qualities which he requires.—Yours faithfully,

Griesbaser Freres et Cie.

27, Rue du 4 Septembre, Paris.

FACTORIAL DEVELOPMENT.

To the Editors.

Gentlemen,—It is with mixed feelings that I accede to Mr. Watkins' request for information as to my use of the factorial system published in last week's B.J. I should have published my factors before but for two reasons, first, they have been adopted from lists already published; and, secondly, I cannot let the figures stand alone, but must add some remarks, which I greatly fear will bring down reprisals on my head. However, a request from Mr. Watkins, to whom I, in common with every photographer, am so much indebted, must not be left unanswered from any motives of self-defence. My factors are as follows:—

Pyro soda.	2 gr. pyro per oz. No bromide	10
.. ..	2 gr. pyro per oz. ½ gr. bromide	5
Azol	.....	25
Metol	.....	35

These are for normal negatives. I make the following variations for negatives hard or soft, according to the printing process to be used:—

	Normal for Illingworth De Luxe	Soft for Kodak Velvet Br.	Hard for Carbon Tissue.
Factor ..	5	4½	6

These different factors I found essential if the best results were wanted without after-treatment of negatives. They may seem greater variations than are called for by the different scales of the paper, but all I can say is that they were worked out and tested in the light of a great number of experiments. I should like to remark in passing that any attempt to produce ideal negatives without a definite idea as to what paper they are to be printed on is bound to fail.

Now as to subject and lighting. The following is a fair indication of my system, but it will not necessarily suit the work of any other studio:—

Lighting factors.	45 deg. light.	Sketch.	Line.
Standard, 5 .	5	4½	5½
Scale factors.	Head and shoulders.	Big head.	Full length.
Standard, 5 ..	5	4½	5½

These different factors must be co-ordinated. A factor which is the mean of paper, lighting, and scale factors must be used in each case. This sounds horribly complicated, but it is not so at all. After a week or two the figure required will be obvious at first glance. There is no need to make a note of the factor for each plate, as the total time need not be decided on until the subject is clearly seen on the plate.

I am afraid I stand a very good chance of being scalped by some of those lucky people who find one factor suit all work, because I shall be accused of making the system too complicated. I really cannot help it, the fault, if fault it is, obviously lies in the lighting. That is to say, the ratio of light to shadow is proportionately higher in my sketch lighting than in my line lighting, when allowance had been made for the variation in scale required in the prints. I did try at one time to equalise this, so that a "universal" factor might be used, but found it far more satisfactory to revert to variable factors. I should like to go into this more thoroughly, but unfortunately have no opportunity of studio work at present.

These figures fitted my own work very well indeed, but it is long odds against their being suited to anyone else. That is one reason why I have never published factors: a rough guide has been published for almost every developer, and I feel sure that personal trial is the only satisfactory way of finding what suits your own work. Mr. Watkin's system is, in my view, ideal, but it must be adjusted for each particular case if the best results are wanted.

Mr. Watkins is despondent about the apathy of the profession to technical matters, and with good reason. But can it be wondered at? I know no trade or profession where technical knowledge is worth so little in the labour market. Speaking as an assistant, I have never found technical knowledge a help in obtaining a post, or a path to a higher salary when engaged. Nor have

I ever found the slightest encouragement to continue such study, except from the added pleasure in my work.

With apologies for the length of this letter.—Yours faithfully,

Alton, Hants., February 19 ARTHUR G. WILLIS.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

B.A.—Impossible to say with certainty, but the negative has the appearance of having been developed with pyro-metol, a very generally used formula of which is that of the Imperial Dry Plate Company, contained in their Handbook.

D. E.—We should think your specimen is a bromide or gaslight print toned with Schlippe's salt; that is, the print is bleached in the ordinary mixture of bromide and ferricyanide, and toned in a bath of Schlippe's salt with small addition of ammonia.

E. E.—This kind of stain does sometimes arise with the chromium intensifier. We don't think the cause of it is properly known, but sometimes it is undoubtedly produced by exposure of the negative to too strong light between bleaching and re-developing.

A. G.—In the trade lantern-slides are most usually coloured with oil colours, but both water colours and dyes are used. About the only book which deals with the subject is "Colouring Prints and Lantern Slides," by R. Penlake, published by Messrs. Iliffe, 20, Tudor Street, London, E.C.4, price 1s. 6d., postage 3d.

A. E.—We have tried to turn up price of Euryscope lens, but the nearest thing we can find is a 25-in. lens listed for 30 × 20 plates in the 1887 Almanac. It is priced at £52 5s., so it is quite likely that a 30-in. lens would be £70 or more. The worst of this lens from the sale point of view is that its focus is longer than most people care about, and its aperture, which probably is not faster than *f*/6, is much too small for present-day ideas.

J. E.—(1) Impracticable to put a 12 × 10 extension box on the back of a half-plate camera, and then a repeating back on the rear of this extension. A light half-plate camera, such as you have, won't stand it. You had far better get a secondhand heavy pattern camera of 12 × 10 size, and have the repeating back fitted to that. (2) The negatives are largely printed on one of the printing boxes or by means of the strip printers, one model of which is the "Pawl," of Houghtons.

C. J.—We cannot identify any recent or special process from your description, which appears to apply to ordinary direct photo-lithography. We suggest that the text-book "Photo-Mechanical Processes," by W. T. Wilkinson, published by Messrs. Hampton & Son, Cursitor Street, London, E.C.4, will give you the necessary information on the working of the ordinary litho process, if such is what you are seeking. If it is something else, we are afraid we should want more definite particulars.

A. and Co.—It is quite clear from the reply of the Home Secretary, which was made to questions addressed to him by the P.P.A. some years ago, that under the Shops Act a photographer can carry out portraiture—which was the subject of arrangement beforehand—even at his own studio during hours when, under the Act, it requires to be closed. Therefore, there is no reason whatever for thinking that the taking of portraits at a place away from the studio could be a breach of the regulations contained in the Shops Act.

S. H.—Really we think the best advice we can give you is that you should study a good elementary book on photography, such as "Photography Made Easy," by Child Bayley. The flat, hazy result may be due to exposure, or development, or both (probably both). If we were you we should use quite a slow plate, such as an Ilford "Ordinary," or Imperial "Sovereign," and any ordinary developer, such as pyro-soda or M.Q. If there is a great deal of haze from the state of the atmosphere and you want a clear, bright photograph, then the best thing you can do is to use a Wratten process panchromatic, which is a rather slow plate, with a suitable filter.

W. H.—We are afraid that with the arrangement you propose your exposures will be rather too long for ordinary sitters. On the authority of the General Electric Co. we have it that 90 per cent. of the light is lost by indirect, or reflected, lighting. The arrangement of the lamps should be satisfactory, but to shorten exposures we should recommend a small diffuser in front of each lamp—say a 12-in. hoop covered with tracing cloth, using the reflected light as well. It would be necessary to hang a white reflector—say 3 or 4 ft. square—above the front lamp, as the sloping roof would waste much light. For the walls, we should recommend a light grey, and you will do well to get one of the ready-made distempers instead of trying to make your own. Oppsite the side lamp the wall would, of course, be white. A 1,000-candle-power will be most suitable for the top light.

M. D.—(1) About the most reliable type of shutter, and quite fast enough for the majority of work, is the roller blind, such as that of the Thornton-Pickard Co., Altrincham, Cheshire. (2) Of course your exposures must be correct, otherwise no system of development will help you to get uniform negatives. If this is so there is really nothing to choose between developing in a dish or in a tank. (3) You can get the supplementary lenses from opticians, such as Messrs. Sharland, 9, Thavies Inn, London, E.C.1, stating what focal length you require. The object of the lenses is to reduce the focal length of the main lens. The Petzval objective could be used for this latter, but owing to its size would need large supplementary lenses, larger, we think, than can be bought. The best lens for the enlarger described is an ordinary R.R. (4) Acetylene is not an easy light to fix to a vertical enlarger; the best is an inverted incandescent gas. If you have not gas and cannot arrange for daylight to be used in conjunction with the enlarger, then you will have to rig up some kind of a reflector above the negative, say, a sheet of white card, at an angle of about 45 deg., and illuminate this strongly with your acetylene burners. The firm for this latter is R. J. Moss and Sons, 98, Snow Hill, Birmingham. We have no experience of adding hydrogen peroxide to the water in the generator. We should doubt if it is much good, and it is quite likely it may be dangerous.

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Contents.

SUMMARY.

Professor G. H. Bryan, F.R.S., in a contributed note, describes his experience of the usefulness of light-struck pieces of plates or bromide paper in testing the activity of a developer. (P. 123.)

MM. A. and L. Lumière and A. Seyewetz, in a paper on the action of the persulphate reducer, express their disagreement with some conclusions reached by other experimenters, and lay emphasis on the fact that regular reducing action of persulphate may be ensured by having the working solution of the required degree of acidity. (P. 124.)

In a contributed article, "Thermit" gives a formula for an amidol developer prepared to keep by means of glycollic acid. (P. 125.)

Mr. E. J. Wall calls attention to a paper of Carey Lea, published in the year 1875, on the action of the less refrangible rays on silver iodide and bromide, and gives an abstract of it in reference to recently observed phenomena in colour-sensitising. (P. 129.)

A recent patent specification, by F. W. Donisthorpe and Dye Impression Photos, Ltd., describes the process of treating a negative image for the production of dye prints therefrom by contact without action of light. (P. 127.)

A user of panchromatic along with other plates states his opinion of the chief disadvantages of the former, which require to be set against the superior results obtained. (P. 131.)

In a notice of the fine pictorial collection brought together at the Scottish Salon we signalise some of the notable exhibits of portrait and landscape work. (P. 123.)

In a leading article we endeavour to answer the questions:—When may a photographer legally copy a portrait photograph made at another studio and in what circumstances is it etiquette that he should do so? (P. 122.)

We regret to record the death in South Africa of Mr. A. H. Lisett, treasurer of the Royal Photographic Society. (P. 126.)

The advantages of a vertical pattern of enlarger as regards small working space and convenience of handling, are becoming more widely appreciated. (P. 122.)

In a reaction from the ornate background, there appears a tendency to employ dark grounds too closely approaching uniformity. (P. 121.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

A recent paper by Dr. R. S. Clay in "Penrose's Annual" outlines a method of producing colour photographs by means of a microscopically wedged film. (P. 9.)

A recently painted process relates to the production of two colour or three-colour cinematograph projections from which, so it is claimed, colour fringing is eliminated. (P. 10.)

Some hints on the exposure of Autochrome plates on interior subjects in dull weather are contributed by Mr. H. W. Canning Wright. (P. 12.)

EX CATHEDRA.

Dark Backgrounds. There is, and has been for some time past, a tendency to use a perfectly plain black background for portraiture, but a singular lack of depth is a feature of such pictures, and some photographers seem to be trying to remedy this by introducing weird splashes of light. As a matter of fact, a perfectly plain, unrelieved background is rarely found in nature, and as far as we know, apart from conventionalised or decorative pictures, no painter has ventured to use one for a portrait. It is not always safe to trust to the older painters for guidance in this direction, although graduated backgrounds are almost invariably found, because in many cases the darkening of the pigments and varnish has obscured the original work. We are convinced that many of those who have adopted the plain black style need only a hint to return to the use of a graduated background which will give the necessary impression of relief and distance. The best backgrounds are like the best people, those which do not obtrude themselves upon the beholder, and the highest praise that can be given to the setting of a portrait is that it serves its purpose without being in evidence. The quite plain background is no doubt a reaction, and a very healthy one, from the terrible things in the form of ducal palace interiors and Haddon Hall terraces, which at one time were the stock-in-trade of almost every studio. Nevertheless, it is true that unobtrusiveness can likewise be carried to an extreme, and that is a feature which marks much of the work which we see from modern studios.

* * *

Screen Testing. Since there are many light-filters, or, as most photographers call them, yellow screens, which have a different factor for different plates, the following practical, if unscientific, system of ascertaining the increase of exposure needed with any brand of plates may be of service to their owners. A large black and white print, platinotype or bromide is copied, first without the screen, giving an exposure which is judged to be correct. The filter is next fitted to the lens, and using the same brand of plate a strip test made by drawing out the slide entirely and closing it, an inch at a time, giving double the exposure at each step, a convenient series being 2 seconds, then 2 seconds, then 4, 8 and 16 seconds for each second the unscreened plate was exposed. We then have a series of exposures ranging from twice to thirty-two times that given without the screen, and this is usually enough. It may not always be realised that with most screens the ratio for exposures with daylight and the arc or mercury-vapour lamps differs greatly from that necessary with daylight. When the two negatives are finished it is easy to see which strip corresponds most closely with the unscreened negative, and to make a note of the factor, plate and illuminant. The two plates should, of course, be developed for exactly the same time.

A Vertical Enlarger. Photographers whose working space is limited are often at a loss to find a position where an enlarging apparatus can be kept ready for use without unduly encroaching upon the area available for dark-room work. When fresh apparatus has to be installed, a vertical enlarger meets the difficulty, the space occupied being little more than the size of the largest picture which is likely to be wanted. Those who already possess an enlarging lantern will be interested to know that it can be used vertically without in any way impairing its usefulness in its ordinary position. A drawing board or table is fixed in a corner of the dark room and two stout wooden grooved runners are screwed vertically to the wall or partition. A board or frame travels up and down in the grooves, and to this the base of the enlarger is fastened with thumb screws, the whole being counterbalanced by means of an ordinary sash-weight with cord and pulley. A small half-watt lamp is a convenient source of light, but an inverted incandescent mantle may be used, if the precaution be taken to interpose a piece of ground glass between it and the condenser. This not only obliterates the texture of the mantle but prevents any ash, dust or fragments of mantle from falling upon the condenser. Our correspondence shows that the vertical enlarger is being more generally appreciated at its due value by photographers, not only on account of its saving of space but for its facility of manipulation.

COPYING PORTRAITS BY OTHER PHOTOGRAPHERS.

THE question whether he should copy a photograph, taken by another photographer and brought to him for that purpose by a customer, is one which every photographer has to answer at some time or other—and some photographers have to answer it many times every week. The question presents itself in two aspects, the legal and the ethical. The former can soon be disposed of.

If the copyright in the photograph is not the property of the customer, or of some other person whose permission to have it copied has been obtained by the customer, then the photographer exposes himself to exactly the same risks of action for infringement as does the customer. The Copyright Act does not distinguish between copying a copyright work and causing it to be copied. It need hardly be explained to those who have even only a nodding acquaintance with the law of copyright that at the present time any photograph of comparatively recent origin is copyright; that is to say, the right to copy it belongs to somebody or other. It is only in the case of photographs of such age as to betray the ancient date of their origin that copyright has probably expired by lapse of time, or by transference of the negative without assignment of the copyright under the 1862 Act. Therefore, it is simply ordinary caution for a photographer to assume that the copyright belongs either to the customer or, if not to him, most usually to another photographer whose name may or may not appear on the mount. As a rule it is not safe to assume that the customer is clear or right in the view he takes as to the ownership of the copyright. Very often he displays his entire ignorance of the existence of such a legal property as copyright. A little inquiry, however, will often be sufficient to ascertain the circumstances in which the portrait was taken. Obviously, if the portrait was made as the result of the customer accepting an invitation to be photographed, the copyright in 99 cases out of 100 is not his at all, though very often he may not be aware that he has not the right to have it copied. Where this is the case, the photographer who is asked to make a copy may feel pretty certain that if he does so, and the fact becomes known to the studio which has the original negative, the copyist will be asked what he proposes to do about the infringement.

When we come to considerations of ethics or etiquette it is not by any means easy to formulate an answer which will apply in all circumstances. The question indeed raises a delicate problem—a problem which each photographer must solve for himself according to his own ideals and his own circumstances. However high a tone he may wish to take in his business relationships, he will not regard the problem as arising in connection with the copying of amateur photographs or old portraits taken by firms which are no longer in existence. No photographer would have the slightest compunction in undertaking copying orders of this kind. The question arises only when a photographer is asked to copy a portrait by a brother professional who could, if requested, supply additional prints from the original negative. The circumstances in which such an order may be given vary almost indefinitely, and the problem varies in difficulty accordingly.

There is the woman, for instance, who admires the artistic poses but dislikes the high charges of a rival, Mr. A, across the street. She gets him to finish half-a-dozen prints of one pose and then brings to Mr. B either one of these prints or a packet of untoned proofs and asks him to tone and copy them.

There is again the customer who is so pleased with the photograph which she had taken two or three years ago, that she prefers to have more prints of it rather than sit again, but for some reason or other does not wish to go back to the photographer who did the work originally. Or, perhaps, one of a photographer's own customers, whom he has often photographed, may ask him to copy a photograph which she has just had taken in London by one of the leading artistic portraitists from whom she has, for reasons of economy, ordered only half-a-dozen copies. Or perhaps he is asked by an old customer to copy a portrait which has just been received from a friend or relative in Australia or Canada.

It is clear that there is a wide difference between these cases. In the last case, ninety-nine out of a hundred photographers would probably take the order; in the first case, probably nine out of ten would refuse it. Each man must decide for himself just where he will draw the line, if indeed he wants to draw any line at all. Unfortunately, many people, especially women who have no experience of business, seem to take it as a matter of course that one photographer will have no objection at all to copying the work of a rival. It never occurs to them that either photographer could object—the first, because, whatever its artistic or technical merits may be, it is put out as the work of another; the second, because the fact that he is asked to supply copies involves the reflection that he himself is not competent to make as good a portrait.

Although the copying of photographs can prove a very profitable business, it is probable that the great majority of photographers would much prefer to make their own portraits rather than copy the work of another man. Many, indeed, resent being asked to copy another man's work, because they feel, rightly or wrongly, that they can do it as well or even better themselves. Naturally, the number of these men will increase with the rise in the status and skill of professional photographers. There is reason to hope, therefore, that in the near future it may become more and more easy for professionals to draw the line strictly and refuse more and more of these copying orders.

THE SCOTTISH SALON.

The promoters of the thirteenth Scottish National Salon are fortunate, on this their third visit to Dundee, in having secured the Victoria Art Galleries to accommodate their exhibition. Ample room is afforded to carry out a scheme of hanging which shows the pictures to the best advantage, and the carrying out of the condition which the committee made to have the prints either framed or in passe-partout, glass optional in both cases, has enhanced the appearance of the display and fully justified the innovation.

In all some 375 prints are on view, 275 of which are of Scottish production. Scots exhibitions are usually strong in landscape, and the present is no exception to the rule, but the subjects chosen for pictorial treatment are pleasantly varied and include portraits, seascapes, architecture and genre studies.

Prominent among exhibitors in landscape is Mr. Hector Murchison, who shows two fine subjects from the Scottish capital, "Salisbury Crag" (No. 11) and "The Crown of Scotland" (No. 80), the spire of St. Giles in the latter standing up in majestic splendour above the nicely subdued roof tops and chimney tops of the surrounding neighbourhood. J. M. Whitehead is again prominent with his low tone subjects, his "Craigmillar" (No. 223) in transferotype, a new medium for him, perhaps being the finest of three exhibits. W. C. S. Farguson is strong with some of his delightful rock and spray studies, but "A Winter Calm" (No. 40), a snowscape of fine quality, serves to show his versatility.

William Howat has also a fine Bromoil of snow in "Sunshine and Snow" (No. 48), and Dan Dunlop shows two characteristic harbour scenes in "Pittenweem" (No. 13) and "A French Harbour" (No. 21), and is equally successful with other subjects.

W. S. Crocket's landscapes exhibit delightful spaciousness in "Morning on the Hillside" (No. 52) and "The Hilltop" (No. 65); the contrasts and lines of the latter are highly decorative. R. D. Stewart, London, shows some woodlands in Hampstead Heath (Nos. 134 and 157).

There are many fine examples of portraiture of distinction, different styles from the vigorous work of Robert Chalmers, of Sunderland—whose "Lucretia" (No. 26), a girl with bare shoulders, is full of grace—to the delicacy of William W. Weir's charming child studies, a fine example of which is "Laughing Eyes" (No. 212). Robert Marshall's "Portrait Study" (No. 109) of a mother and child is delightful in its simple, fresh spontaneity. Miss Jessie Thomson, Glasgow, is again very successful with some fine studies in platinum (Nos. 38, 39 and 42). The work of William Crooke, of Edinburgh, is also conspicuous, his "Sir Harold Stiles" (No. 238) being a particularly fine portrait of the famous surgeon. His portraits of Lord Scott Dickson (No. 77) and Sir John Lorne M'Leod (No. 70) are imposing works. Attention must also be drawn to Robert Crerar's "Don Cossack" (No. 107). Miss K. M. Alexander's "Ave Maria" (No. 58) is a fine study of the strong features of a nun.

James Slater's works are among the most delightful and characteristic in the exhibition, subtle in their refined quality. There are nine on the walls. "Sunlight after Rain" (No. 95) and "Silver Light with Quivering Glance" (No. 105) are instinct with the qualities which their titles imply. "My Lady's Garden" (No. 12), on the other hand, is in a low key, and just as magnificent in this kind of tonality.

T. Carlyle departs from his usual high key in shipping studies to present "A Pilot of the Night" (No. 252), a Bromoil of exceptional richness, whilst A. J. Wood, Aberdeen, shows a similar theme in "At the Close of Day when the Hamlet is Still" (No. 188). Right at the other end of the scale is Robert Ure's "Silent Harbour" (No. 68), which is full of delightful atmosphere, and the same effect has been caught by W. Duncan in "Light at Eventide" (No. 203).

A picture of outstanding merit is (No. 232) "A Tinker's Funeral" (burial would be more appropriate) by J. M. Dunn, Brechin, who faithfully depicts the reverence and grief of a little group of tinkers gathered round the last resting place of one of their number. A picture of real human interest. Flower studies (Nos. 34, 46, 228 and 234) find an able exponent in Wm. B. U. Patterson, of Dundee, whose prints in green carbon are masterpieces in technique; whilst local exhibits of merit are shown by H. C. Milne and V. C. Baird.

SOME SIMPLE DEVELOPMENT TESTS.

Now that "temperature" and "factorial" timing methods are to the fore, it may be useful to again call attention to the use of bromide paper strips for testing the speed of developers. My original note[1] on this subject elicited some valuable criticisms from Mr. Alfred Watkins, from which and from my subsequent experience it would appear that the numerical details involved in the use of such a method must be left to individual workers, and that a tabulated system of formulæ or factors would hardly be practicable.

The shavings which I obtain in trimming bromide papers to the exact size to fit my enlarging box furnish more than a sufficient supply of testing strips, which I keep packed away out of *continuous* light, which, however, freely falls on them when the package or box is open for a short time. To test the developer I dip the end of one of these strips into it, and watch the time which elapses before it is *completely* blackened up, making the test in full daylight. As a rule, I make several tests before developing, as the process is so easy. For tank development of plates (under conditions practicable in foreign hotels), I have obtained the desired contrast by multiplying the time of blackening of the test slip by 40, or more or less according to subject and required result.

1. "B.J.," Sept. 4, 1908, p. 677.

For developing bromide enlargements (from ¼ to 1/1 plate), I regulate the degree of dilution till the time of blackening of the test slip is 30-40 seconds, preferably 35 seconds, but this number is subject to individual variation. In my experience a speed of less than 25 seconds is liable to give blotchy prints, and one much exceeding 45 or 50 seconds involves risk of stains, fogging, or other evils. As a result of such experiences one of my boxes has been inscribed with a label, "Don't forget to Test the Developer!"

By this method account is taken, not only of temperature conditions, but also of any possible deterioration in the developer itself. A thermometer cannot discriminate between a freshly opened bottle of compressed tablets and one opened two years previously.

The manner in which the bromide test slip darkens up affords an indication of the effects of a restrainer, a slip began to turn dirty grey in 5 seconds in metol quinol, but did not blacken thoroughly for about 35 seconds. On adding potassium bromide another slip did not darken perceptibly for a long time, then it suddenly began to flash up, and was completely blackened in nearly the same time as before. With excessive restrainer the slips ultimately darkened to a dirty grey colour rather than a clean black.

Another useful testing stock is afforded by plates that have been rendered useless either by breakage or fogging, and which have been left undeveloped and unfixed. Such a waste plate may be cut or smashed into some hundreds of fragments. In my developing tank the plates are enclosed in an inner box, which is lowered into an outer trough containing the solution. My latest plan is to place a fragment of the fogged plate (or the broken one previously exposed to daylight) in the solution, which overflows at the top of the tank. This can be taken out from time to time and examined in broad daylight to see when the darkening effect has worked through to the glass side, and this affords an alternative indication of the time for removing the plates. This test is particularly useful, allowing as it does for any change of temperature that has taken place since the plates were first inserted. I have succeeded in further checking the result by a second test with a bromide slip in the later stages of the development.

But a still more important use of the chips of fogged plate is to place a small fragment in the fixing bath with a batch of bromide prints, leaving the latter in till the glass has cleared. A patented device on a similar principle was described some years ago (*vide e.g.*, "B.J." Almanac, 1915).

G. H. Bryan, F.R.S., Pres. Inst.Ae.E.

ON IRREGULARITIES IN THE ACTION OF THE PERSULPHATE REDUCER.

Since we first observed[1] the characteristic property of ammonium persulphate, in its action in a silver image, of acting first on the heaviest deposits, and since we first pointed out the usefulness of this property for the improvement of under-exposed and over-developed negatives, the reducer has been studied by many experimenters for the purpose of explaining its behaviour or of pointing out the irregularities met with in the use of different makes of ammonium persulphate.

In a notice of observations of this kind, Sheppard[2] reviews the different theories which have been proposed in explanation of the cause of the specific action of persulphate on the heaviest densities of a negative. He does not, however, quote the papers of ours from which later work originated. The following is the explanation we gave of the peculiar action of persulphate.

The persulphate oxidises the silver in the film, and the sulphuric acid which is liberated in the reaction dissolves the silver oxide formed, yielding silver sulphate or double sulphate of silver and ammonium. The first-named series of reactions may be represented by the equations:—

$$(NH_4)_2 S_2O_8 + Ag_2 + H_2O = (NH_4)_2 SO_4 + Ag_2O + H_2SO_4$$
$$Ag_2O + H_2SO_4 = Ag_2SO_4 + H_2O$$

It may equally be assumed that a double sulphate of ammonia and silver is formed according to the equation:—

$$(NH_4)_2S_2O_8 + Ag_2 = 2\,Ag\,NH_4SO_4$$

The soluble silver salt, which is thus in the presence of the excess of ammonium persulphate externally covering the image, tends to be reduced and to act as a physical intensifier[3] of the silver forming the surface of the image. Silver is thus deposited on the surface of the image, and this deposit interferes with the solvent action of the persulphate on the superficial parts of this image. On the other hand, since the underlying parts of the image are not exposed to an excess of persulphate, the silver dissolves unimpeded by the reduction of the silver sulphate formed.

According to the theory suggested by Marshall,[4] the formation of silver sulphate is a necessary condition for the solution of the silver, the absence of free silver ions bringing the reaction to a standstill. Whilst it must be admitted that this is a condition for the exercise of the solvent action of the persulphate and that an excess of soluble silver salt accelerates this action, it does not explain more satisfactorily than does our theory the selective action on the heavy portion of the image.

The same remark applies to the theory of Lüppo-Cramer quoted by Sheppard, in which the author states that the developed image is formed not of reduced silver but of a compound of silver and a photo-salt. Although the proportion of photo-salt is very small, it would be greater than would correspond to the least exposed portions in consequence of a less active reducing effect of the developer in these parts.

Reducers, such as Farmer's, which contain a solvent (hypo) of the photo-salt, would attack the lighter deposits more easily, whilst reducers which consist of a solvent of silver and not of the photo-salt would act in greater measure on the heavier deposits, which contain a lesser proportion of photo-salt.

Lüppo-Cramer seeks to support his hypothesis by the observation of S. C. Puddy[5] that the action of persulphate can be modified and caused to resemble surface reduction by addition of ammonium sulphocyanide.

Sheppard[6] disputes this action of ammonium sulphocyanide, regarding this compound as attacked by the persulphate with formation of hydrocyanic acid (prussic acid). He attributes the action of the persulphate upon the silver image to the presence in all commercial persulphate of small quantities of ferric salt, which acts as a catalyser, and, according to him, is the cause, through its varying amount as an impurity, of the differences exhibited by commercial persulphates. The action of the ferric sulphate on the silver image would produce the soluble silver salt necessary for auto-catalysis more rapidly, the resulting ferrous sulphate being immediately re-oxidised to the ferric state.

We have found with Sheppard that commercial samples of ammonium persulphate contain small quantities of ferric salt, as shown by a red coloration with potassium sulphocyanide, but this salt does not appear to us to be the cause of the greater or lesser activity of different persulphates, for we have found that every trace of iron can be removed from persulphate by repeated recrystallisations without depriving the product which has been purified in this way of its solvent properties, provided that its solution is of the required acidity.

A sample of sodium persulphate free from iron likewise behaved in the same way as ammonium persulphate in this respect.

We now come to consider the causes of the variation in the activity of ammonium persulphate. For the purpose of studying the causes which render persulphate of ammonia inactive and interfere with the production of regular results in the use of different commercial persulphates we have examined the action of substances which may be present in the solution, both those occurring as impurities in the persulphates and those arising from the water used in making the solution of the reducer.

We made tests first with distilled water and then with ordinary tap water.

1. "Bull Soc. Fr. Phot.," 1898, p. 395; 1899, pp. 226, 304; "B.J.," 1898, p. 473; "B.J.," 1899, p. 294.
2. "B.J.," 1918, p. 314; "Bull Soc. Fr. Phot.," 1919, p. 261.
3. Ammonium persulphate can act, like hydrogen peroxide, both as a chemical oxidising agent and reducing agent. It reduces the silver sulphate, as we have shown. Bull Soc. Fr. Phot.," 1899, p. 226; "B.J.," 1899, p. 294.
4. "Transactions of the Edinburgh Photographic Society," 1900, p. 168.
5. "Photography," Feb. 8, 1900, pp. 99 and 86.
6. "B.J.," 1918, p. 314; "Bull Soc. Fr. Phot.," 1919, p. 263.

Tests with Distilled Water.

(a) *Effect of Acid.*—Using distilled water in dissolving the ammonium persulphate we found that in employing persulphate containing from 92 per cent. to 97 per cent. of the pure salt and of the same acidity, the reducing action of these different products is the same.

A sample of persulphate supplied as "neutral persulphate," and containing 0.22 per cent. of free sulphuric acid and 97.2 per cent. of the pure salt, behaved in practically the same way as a persulphate from the same source containing 0.49 per cent. of free sulphuric acid. Moreover, the acidity of a solution of persulphate gradually increases, owing to slow decomposition, according to the equation:—

$$(NH_4)_2S_2O_8 + H_2O = (NH_4)_2SO_4 + H_2SO_4 + O$$

The initial acidity of "neutral persulphate," which was 0.22 per cent. immediately after dissolving in water, rose to 0.93 per cent. after 24 hours and to 1.3 per cent. after 48 hours, at a temperature of 60 deg. F. Its solvent (reducing) action on silver became more rapid as the acidity increased. If the solution does not contain free acid, and more especially if it has an alkaline reaction, no solution of the silver takes place. But a neutral solution in water which is inert to start with becomes gradually active in proportion as decomposition of part of the persulphate renders the solution acid.

If the proportion of free acid in the solution is considerably increased the solvent action becomes much more rapid, and the persulphate no longer dissolves silver in the depth of the film but superficially, like other reducers, no doubt owing to the facts that the solution of the silver becomes the predominant reaction, and that the reduction of soluble silver salt which brings such solution of surface silver to a standstill no longer takes place in a very acid solution.

(b) *Effect of Chlorides, Bromides and Iodides.*—Stenger and Heller[7] have observed that the presence of small quantities of chlorides in the persulphate solution changes its mode of action, and they attribute this result to the fact that the soluble chloride precipitates as insoluble chloride the sulphate of silver which is formed, thus removing the catalysing silver ions and protecting the silver against acceleration of the reaction.

In studying the action of alkaline chlorides (of sodium, potassium, lithium and ammonium) on the persulphate reducer, we found that when the persulphate solution is feebly acid the alkaline chlorides when present in small quantity (0.01 sodium chloride per 100 c.c.s. 4 per cent. solution of persulphate) completely destroy the solvent action of the persulphate. By increasing the quantity of chloride (to 0.5 per cent.), the image gradually bleaches, being converted into silver chloride. The addition of sulphuric acid to this solution (2.5 c.c.s. of 10 per cent. sulphuric acid per 100 c.c.s. of solution) counteracts this chlorising effect; the image is not reduced, but, on the other hand, undergoes slight intensification owing to change of colour of the silver.

Bromides behave similarly to chlorides; in the case of iodides, iodine is liberated

The action of chlorides and bromides may be explained by the slow liberation of chlorine or bromine by the persulphate. The nascent chlorine or bromine tends to convert a silver image into silver chloride or silver bromide which is no longer attacked by the persulphate. Hydrochloric acid and hydrobromic acid, if present in the free state in the solution, behave similarly to chlorides and bromides.

(c) *Effect of Sulphates and Nitrates.*—Sulphates and nitrates of the alkaline metals, when present in small quantity, do not interfere with the action of the persulphate on the image, but if present in quantity as great as 0.5 per cent. the action on the silver image is retarded if at the same time the sulphuric acid in the solution is present in quantity between 0.45 per cent. and 1 per cent. of the persulphate. By increasing the acidity of the solution the silver is dissolved even in the presence of sulphates and nitrates.

(d) *Effect of Chemical Reducers.*—If the gelatine film of the negative contains reducing substances, e.g., hypo from the fixing bath which has not been completely washed out, it will be understood that the persulphate is thereby reduced and ceases to act as a solvent (photographic reducer) of the silver image in presence of sulphuric acid.

Tests with Ordinary Tap Water.

The various samples of commercial persulphate employed in the preceding tests made with distilled water were likewise used for a similar series of tests in which the persulphate was dissolved in ordinary tap water. The results obtained were similar in the two cases, but it must be mentioned that the tap water employed contained only an insignificant quantity of chloride and a small proportion of sulphates.

The results would certainly not have been the same had the water contained larger quantities of chlorides or sulphates.

The general conclusion from these results is that the cause of irregularities in the use of different commercial makes of persulphate is either that the persulphate is dissolved in ordinary water or in distilled water with insufficient addition of free sulphuric acid (in which case the reducer acts very slowly) or the solvent action of the persulphate on the silver image is brought to a standstill, particularly by the presence of chlorides or sulphates in sufficient quantity when using ordinary tap water for making up the solution.

In all these cases it is easy to obtain a normal reducing action with the different commercial makes of ammonium persulphate. For this, all that has to be done is to dissolve the sample in distilled water and to add as required solution of sulphuric acid so as to bring the acidity between 0.25 and 0.50 per cent. of the solution.

A. and L. Lumière.
A. Seyewetz.

[7] "Zeit. für Wiss. Phot.," 1910, p. 73; "Revue des Sciences Photographiques," 1914, p. 223.

GLYCOLLIC ACID AS A PRESERVATIVE FOR AMIDOL.

Amidol as a developer, though largely restricted to use on bromide papers, is decidedly popular among professionals. But every developer has its weak points and the fly in the amidol ointment is the marked instability of the diamidophenol salt. I have been a user of amidol for about fifteen years, and I have often tried to solve the stability problem by compounding some mixture that would keep, if not indefinitely, at least for some weeks. To describe all the mixtures that were tried (with varying degrees of success) would take too much time and space, but some recent trials of formulæ containing glycollic acid should interest users of amidol, although the results are not final or the experiments complete.

When I first decided to try glycollic acid—I had seen a mention of its peculiar property in the "B.J."—I set about finding out what proportion it should bear to the amidol and what formula gave the best deposit. My ultimate aim was, of course, to test the preserving power of the acid, but no amount of preservation is of value if accompanied by any degradation of quality in the resultant prints. My conclusions were that for development papers in general a solution containing—

Soda sulphite	5 ozs.
Amidol	200 to 240 grs.
Potass bromide	10 grs.
Glycollic acid	10 grs.
Water	75 to 80 ozs.

gave a deposit of a very fine shade of pure black. With Criterion papers a little extra bromide does no harm, and for Vitegas and Kodura an appreciable increase may be considered necessary, though the blacks on these papers with the above formula as it stands are very good.

Being satisfied that the above formula was good enough from the quality standpoint, I left a quart bottle of the solution standing for a week before putting it to use. When poured out it was in the dish for something like 2½ hours, during which 600 sq. in. of exposed paper passed through it, the last print showing no loss of quality. The next test I made was for quantity of work, and I found that a pint (which was three days old) was capable of developing 700 sq. in. (equivalent to about 32 post-cards), while 30 ozs. from another bottle did 1,060 sq. in. in the course of three hours. In the latter case, when the last print was through, the

developer—somewhat discoloured, but not muddy—was left in the dish for another hour, after which it was found to be still active.

Encouraged by the above results, I am now carrying out a series of methodical experiments to find out the maximum extent of preservative action exerted by glycollic acid, and the possibilities of compounding the two with other salts to obtain certain definite advantages. At the moment of writing I am optimistic, believing it quite practicable to improve the working qualities of amidol while reducing its cost, and also to compound new developers with well-known photographic chemicals.

The amidol used in the aforementioned formula was Johnsons'. This I have always found to be less alkaline—or more acid—than pre-war amidols. With the latter, which I believe are about again, the proportion of glycollic acid would probably be incorrect, as some action might take place between the acid and the alkali. Unfortunately, glycollic acid does not seem to be well known even among chemists. I had great difficulty in obtaining a sample, but I have heard that its manufacture on a large scale is a future possibility, as it has some commercial value. THERMIT.

ALFRED STIEGLITZ.

ALFRED STIEGLITZ was born at Hoboken. The date of his birth is not at the moment ascertainable. His reputation rests upon a long series of daring and often beautiful photogravures, printed in the only really sumptuous, truly *le luxe* periodical that photography has ever boasted—the "B.J. Almanac" not considered—to wit, "Camera Work."

The name of Stieglitz was a mighty one in Britain about twenty years ago; but with the course of time several things happened, amongst others, the war, and the name of Stieglitz became that of a forgotten thing. To all intents and purposes Stieglitz was dead.

But Stieglitz was a bad ghost to lay. He was dead, and is alive again; was lost and is found. His troubled spirit fretted for something, and broke away from the rest of the company of remorseful U.P. departeds. Like a boy who comes down in the night to steal one more tart, Stieglitz rose from the tomb to have one more one man show. His resurrection is a staggering phenomenon, and in its *eclat*, dazzling.

The fact is proclaimed by the silver trumpets and trembling harps of a 4 pp. circular, sumptuous in the old way. In this there is a self-psycho analytical report of all the "urges" and "complexes" of the *genus* Stieglitz. He has put on incorruptibility, and put it on thick:—"I was born in Hoboken. I am an American. Photography is my passion. The search for Truth my obsession." He asks us to note that in his "Statement" the following fast becoming "obsolete" terms do not appear: ART, SCIENCE, BEAUTY, RELIGION, every ISM, ABSTRACTION, FORM, PLASTICITY, OBJECTIVITY, SUBJECTIVITY, OLD MASTERS, MODERN ART, PSYCHOANALYSIS, ÆSTHETICS, PICTORIAL PHOTOGRAPHY, DEMOCRACY, CEZANNE, "291," PROHIBITION. The term TRUTH did creep in, but may be kicked out by anyone.

The rest of the proclamation is a catalogue from which we cull a bunch or two of these last-fruits; "Buildings Moving Northward," "Wall Closing In," "The Way Art Moves." These seem to show that Stieglitz has less use for still-life than ever.

"A WOMAN" (One portrait).
"HANDS" (One portrait).
"FEET" (One portrait).
"HANDS AND BREASTS" (One portrait)
"TORSOS" (One portrait).

What does this collection of human remains portend? Are they the *disjecta membra* of unsatisfactory sitters? The reiteration of the phrase "One Portrait" is perhaps a covert expression of disgust at multi-exposure and cinema work.

Apart from the æsthetic shambles we should much like to see this show, which dates from 1886 to 1921. What a *revue*! Its countless visitors will reel out from its portals dazed by the force of impressions received, and muttering, in a distracted search for a cause to fit effects so sublime, "He was born in Hoboken."

F. C. T

DEATH OF MR. A. H. LISETT.

WE regret to record the news of the death, at Port Elizabeth, of Mr. A. H. Lisett, honorary treasurer of the Royal Photographic Society and an active member of its Council. Mr. Lisett, in company with his daughter, left England in November last on a business trip to South Africa. At present only brief cabled intelligence of his death has been received. In addition to taking a large share in the management of the R.P.S., he had been for many years an active member of the North Middlesex Photographic Society, and was known for his lectures before these and other societies on popular photographic subjects.

FORTHCOMING EXHIBITIONS.

February 19 to March 12.—Scottish Salon, Dundee. Particulars from the Hon. Secretary, James Slater, Rosemount, Camphill Road, Broughty Ferry.

March 14 to 26.—Dennistoun Amateur Photographic Association. Hon. Secretary, Wm. F. Macpherson, 152, Craigpark, Dennistoun.

March 16 to 19.—Hackney Photographic Society. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Professional Photographers' Association, at the Photographic Fair, Horticultural Hall, Westminster, S.W. Hon. Secretary, Marcus Adams, 83, White Knights Road, Earley, Reading.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Latest date for entries, March 17. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, February 14 to 19:—

SHUTTERS.—No. 5,409. Releasing-device for photographic obturating slides. H. Klapprott.

DEVELOPMENT.—No. 5,097. Developing-tanks. W. A. Leggett.

STEREOSCOPY.—No. 5,517. Stereoscopy. Optische Anstalt C.P. Goerz Akt.-Ges.

CINEMATOGRAPHY.—No. 5,422. Outside revolving shutter for cinematograph projection machines. F. Cremer.

CINEMATOGRAPHY.—No. 5,606. Shutters for cinematograph projectors, etc. J. F. H. E. Miller.

CINEMATOGRAPH-PHONOGRAPH.—No. 5,191. Apparatus for synchronising cinematograph films and sound records. F. A. Thomassin.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International

COLOUR CINEMATOGRAPHY.—No. 154,150 (September 3, 1920). The invention consists in a negative cinematograph picture film band taken at the rate of 32 pictures per second, with which the

different colour elements alternate with the elements of an ordinary black and white film, and from which black and white or colour picture positive films can be produced which are susceptible of projection at the ordinary speed employed (16 pictures per second) for exhibition of black and white pictures. Zoechrome, Ltd., and Thomas Percy Middleton, 146, Bishopsgate, London, E.C.2. [Particulars of the process will be found on another page in the "Colour Photography" Supplement.—Eds. "B.J."]

DYE IMPRESSION PRINTS.—No. 158,021 (September 30, 1919). The invention has for object an improved means for obtaining prints direct from photographic negatives by surface contact and independent of the aid of light, thus permitting of utilising a base which is not transparent, for the manufacture of photographic plates and films and of a printing base, which is in no way sensitive to light and may be dried with great rapidity, thus also obviating the expense of glass or celluloid and of sensitised photographic or other specially prepared printing paper for these purposes. It is believed that the only other attempt at this object was carried out under Patent No. 13,874, of 1907 (of F. W. Donisthorpe, "B.J.," January 10, 1908, p. 29), wherein is mentioned the properties of certain chemicals (vanadium chloride in particular) for rendering the silver image of a photographic plate or film impermeable to certain dyes. However, the defect of this invention was that the dye would frequently refuse to penetrate the negative, or would penetrate very unevenly in patches and streaks.

As in Patent No. 13,874, of 1907, the developed photographic plate or film (the negative) is first immersed in a "preparing bath" possessing the above-mentioned properties, and then in a dye bath; the dye absorbed by the negative, being then transferred by contact to a suitable printing medium. The improvement is primarily based upon the discovery that the proportionate penetration of the dye into the negative may be perfectly controlled by the proportion of acid, for example, oxalic acid, in a preparing bath containing, for example, potassium ferri-cyanide or like reducing agent, and a vanadium salt, and upon the discovery that the degree of impermeability to dyes imparted by this preparing bath to the silver image of a negative is far greater than the degree of impermeability produced by the action of light on the bichromated gelatine, used in the Pinatype process. The outcome of such discoveries is that not only can far more rapidly penetrating dyes now be used, but also extremely cheap printing papers, which can be dried with great rapidity by heat.

The process of hardening bichromated gelatine by means of light has not only been employed in the Pinatype process, but also to render an entire coating of gelatine insoluble in hot water for use, for instance, with (other dye) transfer processes, or so hard as to be unaffected even by the higher temperature of a direct flame. It is obvious, however, that a coating of gelatine so hardened cannot be employed on a printing paper for the Pinatype process, since the dyes utilised and known as Pinatype dyes are such as to produce a correct dye image by refusing to penetrate the light-hardened bichromated gelatine of the negative, and therefore refuse to penetrate the surface of a similarly hardened gelatine-coated paper.

The degree of impermeability to dyes obtained in a negative by the aforementioned preparing bath being, as stated above, far greater than that obtainable by light with bichromated gelatine, the slowly penetrating Pinatype dyes may be replaced by dyes, e.g., patent blue, which rapidly penetrate and even possess an affinity not only for soft gelatine, but also for gelatine so hardened as to be insoluble even in hot water at temperatures above 160 deg. F., such dyes refusing, nevertheless, to penetrate the silver image of a prepared negative.

It will now be understood that since the rapid dyes may be utilised under the present invention, the corresponding printing paper may be coated with gelatine hardened by any known process such as the bichromate and exposure to light, or by means of alum, formaline, and the like, the degree of hardening being such that prints obtained on such papers may be dried with great rapidity by heat. The advantage of such rapid drying is not only the increased speed of the process, but also the elimination of all loss of sharpness of the dye image due to the spreading of the dye while the print remains damp.

It will be understood furthermore that since the printing paper utilised under the invention may advantageously possess a surface of hardened gelatine, other more easily obtainable and considerably cheaper papers may also be employed for the purpose; for example, the papers known as baryta-coated papers, art paper, and the like.

If a negative is immersed first in a preparing bath (of the type given in Specification No. 13,874, of 1907) and including a relatively small proportion of acid, such as oxalic acid, and then in a dye bath for the necessary periods, it will be found that the dye will either refuse to penetrate the negative or will penetrate only in patches and streaks. If the proportion of acid is increased, the dye will penetrate more readily and with greater uniformity; moreover, when sufficient acid has been added, the penetration of the dye will be quite uniform and regular, also inversely proportionate to the quantities of silver in the various parts of the negative's surface. If the proportion of acid in the preparing bath be still further increased, the dye will begin to penetrate the silver in the negative until finally the darkest parts are penetrated.

It will now be clearly understood that by means of a preparing bath, the constituents of which have been correctly adjusted in respect to the proportion of acid, the dye can be regulated to penetrate the negative as required, namely, in such a manner that the dye image transferred to the wet printing medium will be the exact inverse of the silver image on the unprepared negative.

The following is the preferred formula for the above-mentioned preparing bath. It should, however, be understood that this formula is only given by way of example, and does not limit the scope of the invention. It is preferred to employ a preparing bath consisting of two stock solutions A and B which are mixed when required for use. Equal parts of A and B solutions are mixed when preparing a negative of average density, the B solution being either diluted alone or the mixture diluted as a whole when preparing a negative having a dense silver deposit.

The preferred formula for the A solution consists of a 10 per cent. solution (by weight) of vanadium oxalate crystals, including a great excess of oxalic acid, and having the following approximate composition:—

Vanadium oxalate	6.5 per cent.
Oxalate acid in excess	73.5 per cent.
Water	20 per cent.

For the B solution a 2.5 per cent. solution by weight of ferricyanide of potassium crystals is usually employed.

The possibility of utilising extremely cheap commercial papers, together with the rapidity with which successive prints may be obtained from the same negative and dried, renders the process extremely advantageous for the purpose of commercial reproduction of photographs, plans, or drawings, when the dimensions of the required prints are relatively great. Many such papers, e.g., the baryta-coated and art papers, do not, however, possess, when dry, surfaces which are transparent, as in the gelatine-coated papers. Such being the case, the efficient use of such commercial papers has only been rendered possible owing to the further discovery that the consequent veiled appearance of a dye image on such papers, most detrimental when depth of colour and half-tones are required, could be obviated by rubbing or coating the surface of the dry print with a clear transparent oil, varnish, or other preparation capable of rendering transparent the surface of the print. Prints when so prepared possess the advantage that they are partially waterproof.—Frank Wordsworth Donisthorpe, 87, Lauderdale Mansions, Maida Vale, W., and Dye Impression Photos Ltd., 24, St. Mary Abbott's Terrace, Kensington, W.14.

The following complete specifications are open to public inspection before acceptance:—

APPARATUS.—No. 158,557. Automatic photographic apparatus. D. Zema.

CINEMATOGRAPH.—No. 158,824. Pocket cinematograph. R. Goldschmied, A. Schey, and L. Zupnik.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

VIDOL.—No. 411,452. Chemicals used for photographic purposes. Johnson & Sons, Manufcaturing Chemists, Ltd., 23, Cross Street, Finsbury, London, E.C.2, manufacturing chemists.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, MARCH 6.

South London Photographic Society. Outing to Merstham.

MONDAY, MARCH 7.

Bradford Phot. Soc. "Amateur Photographer" Prize Slides.
Catford, Forest Hill and Sydenham Phot. Soc. "Fair Lusitania." Rev. H. O. Fenton. Also Print and Lantern Slide Competition.
Cleveland Camera Club. "Use of a Camera."
South London Photographic Society. "Paget Colour Photography." Paget Prize Plate Co.
Willesden Phot. Soc. "Vest-Pocket Camera Work." G. C. Weston.

TUESDAY, MARCH 8.

Royal Photographic Society. Annual General Meeting.
Birmingham Photographic Society. "Some Slides of the Lesser-known North Wales Coast." Bernard Moore.
Bournemouth C.C. Lantern Slide Competition. "Monochrome."
Dennistoun Amateur Photographic Association. Whist Drive.
Doncaster Camera Club. "In a Quiet English Vale." W. Hargreaves Cooper.
Exeter Camera Club. Members' Lantern Slide Evening.
Hackney Photographic Society. "Simple Artificial Light Portraiture." H. W. Fitch.
Leeds Phot. Soc. "Platinotype Printing." J. H. Gough.
Leith Amateur Phot. Assoc. "Bromoil." G. Raeper.
Manchester Amateur Photographic Society. "Amateur Photography." 1920 Prize Slides.
Sheffield Phot. Soc. "Autochrome Process." J. H. Taylor.
Stalyhridge Photographic Society. "The Romance of Aerial Photography." Thornton, Pickard & Co., Ltd.
Welfare Camera Club, Linthouse. "Clyde Steamers of Four Decades." Andrew M'Queen.

WEDNESDAY, MARCH 9.

Accrington Camera Club. "Photography and its Relation to Education." E. R. Reeve.
Croydon Camera Club. Annual Rummage Sale.
Dennistoun Amateur Photographic Association. "Photographic Lapses." Miss K. M. Alexander.
Ilford Phot. Soc. "Gum Bichromate." C. G. Kennedy.
Partick C.C. "A Talk on Pictorial Photography." W. S. Crocket.
Photo-micrographic Society. "British Hydracarina (Water Mites)." C. D. Soar.
Rochdale Phot. Soc. "Amateur Photographer" Prize Slides.
Woodford Photographic Society. "A Naturalist's Holiday in Southern France." H. Main, B.Sc.

THURSDAY, MARCH 10.

Brighouse Photographic Society. Lecturettes by Members.
Camera Club, The. Club Dinner.
Everton and Dist. Phot. Soc. "Faking Negatives." J. R. Hall.
Hammersmith (Hampshire House) Photographic Society. "Vest-Pocket Camera Work." G. C. Weston.
Hull Phot. Soc. "The Coolin Hills of Skye." A. Charlesworth.
North Middlesex Photographic Society. "Hints on Camera Making." J. F. Nesbitt.

FRIDAY, MARCH 11.

Bedford Camera Club. "Lenses." P. S. Dudswell.
Birmingham Photographic Art Club. Slide Night.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held March 1, the President, Dr. G. H. Rodman, in the chair.

The President announced with sorrow the death of the hon. treasurer of the Society, Mr. A. H. Lisett.

Mr. Dudley Johnston delivered a lecture, "A Plain Traveller's Tale: Rome and Naples," illustrated by a series of magnificent lantern slides. He dwelt first on the sights of Rome, and particularly on the monuments to the engineering genius of the ancient Romans in the shape of the private palaces of the emperors, brickwork which had withstood the ravages of time and barbarian invaders for 2,000 years. After a glimpse of Tivoli and its famous gardens, he passed to Naples, illustrating his discourse with slides in keeping with the sunshine and hustle of Neapolitan life.

A most hearty vote of thanks was accorded to Mr. Johnston by a large audience.

CROYDON CAMERA CLUB.

Mr. S. H. Wratten, representing himself, bravely demonstrated "Transferotype Paper," representing one of the many products of Messrs. Kodak, and not the least interesting. His courage lay in the fact that, despite long notice, he had, as is usual, postponed acquaintance with this transfer bromide paper until almost the last moment, and then circumstances stepped in which prevented any experimenting. Nevertheless, he said, based on seeing one print developed, and that a dud, he proposed attempting to demonstrate the process before his fellow members, supported by the thought that however things went, "dog never eat dog." If a proper demonstration had been wanted a proper demonstrator would have heen sent.

With disaster apparently unavoidable, a most enjoyable evening seemed assured, and his many friends were obviously bucked in gleeful anticipation. Then came a thoroughly disappointing time, for down on paper, glass, opal, and other materials were the transferotypes squeegeed and stripped without suspicion of a failure. To add to the general sense of injury Mr. Wratten, in haphazard way exposed a piece of the paper hehind a negative to the general illumination of the room and secured a perfect print. It is a pertinent and kindly action to point out to him that the law has ever been careful not to define the word "fraud," which should give rise to reflection, though raising false hopes, may not hring oneself within its scope.

The process being well known need not be discussed, especially as Messrs. Kodak issue a capital booklet covering the ground. It is, however, rather astonishing that it is not more used by amateurs, for unique and very beautiful effects are possible, and the manipulation is simple. Perhaps the pictures transferred to vellum paper were most admired. The lecturer said he had been informed at Harrow that transferotypes made first-class lantern slides. Opinion among the members differed on their use for lantern slides and small transparencies for enlarged negatives, but many thought they seemed admirably adapted for enlarged negatives of the "pictorial" order. This view was supported by some transparencies on glass, which approached carbon in gradation.

In the discussion it was elucidated that for lantern-slides the paper should be fresh, otherwise slight granularity might result. The temperatures given in the instructions should not be exceeded, owing to the Germans not eating so much veal as formerly. Consequently, present-day gelatine falls below pre-war standard, accentuated by the supply being unable to meet the demand. Glass, too, is far below being what it was, and may easily fracture at the focus of a concentrated stare. Mr. Purkis pointed out in reference to sizing, that a half per cent. solution of gelatine remains liquid at ordinary temperatures, and keeps good for a long time with a little thymol added. Mr. Hibbert agreed, one drop of a ten per cent. solution of thymol in alcohol to every ounce preserved excellently (this information is of use for substratums on glass, etc., but the solution is far too weak for sizing most papers used for transferotype supports). Continuing, he said transferotypes are now exclusively used at the Polytechnic as a basis for colouring on ivory. Here, many will think carbon might gracefully be allowed to maintain premier position. Mr. Reynolds inquired whether transfers could be effected on bald heads, an inevitable question with humorists present. He is to be congratulated on getting in first. Among the visitors was Mr. Slater (time and temperature), who confirmed all the demonstrator had said. Mr. Luboshez was expected, but failed to appear. It was conjectured he had been carried on to Brighton lost in thinking out some new variation of dead-front lighting. A most hearty vote of thanks was accorded Mr Wratten for a highly successful evening.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given of the dissolution, by mutual consent, of the partnership between Harold Edward Marshall and Cecil Hubert Higson, carrying on business as photographic trade printers, at 251a, Mansfield Road, Nottingham, under the style of Marshall and Company. All debts due to and owing by the late firm will be received and paid by Harold Edward Marshall, who will continue the business.

Notice of intended dividend is given in the case of Daniel Prodger, photographer, Fernbank, Eynsford, Kent, lately residing and carrying on business as C. F. Treble, at 373, Brixton Road, London, S.W. Proofs must be lodged on or before March 12 with J. Osborne Morris, Official Receiver, 280a, High Street, Rochester.

NEW COMPANIES.

L. C. HALL, LTD.—This private company was registered on February 18 with a capital of £1,000 in £1 shares. Objects: To carry on the business of opticians, photographers, manufacturers, importers and exporters of and dealers in photographic materials, etc. The permanent directors are: C. W. W. Hipperson, 103, St. Giles Street, Norwich, chemist and druggist; L. C. Hall, 28, Sandringham Road, Norwich, chemist and druggist. Registered office: 37, Prince of Wales Road, Norwich.

PALATINE ENGRAVING CO., LTD.—This private company was registered on February 23, with a capital of £3,000 in £1 shares. Objects: To carry on the business of process engravers, artists and photographers, printers, stationers, lithographers, etc. The subscribers (each with one share) are: J. Forbes, 88, Adelaide Road, Brockley, S.E., newspaper manager; E. W. Edwards, 120, Brockley Rise, Honor Oak Park, S.E., printers' representative. The first directors are not named. Secretary: G. H. Orford. Registered office: 11, Crosshall Street, Liverpool.

LEES INVENTIONS, LTD.—This private company was registered on February 17 with a capital of £2,000 in £1 shares. Objects: To acquire and turn to account any patents, inventions, devices, novelties, secret or other processes, systems or recipes; to manufacture and deal in iron or other metal, or wood, leather, textile, or other general work, engineers, etc. The subscribers (each with one share) are: A. Bennett, 60, Doughty Street, W.C., photographer; A. E. Walsham, 60, Doughty Street, W.C., photographer. The first directors are: S. Lingwood, F. A. Ellis, A. E. Ellis, S. E. O. Eades, A. E. Walsham, and A. Bennett.

WHETTON, SPARROW & CO., LTD.—This private company was registered on February 23, with a capital of £1,000 in £1 shares. Objects: To take over the business of photographic, scientific and general engineers carried on at Chisold Works, 151, Albion Road, Stoke Newington, as Whetton, Sparrow & Co. The first directors are:—E. P. Whetton (managing director), 67, Albion Road, Stoke Newington, N.; E. Whetton, 151, Albion Road, Stoke Newington, N.; S. C. Whetton, 13, Harcombe Road, Stoke Newington, N.; W. S. Sparrow, 10, Aden Terrace, Stoke Newington, N. Secretary: E. Ashby, 74, Burma Road, N.16.

PRESERVING PICTURESQUE VIEWS.—A correspondent interested in the view-publishing trade states that a movement is afoot to acquire an old and picturesque English village for the purpose of preserving it unchanged throughout the years. It is suggested that some rich landowner should give such a village to the National Trust for Places of Historic Interest or Natural Beauty, which body has promised to keep it in its original condition. The movement has been started because of the many old and picturesque villages which are now being spoiled by ugly modern buildings, and the destruction of ancient houses of real interest. Among the most suitable old and picturesque villages which have been suggested, and which the National Trust has its eyes upon, are Chalford and Painswick in the Cotswolds, Axmouth in Devonshire, Porlock in Somerset, Shere in Surrey, Aldbourne on the Wiltshire Downs, and Chiddingstone in Kent, the latter appearing to be the favourite, though architects appear to have a special liking for one of the stone built villages in the Cotswolds.

News and Notes.

NEOL INDUSTRIAL COLLODIONS, LTD., is the new title of the business formerly known as the New Explosives Co., Ltd., of 62, London Wall, London, E.C.2, concerned in the manufacture of Neoloidine, a British made celloidin, and collodion of various descriptions for photographic purposes.

WISDEN'S CRICKETERS' ALMANAC.—The yellow cover of "Wisden" has been familiar to cricketers for almost as long as that of the "B.J. Almanac" to photographers, for the 1921 issue which Messrs. Wisden kindly send us is the 58th. It runs to 524 pages, and is evidently a most complete record of cricketing events and personalities. Its price is 5s.

THE AERIAL PHOTO CO. has changed its address, which is now 24, Long Causeway, Peterborough. In advising us of this fact, the company sends us its latest price list for postcard printing, together with some examples of its work in black and sepia postcards, both matt and glossy, all of excellent quality. The firm has recently installed one of the latest patterns of Graber printing machine and is able to give prompt delivery of work.

DEATH OF MR. FAYETTE J. CLUTE.—We are sorry to receive the news of the death on January 28 last, at the age of 56, of Mr. Fayette J. Clute, proprietor and editor of our Californian contemporary, "Camera Craft." For many years past Mr. Clute had made his magazine a distinctive photographic organ, appealing to all classes of photographers. It is intimated that "Camera Craft" will be continued unaltered under the proprietorship of Mr. Clute's two sons.

CITY SALE BARGAINS.—The City Sale and Exchange, 90-94, Fleet Street, E.C.4, send us a catalogue of nearly 140 pages listing an immense variety of apparatus both new and second-hand. In the latter class are included roll film, plate, field and studio cameras in a great range of sizes and prices. A special feature is made of apparatus for stereoscopic photography in special reference to the Verascope and Homeos cameras of MM. Richard for which the City Sale are agents in this country. Another French camera which they offer is the Krauss "Tropex" in quarter-plate size, and they also are making a special offer in quarter-plate reflex cameras. The list will be sent free on application.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

** *We do not undertake responsibility for the opinions expressed by our correspondents.*

COLOUR SENSITISING BY MINERAL SALTS

To the Editors.

Gentlemen,—With regard to the extremely interesting papers of Messrs. Capstaff and Bullock and Mr. Renwick, and the letter of the latter, in which he suggests the presence of colloidal silver as the possible cause of the colour-sensitising, or rather the change in size of the particles, it appears to me that a paper by Carey Lea, "Action des rayons lumineux les moins refrangibles sur l'iodure et le bromure d'argent" ("Bull. Soc. Franc. Phot., 1875," XXI., 236), has considerable bearing on the subject, at least in the case of the iodide.

It is quite possible that the above paper appeared in the "B.J." about the above date September, 1875 but I cannot readily refer to the same at the moment of writing. For I gather that he was in the habit of sending original papers to both the "Bulletin" and the "B.J." simultaneously, as the same communications have appeared in both journals as original communications, and both papers were then, as they are now careful to credit contributions culled from other sources.

Lea's paper is somewhat too lengthy to include as a whole, but possibly the following brief abstract may be interesting. He starts

out with the purpose of proving that silver iodide and bromide are sensitive to all spectra rays; that the iodide is more sensitive to the less refrangible rays than the bromide; that E. Becquerel's hypothesis of "rayons excitateurs et continuateurs" is nullified by a careful examination of the phenomena. Lea abandoned the use of the spectroscope and adopted coloured glasses, as being easier to use in practice, and also because one can make quite sure that none but the less refrangible rays are passed by the glasses, and, further, that the glasses could be obtained of any desired dimensions so that simultaneous exposure of the papers to be tested could be made.

Lea floated paper on weak solution of potassium bromide and iodide, in molecular proportions, so that each would consume the same quantity of the silver nitrate bath, which was 30 grains to the ounce; a fresh bath being used each time to avoid contamination of the iodide with the bromide and vice-versa, which might happen, as both silver halides are soluble in silver nitrate. That the alkaline halide used was free from bromides was analytically determined. After salting, the papers were dried between blotting papers, so as to prevent unequal distribution of the salts, as would happen were they hung up to dry. Sensitising was effected by floating on the silver solution followed by washing in running water and drying.

Commercial red glass was used, and in order to set some criterion of exposure a negative was placed in contact with the papers. Two kinds of red glass were used, a dark and a medium, and the limit of absorption of these combined was wave length 594. When two dark glasses were used the limit was 600; with three dark ones the limit was 605, and the maximum of transmission was beyond this. With two glasses, limit 594, an intense direct image was obtained on the iodised paper in five minutes. On the bromide paper, exposed simultaneously, nothing was obtained, and long development gave but a feeble trace of an image. Under the two glasses with limit 600, it was impossible to obtain an image by development on the bromide paper, even with 1½ hours' exposure to sunlight at midday in January. On the other hand, the iodised paper gave in twenty minutes a trace of a feeble direct image, that is one visible without development. Under three glasses, limit 605, the iodised paper gave in thirty minutes, sunlight exposure, a feeble image, but with four hours a vigorous one, both these tests were developed. Bromide paper exposed side by side with the above gave nothing, and with four hours' exposure and development prolonged for some hours, only the faintest trace of an image was discernible.

Lea repeated these experiments under yellow glass, that is under a brown and a green, the limits of absorption of which were 638 and 527, and with a maximum of transmission at 570, and came to the conclusion that both the bromide and iodide of silver were sensitive to these rays, but the latter more so than the former. Using green glasses with an effective region of 517 to 569, the iodised paper gave more vigorous images in five minutes than the bromide in 3½ hours. Further experiments were carried out with admixture of the two halides, but it is unnecessary to enter more fully into Lea's conclusions, as access to the original papers is obtainable in the libraries of the R.P.S. and the Patent Office The developer used was the well-known physical one of gallic acid, silver nitrate, and acetic acid.

It would seem reasonable to suppose that if the above results are sound, the increased red-sensitiveness of the iodide-treated emulsion is easily explicable on the assumption of a mere external skin of AgI, and there is no necessity to assume the existence of colloidal silver, because Carey Lea's sensitive salts were not ripened, at any rate, in the present-day acceptation of the word, and were formed without a vehicle like gelatine. But this would not explain the action of the sulphurous acid or potassium cyanide. Mr. Renwick, in his letter ("B.J.," 1920, p. 743), states that iodide, cyanide and sulphite of silver are not known to exist having a strong absorption in the yellow, orange and red of the spectrum. But have the two latter salts ever been prepared in the form of an emulsion and spectroscopically examined? Both are sensitive to light, and it should not be a very difficult matter to prepare emulsions of the same, considering their comparative insolubility in water, and thus test them out either in the spectrograph, or, following the above method, under coloured filters; the latter method being preferable from a time-saving point of view. And if a neutral wedge was also used some comparative idea of the relative sensitiveness could be obtained.

Both the silver halides are soluble in sulphites and cyanides, so that one is tempted to ask whether one might not have partial solution with the formation of a double salt, which might be sufficient explanation of the conferred red-sensitiveness without the hypothesis of the formation of colloidal silver, presuming that these two salts were found to be colour sensitive.—Yours truly,

E. J. WALL.

Cambridge, Mass., U.S
February 12

[The paper to which Mr. Wall refers appeared in the "B.J." of May 28, 1875, pp. 256-258.—EDS. "B.J."]

FIRING FLASH POWDER.

To the Editors.

Gentlemen,—Referring to your report in to-day's issue of Mr. D. Charles' paper on "Improvements in Flashlight" at the Royal Photographic Society, your reporter is not quite correct in the remarks attributed to me. I mentioned that the only "absolutely certain" method of firing flash powder, as far as my experience was concerned, was a braided cigar light held in a small spiral at the end of a copper wire, and pushed into the powder, and that a ceric iron igniter, provided the disc was kept clean, was almost equally satisfactory.

Perhaps you will kindly insert this correction and oblige.—Yours faithfully,

ARTHUR G. BANFIELD.

49, Old Bond Street, W.1.
February 25.

THE PROFESSIONAL'S DEVELOPER: CONCENTRATED M.Q.

To the Editors.

Gentlemen,—In my article on the above subject, in your issue for February 25, there is an unfortunate mistake. This is probably an error of my own in correcting the proofs, and I can only plead in extenuation that I was in bed with influenza at the time. As stated under the heading, "The Amount of Sulphite," the latter should be about six times the reducing agent, and the formula needs revision accordingly. It should read :—

Metol	¼ lb.
Hydroquinone	½ lb.
Soda sulphite	4 lbs.
Caustic soda	1 lb.
Water to	2 gallons.

Dilute one part with 10 to 15 water.

In the article the sulphite was given as 2 lbs.—Yours faithfully,

P. M. JONES.

Brockham Green, Surrey,
March 1

To the Editors.

Gentlemen,—May I be allowed to offer a criticism on the composition of the developer advocated by Mr. P. M. Jones in your latest issue? The formula that he advises contains :—

Metol	4 ozs.
Quinol	8 ozs.
Sol. sulphite	32 ozs.
Canstic soda	16 ozs.
Water to	320 ozs.

The chemical formula for metol is $C_6H_4NHCH_3$, OH, $\frac{1}{2}H_2SO_4$, which gives a molecular weight of 172. In order to form the free base this weight requires 40 of caustic soda; to form the sodium salt, C_6H_4, $NHCH_3$, ONa requires 80 parts of caustic, so that 4 ozs. of metol require 1.86 of caustic. Hydroquinone, $C_6H_4(OH)_2$, molecular weight 110, also reacts with two molecules, or 80 parts of caustic soda, to form the phenolate $C_6H_4(ONa)_2$, so that 8 ozs. of hydroquinone will combine with 5.8 of caustic soda. From my work on "rodinals" I have found that the least excess of caustic over the quantities indicated above lends to rapid deterioration of the developing strength. But Mr. Jones advises 16 ozs. of caustic, where the maximum admissible is 1.86 + 5.8 or 7.66 ozs.;

and in my experience, a somewhat smaller proportion, say 7 ozs. to 7½ ozs., would be ample. The proportion of sulphite recommended by your contributor is 32 ozs. in 320 ozs. of water. If this is anhydrous, it is as much as will dissolve; but if the crystalline sulphite, 64 ozs. should be used to get the maximum stabilising effect.—Yours faithfully,

W. F. A. ERMEN.

Alderley Edge,
February 28.

To the Editors.

Gentlemen,—*Re* article "The Professional's Developer," I beg to point out that there is an inconsistency between Mr. Jones's article and his formula. He states that the sulphite should be six times the amount of the reducing agent. As the reducing agents are ½ lb., then the sulphite should amount to 4½ lbs. instead of 2 lbs. as in the formula. Mr. Watkins gives the proportion of soda carbonate as 2½ to 2 of sulphite, and if as Mr. Jones states 1-12 of the weight of caustic soda be as effective as the carbonate, then the amount of caustic should be 3¾ ozs. instead of 1 lb., or if 4½ lbs. sulphite is right then 6 ozs. caustic.

The idea of a concentrated developer is a good one, and I was feeling inclined to mix according to formula, but cannot help thinking that there is a mistake in it. Perhaps Mr. Jones would be good enough to go into the matter.—Yours faithfully,

K. A. NORTON.

Whitchurch Road,
Cardiff.

KEY INDUSTRIES AND THE P.P.A.

To the Editors.

Gentlemen,—At the last Council meeting of the P.P.A. the secretary is reported to have called attention to the "interesting correspondence" in the "B.J." on key industries, and it is stated that it was agreed to postpone discussing the subject. One would imagine that the importance to photographers of being able to obtain a full supply of the raw material of their industry at reasonable prices would be so self-evident that the Council of the organisation that professes to exist for the purpose of protecting their interests would have had the matter constantly before them, and, instead of treating it as something to be talked about at some future occasion, would have already taken whatever steps are possible to deal with the circumstances we have to face.

Combinations among manufacturers are always heralded with the proposition that by large-scale production production is made cheaper. So it may be, but experience shows that the benefits thereof rarely reach the consumer. Take soap or sewing cotton or tobacco for instance, each an industry that has now reached, under combination, the position of almost entirely eliminating competition, with the result that we are paying for our everyday requirements a price that is quite unjustifiable by the cost of material, labour and organisation.

In our own circle we have "the unanimity," as some one has called it, which has been organised for the sole purpose of stifling that healthy competition that makes for economy and efficiency in production. Under the circumstances of war, that prices of both raw and manufactured material should become advanced, even inflated, was inevitable; but we ought to be returning by now to more healthy conditions. Since the last advance in the price of plates, glass has fallen very considerably, silver is less than half the price, all the chemicals are greatly reduced, but we are getting no reduction. The prices of plates are now higher than the highest charged in 1850, when the conditions of manufacture were primitive compared with those existing at present.

Under the captivating cry of protection for British industries strong effort is being made to promote legislation to exclude foreign material from our markets. If it should succeed there will be an immediate rise in prices of that home produced. A certain British-made developer was quoted 80s. a pound some little time ago, when it was thought that, under a certain Order in Council, the German product was unimportable. Then came a rumour that this was not so. The price dropped to 60s. The rumour became a certainty, and there was a further big drop. This illustrates the effects of protection. Photographers are not less patriotic than any other class of the community, and as sincere in their desires to protect the industries of their country; but they are quite clever enough to realise that protection of one class at the expense of another is not a beneficial kind of protection. Unfortunately, we are not an influential class, and have little power to make known our opinions or to protect ourselves against imposition. It is the more disappointing, therefore, to find that the P.P.A., which we should be able to look to to safeguard our rights, takes so languid an interest in this matter, which affects us much more materially than those the Council appear to be so engrossed in. The annual picnic is very well in its way. It is a pleasant outing for those who can attend it, and it is not without its uses. Perhaps the "Circular" also may have its uses, notwithstanding it is, probably, the most feeble and the most costly attempt at journalism that is published in this country. The 8d. or so per number which it appears to cost might surely be applied to better purpose, but I suppose we ought not to complain, as we get it for about its true value.—Yours truly,

M. P. P. A.

PANCHROMATIC PLATES.

To the Editors.

Gentlemen,—I have read the most interesting article on panchromatic plates, and think that possibly short notes on the results of an amateur, who has used them since their introduction, may be useful. About May of last year I started to take up photography after a lapse due to the war, and have exposed a goodly number of plates, mostly on subjects which are intended to be pictorial. Roughly—I have no records—I should say that my percentage of plates and films would be films 30 per cent., ortho. plates, including the screened variety, 35 per cent., panchromatics 35 per cent., non-corrected nil. A short time ago I was preparing a set of my best prints, say three dozen. When I had done these I found that well over 60 per cent. were on panchromatic plates, nearly all being taken with a screen increasing the exposure three to four times, one or two being with a deeper screen to give full correction.

There are two disadvantages with these plates:—

(1) An under-exposed negative on a panchromatic plate is more hopeless than on any other—the shadows frequently being clear glass.

(2) Owing to the difficulties in manufacture, or probably inspection, small blemishes in the plates are more common than with other types, and this necessitates careful spotting if the negatives are small ones which require enlarging.

I prefer Ilford formula pyro-soda for developing, and this will normally give the kind of negative I want in 5 minutes at 60 deg. Fah., when diluted with 25 per cent. water.

Using a Radiolite watch, as suggested, it is preferable to alter the dilution to suit the temperature, and keep to a standard development time of 5 minutes, which can easily be read on the watch. Smaller intervals being difficult to gauge, as the luminous markings are not usually made to minutes.—Yours faithfully,

S. H. HALL.

Elliot Vale, Blackheath, S.E.3.

FACTORIAL DEVELOPMENT.

To the Editors.

Gentlemen,—Like another of your correspondents I have often wondered why the factorial system is not more popular than it is to-day. Your correspondence pages, however, have opened my eyes, and I think I can now understand why so many decline to use the system. In short, the personal factor appears to enter too largely into the working of it, different results being obtained by different workers, even though they use the very same make of plates and developers.

The factor numbers are the trouble. The makers of such numbers are too dogmatic and precise. Had the plan of saying, "Factor

from — to — " been adopted (*vide* Mr. Jones's instructions given on page 108, " Watkin's factor, 12 to 15 "), instead of that of giving a definite number, the system would have been more useful.

All reference books, for instance, give Azol as 30, as also do the makers, though for many years I have advocated and used a factor of 35. And now Mr. Willis comes along and says (page 119) Azol 25! The lowest I have ever heard of for Azol. We thus get three different numbers for " normal development " with Azol, and may, of course, have many more, according to our ideas of normal density. Some may argue that the possibility of using different factors and getting any kind of negative desired by using the factorial system, is a strong point in its favour. This, indeed, may be so, but it is not the point of my argument.

Had I known nothing of the system and taken Azol as having a factor of 25, as given by your correspondent—who, it is clear, is a good practical worker—the result obtained would not have been to my liking (I prefer 35), and rather than be bothered I might have turned down the system as being unsuitable, and for ever afterwards used either dish or tank. And Mr. Willis might have done the same had he taken at the start my factor of 35. He and I, however, happen to be of an experimental turn of mind, and we found our own factors. But all workers will not make such experiments, hence some dissatisfaction at times with the set factorial numbers, or the system as a whole.

A present-day objection—and a growing one—to the factorial system, is the necessity of having to expose a rapid film to a red light in order to ascertain the correct " time of appearance." This has to be done at a time when the film should really be carefully shielded from the light. In the case of ordinary plates this exposure to a red light may do no harm, but with the ultra-rapid plates we have to-day the " time of appearance " period is more likely to be looked upon as being the " time of fogging."—Yours faithfully,

H. GREEN.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's " Journal " must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

J. B.—The firm which produces the Mackenzie Wishart goods is Mackenzie and Co., 212, Old Dumbarton Road, Glasgow.

J. E.—Both Messrs. Houghtons and Messrs. Kodak supply materials for a system of card indexing dealing with the recording and execution of orders in a studio establishment.

H. C.—8s. 6d. is a reasonable enough price for the post-cards, but we must say we are not surprised that your customer should be dissatisfied with the out-of-focus effect. We agree with him; the difference in definition between the two eyes is a marked defect.

S. D.—As regards patents, if you know the name of the patentee, it is a fairly rapid business to find a patent in the annual indexes of the Patent Office Library; but, of course, the Patent Office does not attempt to connect the trade names under which goods are sold with the names of the patentee. That would be an enormous job.

B. J.—A copper dish lasts fairly well for use with a developer which does not contain ammonia in any form, but not as well as a steel dish, nor, of course, as one of enamelled metal or " granitine." But if the dish is thoroughly rinsed after use, and not left with alkaline developer adhering to it, it will last for a very long time.

S. S.—The collected researches of Hurter and Driffield are published here by the Royal Photographic Society, 35, Russell Square, London, W.C.1. Messrs. Tennant and Ward, 103, Park Avenue, New York, are the sole selling agents in the United States. Any application from the United States to the Royal Photographic Society would be referred to Messrs. Tennant.

A. P.—We should doubt, from what you tell us, if there is likely to be any great advantage in fitting up a gas installation as supplementary to daylight. But, at any rate, the choice among studio gas lamps is very small. There is a lamp supplied by the Kodak Company as the " Powerful," and Messrs. Griffins still supply very excellent inverted burners (Howellite) specially for making up into studio installations, but they do not supply the latter complete.

P. J.—You are correct in assuming that the main effect of " rust " on a lens is to slow it. In a bad case, with ordinary plates, this might be to the extent of 50 per cent. The only precaution necessary in buying such lenses is to reject any which are perceptibly yellow when looked through; the surface iridescence is of little note. The tin boxes referred to have been offered at many furniture and ironmongers' shops in London, *e.g.*, Black and Co., 50-51, High Holborn.

E. M.—We expect your customer wants the enlargements framed in the passe-partout style, but with celluloid instead of glass. There is no special firm doing this kind of work; any of the trade enlargers could do it. Or your assistants could easily make up the enlargements in this form, using celluloid sheets, such as are obtainable from Greenhill and Sons, 8, Water Lane, Butcher's and other people supply the necessary binding strips and ring hangers for the passe-partouts.

J. S.—Your Meyer lens is of 3¼-inch focal length, and the pre-war price was £2 5s. It is a good average wide-angle lens. (2) " Instruction in Photography," by Abney, is out of print, but you are pretty certain of being able to get a copy from Messrs. Sotheran and Co., 140, Strand, London, W.C.2. (3) About the best book on lenses is " Photographic Lenses," published by Messrs. R. and J. Beck, 68, Cornhill, London, E.C.3. We think it is still obtainable from them. If not, apply to Messrs. Sotheran. (4) As regards your other queries, we find it rather difficult to know exactly what you want. For quarter-plate we think a useful focal length for long-focus work is 12 inches; 18 inches to 24 inches for half-plate size. No useful purpose in having these lenses of greater maximum aperture than *f*/8 or even *f*/11. (5) For a good all-round anastigmat for quarter-plate and half-plate respectively we should suggest a lens such as an *f*/6.8 anastigmat of 5½ and 8 inches respectively.

THE BRITISH

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Contents.

SUMMARY.

A new regular feature of the "British Journal" appears this week in the shape of "Paris Notes," contributed by M. L. P. Clerc. It is intended that an article of this kind by M. Clerc should appear each month, and should give an account of photographic events in France. (P. 134.)

In his first article M. Clerc describes the great increase in its activities which the French Photographic Society has witnessed since the Armistice, and which has its evidence in the holding of eleven meetings monthly. He also refers to a new non-halation plate, and to a lens of *f*/1.5 aperture. (P. 135.)

A dull annual general meeting of the Royal Photographic Society livened up at the end when the views of the dark-room group, presented under the personal direction of Mr. C. P. Crowther, were heard. (P. 143.)

For "soul" in a photograph, use chiffon—is a maxim solemnly reported from a meeting of the R.P.S. Pictorial Group. (P. 144.)

The inventor of an automatic machine for while-you-wait photography has hit upon a happy device for ensuring the expeditious service of an anticipated stream of customers. (P. 134.)

In a leading article we lay emphasis on the practical information for the use of the persulphate reducer contained in the paper by MM. Lumière and Seyewetz, which we published a week ago. It may be said that a satisfactory explanation of the characteristic action of persulphate has yet to be found. (P. 134.)

In a contributed article, Mr. Arthur G. Willis lays stress on the business merits of the carbon, platinotype, and silver print-out processes, and urges the special claims of these media in the making of portraits of distinction. (P. 136.)

A provisional programme of the forthcoming Congress of the Professional Photographers' Association will be found on page 141. The Congress on Thursday, April 21, is to visit the Harrow works of Messrs. Kodak, Ltd. (P. 141.)

Both non-members and members of the P.P.A. are free to send in their work to the forthcoming exhibition of professional photography, which, this year, will have a technical section. (P. 133.)

Mr. C. Goodwin Norton, familiar to many lanternists of the past generation, sends us some practical notes on the doctoring of parts of camera woodwork which stick. (P. 146.)

A scientific paper issued by the U.S. Bureau of Standards describes the theory and practice of using a photographic method for the detection of changes in groups of objects, e.g., in the disclosure of military camouflage. (P. 138.)

Constructional details of an enlarging, printing, and copying camera, and of a telephoto lens, are contained in two recent patent specifications. (P. 142.)

EX CATHEDRA.

The P.P.A. Exhibition.

The prospectus of the exhibition of professional photography to be held by the Professional Photographers' Association in conjunction with the forthcoming Congress has now been issued and is obtainable from Mr. Marcus Adams, 43, Dover Street, Piccadilly, London, W.1. As was the case last year the exhibition is open to any professional photographer, whether a member of the P.P.A. or not. An entrance fee of 5s. is charged, which covers any number of exhibits and includes the cost of packing and postage for their return. Exhibits must not be either framed or glazed, but simply mounted on thin white or light-toned mounts of outside dimensions either 16 x 12 inches or 20 x 16 inches. This year, in response to a feeling which was expressed twelve months ago, a section of the exhibition will be set apart for technical, as distinguished from portrait, professional photography. For the purposes of the exhibition "technical photography" has been defined as covering every branch of photography other than portraiture. It is to be hoped that those both within and outside the Professional Photographers' Association will provide the selecting committee with an entry which will make it possible to bring together a thoroughly good and representative collection of professional photographic work. The last day for the receipt of exhibits and entry form is Thursday, April 7. Both are to be sent, not to Mr. Adams, but to Mr. R. N. Speaight, 157, New Bond Street, London, W.1.

* * *

Desensitisers in Bromide Printing.

The treatment of exposed bromide paper with an aqueous solution of amidol (1:2,000) in order to allow of the development being conducted in a bright yellow light, is an obvious variation of one of the experiments which led Luppo Cramer to the so-called Phenosafranine process. It is a debateable point, however, whether the slight gain in comfort in the dark room resulting from desensitisation with amidol solution is worth the risk, and until further information is available regarding the influence of such treatment on the rate of development, etc., we would caution any of our readers against submitting large prints to this operation. We hope to publish some further notes by Mr. Crowther on such points in the near future, but we can say at once that, provided development after desensitisation be continued to the same factor as would ordinarily have been given, the apparent speed of the bromide emulsion is unaltered. If, on the other hand, a simple time method of development is employed, the results after desensitisation are liable, as a correspondent has indicated, to lead to the assumption that the amidol solution has partially destroyed the latent image. Staining of the paper by aqueous solutions of developing substances is also a factor which needs careful consideration, and the well-known resistance of such stain to washing

out with water, even after an acid fixing bath has been used, are further deterrents to experimentation with large or valuable prints.

* * *

Paris Notes. We have a good deal of pleasure in making the announcement that a further regular feature of the "British Journal" will be a series of notes dealing with photographic matters in France, contributed by M. L. P. Clerc. A leading member of the French Photographic Society, M. Clerc is widely known, not in France only, but in other countries, by his writings on photography and particularly by two very excellent text-books dealing with branches of photo-mechanical work. After a strenuous career during the war, when he rendered valuable service in the technical branch of the Photographic Section of the Aviation Service, M. Clerc has associated himself with several of the leading French photographic journals, and is thus closely in touch with photographic developments in his country. The first instalment of his notes, which will be found on another page of this issue, fairly represents in its range of topics the comprehensive scope which his articles will aim to exhibit. Subject to the necessity of finding space for matter calling for immediate publication, we hope to include these "Paris Notes" in the second issue of the "British Journal" of each month.

* * *

Appropriate Framing. Now that larger sizes than the cabinet are becoming the usual thing in high-class studios it is essential that the portraitist, who wishes his work to be displayed to the best advantage, should endeavour to secure orders for any frames which may be needed. He can thus avoid the perpetration of such outrages as framing a red carbon in a crimson plush or other unsuitable setting. There is now a tendency to sombreness in photography, but it need not be intensified by the unvarying use of black or dark brown woodwork, suitable as these may be in most cases. Light sketchy work will appear to advantage in oxidised silver, with perhaps a silvery grey veneer mount. Coloured work is nearly always safe in a narrow gold moulding with or without "Louis" embellishments. A few sample frames should be kept ready for insertion of the stock sizes of mount, as few customers are competent to judge the effect of a frame from samples of moulding. The prices charged for frames should not greatly exceed those charged by local frame makers, and we recommend that the photographer should arrange with one of these to make those of his frames which are not purchasable ready made. Home framemaking is not profitable on a small scale.

* * *

Next, Please. Every portrait photographer has good reason to regard the prosperity of his business as threatened by a new invention which we see described in a Continental journal. It is an automatic machine of somewhat elaborate construction. You take up a position in front of it for delivery of your portrait in a few seconds. If you want a full length, you set a certain lever; if a head and shoulders, another lever; and if you desire the print to be seented, you make still a third adjustment. Then when you are ready for the exposure to be made, and press a button for that purpose, gramophones within the interior of the machine discourse to you and tell you when the exposure has finished. But a further feature of this invention is one which extorts our respect for the thorough-going genius of its designer. If you do not move quickly away, after having received the portrait through the delivery-slot of the apparatus, hydraulic mechanism comes into operation and squirts a jet of water over you. We are unable to gather whether notice of this stage of the process is communicated to the customer. Possibly it is, by the performing gramophones. At any rate it suggests the healthy optimism of the inventor, who clearly has in his mind's eye a queue of customers. It might be supposed from the effective method chosen for persuading each to make way for the next that the machine owes its existence to some aimable Prussian. Strangely enough it appears to have been inspired under the soft skies of Italy.

THE PERSULPHATE REDUCER.

To the average photographer it may appear somewhat surprising that so much attention has been paid by scientific investigators to the reducing action of solutions of persulphates, for the aforesaid average photographer has learned, frequently by costly personal experience, that this reducer is a most fickle servant only suitable for use by experts. In the hands of those who have obtained control of this reagent, however, it constitutes one of the most valuable chemicals in one's equipment. It is undoubtedly unique in its reducing action when correctly applied, and is capable of converting hopeless results of the "soot and whitewash" variety into negatives eminently suitable for use, even in the enlarging lantern. Hitherto, perhaps, this reducer has appealed more particularly to the amateur photographer, but with the present-day tendency of the professional to devote an increasing proportion of his time to subjects other than portraiture, it will not be inappropriate to offer a few comments on the very interesting communication by MM. Lumière and Seyewetz which appeared in our last issue.

In the first place it is evident that the scientific investigators of our profession are alive to the importance of such a reducing agent as persulphate, and also to the fact that failure to get it to exert its characteristic "depth" reduction is all too prevalent. An investigation into the cause of such failure and the evolution of a safe formula which will be reliable in all districts, with all types of tap water, therefore merit commendation. We certainly thought when we read the communication from the Eastman Research Laboratory on the influence of traces of iron salts that we were arriving at a clearer understanding of the tantalising variations so often met with when using persulphates, but now it appears that the presence of iron salts, *per se*, is not necessarily the cause of these variations. Even the chemically pure persulphate will play tricks on us if the conditions under which we use it are not carefully controlled. For example, the worker in Glasgow or Manchester may get it to work perfectly immediately after dissolving it in tap water, whilst the worker in London may have to wait days after making up the solution before it becomes active enough to cause any reduction. Exactly why this is so can be readily understood from MM. Lumière and Seyewetz's work. They have shown that the reducing action is only exhibited by acid solutions, and that the pure neutral salt when dissolved in distilled water rapidly becomes acid, its activity being correspondingly enhanced. All hard, alkaline waters, therefore, affect the reducing action of persulphate, the action only manifesting itself when the acid developed on storage has overcome the natural alkalinity of the water. Further, it is to be noted that the characteristic depth reduction propensities of persulphate solutions are vitally affected by the concentration of acid present, and also by the presence or absence of certain salts which are, in varying amounts, to be found

in most samples of tap water. It appears, therefore, as though we are only assured of success with this reducer if its solution is made up with distilled or very pure and soft tap water. If we wish to make certain of similarity of action at all times it is advisable to compound the solution (6 grains ammonium persulphate to each ounce of water is, in our experience, quite strong enough for all ordinary purposes) as required, and to add *one drop* of concentrated sulphuric acid to each ounce of solution. We can confidently recommend a solution compounded in this way; used freshly prepared on well-wetted negatives we cannot recall a single failure in our personal practice for several years.

When we come to consider the theory of the process we are not so fortunately situated, and we have little hesitation in saying that a satisfactory explanation of the peculiar action of persulphates as reducers has not yet been published. It is somewhat significant that the characteristic depth action of this reducer is most apparent on silver images embedded in gelatine. We have not had an opportunity of investigating the matter strictly quantitatively, but comparative experiments with negatives in collodion against those in gelatine, leave little doubt that in the case of the former there is practically no evidence of depth reduction. It is clear, therefore, that the old idea that metallic silver catalyses the reducing action, speeding it up in proportion to the amount of silver present, will have to be abandoned. Perhaps, by combining the recent observations of Lüppo-Cramer on the depth development properties of amidol solutions with those of MM. Lumière and Seyewetz on the influence of free acid in the persulphate solution, a satisfactory explanation of depth action may be forthcoming. The latter experimenters suggest that at the surface of the negative, where the shadow images preponderate, the silver-ammonium sulphate first formed acts, under correct conditions of acidity and persulphate concentration, as a physical intensifier. As the reducing solution penetrates the gelatine, not only is the concentration of the persulphate lowered by virtue of the oxidation of the gelatine, but also as Lüppo-Cramer has shown, the concentration of acid is reduced; reduced in all probability to a point below that at which it will cause the excess persulphate to react on the silver-ammonium salt. Physical intensification will therefore not occur in the depth of the image. Such an explanation is, of course, put forward tentatively, but in view of the difference in the action of persulphate solutions on images in collodion and gelatine, the point is worth further investigation. We therefore commend the matter to the attention of those of our readers who are interested in photographic technics

PARIS NOTES.

In undertaking, on the kind invitation of the Editor of the "British Journal," to contribute every few weeks notes on photographic doings in France, it seems advisable in this first communication to say a few words on the place which is occupied in French photographic affairs by the Société Française de Photographie, which is the equivalent in France of the Royal Photographic Society. The French Photographic Society was established in 1854, and began the publication of its "Bulletin" in the following year. Since 1905 it has occupied its present house at 51, Rue de Clichy, Paris, a building which is owned by a small company composed of some of its members. On the ground floor is a lecture hall seating 250; the four upper floors include offices, library, club rooms, a testing laboratory for the examination of lenses, shutters, etc., two studios and numerous dark-rooms. Unfortunately, there is no accommodation for the permanent exhibition of the valuable collections of specimens and apparatus relating to the old processes of photography and of the various applications of photography which the Society possesses. The taking of larger premises came up for discussion some years ago, but the plans were interrupted by the war. Up to the year 1910 the proceedings of the Society were limited to two monthly meetings, one of which consisted of a lantern exhibition of members' work and the other a series of monthly instruction evenings. In 1910 several technical sections were successively formed. During the war the active life of the Society was very greatly restricted; on the outbreak of hostilities its premises were taken into use as stores and work rooms for the Aviation Service, the staff of which at the outset was largely recruited from its most active members. But since 1919 the Society has entered upon a period of remarkable activity, shown by its large increase of membership and by the holding of eleven meetings per month. The general monthly meeting is devoted to the presentation of original works by the authors, of minor items of practice, and to the exhibition and description of new apparatus, materials, etc. At the sectional meetings scientific photography, cinematography, process work, colour photography and studio portraiture are particularly dealt with; and there is a course of weekly lessons for beginners in addition to meetings for students, for the trial of new processes and a monthly lantern evening which is frequently accompanied by a practical discussion on some special application of photography, and is almost always lightened by musical selections. English photographers who may be passing through Paris are cordially invited to visit the Society's headquarters, where they may obtain an invitation to attend any of these monthly meetings.

Relief on the Screen!

A good deal of publicity has been given in the cinematograph journals, and even in some of the scientific periodicals, of an alleged great invention of a Dr. J. L. Pech, of Montpellier, who, by using a concave projection screen, claims to produce the effect of relief in the projected cinematograph pictures. The somewhat involved theory of the inventor unfortunately received a severe blow on a public demonstration given in Paris, at which none of the spectators, however much they tried and wherever they placed themselves in the hall, were able to perceive any relief effect. It can only be assumed that the projection lens possessed a somewhat curved field, giving a lack of definition at the margins when a flat screen was used, and that the concave screen almost corrected this defect.

A New Non-Halation Plate.

The black backing used on the glass side of English plates as a preventive of halation has never been very popular in France, where, except for panchromatic plates, a coloured film between the glass and the emulsion is preferred. A new anti-halation plate of this kind has been put upon the market by MM. Guilleminot. The film underlying the emulsion is formed of manganese peroxide suspended in gelatine. The brown colour of this coating disappears in an acid fixing bath. Similar means have been previously employed, notably in the Lumière "Simplex" plate, but the special feature of the new plate is the very slight opacity of the yellowish-brown film, so that the latter presents no obstacle to the control of development by examination of the plate by transmitted light in the ordinary way. I may mention also that MM. Grioshaber

have recommenced the manufacture, discontinued some years ago, of a sensitive salted paper, which gives very fine matt prints.

An f 1 5 Lens.

A new optical firm, the Société Optis, has entered on the manufacture of cinematograph lenses. Their "Galear" of *f*/3.5 aperture and of five glasses covers sharply a field of more than 45 deg., and their "Aetar" of *f*/2.5, and of six glasses, one of more than 40 deg. The firm announces that the series will be extended for photographic work, and that they have in course of construction, to be placed on the market shortly, a lens of *f*/1.5 aperture.

New Projection Lamps.

Makers of the ordinary optical lanterns and of cinematograph projectors are striving to secure the highest efficiency from incandescent electric lamps of the clustered or focus type working at from 12 to 20 volts. Several large cinema theatres have already adopted a "Radius" projector fitted with a lamp of 1,200 c.p. consuming only 500 watts, whilst smaller optical lanterns for amateur use have shown their ability to give satisfactory projections of Autochrome on a 5-ft. screen with a consumption of 100 watts.

A further interesting new introduction in cinematograph projection is the "Garbarini" arc lamp, which has only one carbon. The other electrode consists of a hollow tungsten ring, which is placed concentrically with the carbon and is kept cool by a current of water. Suitable coils give a rapid rotation of the arc, which thus traverses a circle of about ¼-in. in diameter, producing an intense light which does not suffer any masking. Feed of the carbon is controlled by an electric motor through a bi-metallic plate which normally is kept curved by the radiation of heat from the arc, but which straightens itself and cuts off the current when the arc tends to enter the interior of the annular electrode.

X-Rays and Paintings.

Reviving a method suggested in 1914 by Faber (a German), Dr. A. Chéron has obtained some interesting results in the use of X-rays for the examination of paintings. Whilst the old painters used almost exclusively mineral colours opaque to X-rays on wood panels or canvases treated with carbonate of lime transparent to these rays, modern painters make chief use of lake colours transparent to X-rays on canvases treated with white lead opaque to these rays. Thus, fraud in the renovation or alteration of an original painting of ancient date is readily detected. Unfortunately, it will be very easy for forgers of old paintings to adjust their practice to this modern method of detection.

Pictorial Photography.

One of the promoters of pictorial photography in France has just died in the person of M. Maurice Bucquet. As founder and president of the Photo-Club de Paris, he did a very great deal towards inspiring and encouraging this group of amateur workers. The annual exhibitions of the Photo-Club and the handsome "Bulletin" which the Club issued were a revelation to the French public of numerous artists in France and abroad. It is to be hoped that the loyal co-workers of M. Bucquet will be able to revivify the Paris Photo-Club, all signs of life of which had ceased before the war. The only exhibition of pictorial photography which exists in France at the present time is that which is organised by the firm of MM. Poulenc in their premises, where are also periodically given some very interesting lantern exhibitions.

Travel and the Film.

Several concerns engaged in the transport business are now using the cinematograph as part of their advertising campaign. Some time ago the Compagnie Générale Transatlantique, the most important of the French shipping companies, produced a very interesting film having as its subject the route traversed by their road motor services in regular operation in Tunis, Algeria and Morocco. This film is shewn, with others, illustrating travels in Cote d'Azur, Corsica, the Alps and the Pyrenees, in the offices of the Compagnie Française du Tourisme, established with Government assistance and with that of the leading touring associations, for furthering travel in France.

The French Physical Society will hold on March 31 and April 1 this year its annual exhibition of new discoveries in pure and applied physics, together with newly introduced scientific and industrial appliances. In these exhibitions, the sequence of which has been interrupted by the war, there have been almost invariably new introductions connected with photography in one way or another.

Personal.

I close this first series of notes by announcing that at its meeting of February 25 last the French Photographic Society had the honour of admitting as life members Sir William J. Pope and Mr. F. F. Renwick, the researches of both of whom on scientific methods relating to photography have attracted much notice in France. It is to be hoped that close relations between associations pursuing the same ends on each side of the Channel will be formed, and, if I may speak for myself, it will be a very great pleasure to contribute to that end.

L. P. Clerc.

DISTINCTION—AND THE PRINTING PROCESS.

The standing of a studio in the estimation of the public is determined by the prints it sends out. This is an obvious fact, but one apparently often overlooked; for how else can one account for the fact that when a new business is started, or an established one taken over, much time and thought goes to the selection of the various apparatus and to the choice of plates and mounts? But the printing process usually "decides itself," if we may use the expression, as if bromide were the only practicable process. That there are others it is the aim of this article to point out, but before going on to review them a few words may be necessary on the desirability of leaving bromides on one side if really distinctive work is to be turned out and good prices are to be obtained. It will be as well to state here that if quantity rather than quality is your aim these notes will be of little interest to you.

"Something different" is the aim of every progressive studio, because it is recognised as the one certain way of obtaining business. Even a cut-price line often fails to attract clients, but the draw of prints that are "different" never fails, the public is always on the look out for the man who turns out work out of the ordinary rut, and the farther you get out of that rut the better for your business.

Frequent attempts are made to get this distinction into results by unusual lighting or posing; these methods are useful in some special cases, but for routine work they carry their own certain destruction, insomuch as they can never be successfully applied to all types of sitter. To score a hit with a line-lighted profile of a lady with well-formed chin and neck is frequently the prelude to a request to repeat the performance on a lady with a larger share of chins than of artistic taste. For special subjects, of course, one must go outside the standards of lighting and pose, but to make a standard line of such a production is to court disaster.

But a printing process does not suffer from any such limita-

tions. A sepia carbon of a many-chinned matron will have the same distinctive qualities as one of a more swan-like damsel. The quality has not to be striven for, it comes automatically as the result of using the particular process. You are therefore free to concentrate on obtaining the best possible presentment of your sitter without the need of striking originality in every negative. This difference in methods of obtaining distinctive prints is one very apt to be overlooked, but it is one of the greatest practical importance.

Probably the reason most likely to persuade the good class worker to go off the beaten track in printing is the very fact that the new process taken up will be actually different from bromide. It at once provides an answer to that question, so difficult to dispose of sometimes. "Why is it that I can get postcards at Mr. Blank's for 5s. a dozen, and you charge me two guineas for prints very little larger?" A different process, different in essentials as well as in details of surface and manipulation, is a thing your clients will appreciate and pay for. The cheap-jack may be able to follow you in lighting and posing, but he cannot successfully imitate your results if you forsake bromide as your printing medium.

This need not mean resource to daylight as the printing light; carbon and platinotype may be printed perfectly well with an artificial light installation, and P.O.P. may be used in the same way. But even if daylight is used the troubles supposed to be inseparable from it are by no means insurmountable. The speed of bromide printing can, of course, never be equalled, but speed is not everything. Clients really do not mind waiting a fortnight instead of a week, providing they can see the advantage of so doing; in fact, the refusal to be hurried is a mark of many high class studios, who find it a paying stand to take up.

Providing negatives are kept reasonably thin and quite free from fog no trouble need be anticipated in the holding up of orders in the printing room. There is one point which will need careful watching when changing over to a daylight printing process: the quality of the negatives must be first class. Bromide papers will give a passable result from most negatives, but carbon, platinotype and P.O.P. demand really good negatives. This is not altogether a disadvantage, as it ensures that any falling off in negative quality will be noticed. The exclusive use of bromide papers frequently leads to a great deterioration in negatives, and this means more work for the retoucher and printer and a subtle, but none the less real, deterioration in the prints. With a daylight process this falling off is so obvious that it may be instantly recognised.

If daylight has the disadvantage of being variable, and sometimes least in evidence when most needed, it has also advantages, as its suitability for vignetting or for shading parts of a print; and there is no light so "easy" on retouching or knife work on the negative. Direct sunlight is ideal for the production of soft prints from hard negatives, while by printing through green glass vigorous prints may be obtained from soft negatives.

Figures, even rough ones, are frequently of very great help to a man without practical experience who wishes to decide on a process. Therefore, as a *very* rough estimate one may say that an "average" studio negative should yield at least three prints per day, even on a dull winter day, when P.O.P. is used, both carbon and platinotype are rather faster, and might give four prints instead of three.

Having cleared the ground to a certain extent we may now pass on to consider the three chief processes, carbon, platinotype, and P.O.P. silver paper.

It has been said that a greater variety of effects are obtainable by the carbon process than by the use of all other printing materials combined. This is by no means an over-statement, the range of effects is absolutely unlimited, yet each effect can be repeated whenever required; this is a point the advantage of which cannot be over-estimated. With a development process, or, still more, when a print is toned, the colour will vary with each batch of paper and with every sample of chemical employed; with carbon the colour is definite—it is the colour of the pigment, and does not alter with different treatment or with the depth of print; double tones are impossible, and stains of any sort can only be caused through gross carelessness. The variety of effects on carbon may be gauged by a few facts. There are over 30 distinct colours of tissue on the market. Each of these may be placed on *any* paper base,; there are over a dozen different bases sold especially for the purpose. In addition to this any print may be given a matt, semi-matt, platino-matt or even a glossy surface. There is something wrong with a picture that cannot be suited with such a range as this.

If portrait films are used there is no need to go beyond single transfer printing; double transfer has the name of being a troublesome process, although personally I have never found it too lengthy; the one extra operation seems well worth while when the advantages of a non-reversed print from the film side of a negative are taken into consideration. Considerable control may be exercised over the contrast of carbon prints by variations in the sensitising bath, which is one reason why it is best to do your own sensitising.

The quality of a carbon print is the very finest possible; to many workers it would be a revelation to see a carbon alongside a bromide from the same negative. Carbon surface, carbon effect, and other such claims for bromide papers are stretched too far, because the carbon effect is inherent to the process, and cannot be obtained in any other way. As remarked above, good negatives are essential, and there is one other point which should be noted. When a print has been made on carbon tissues the negative should be carefully wiped over before it is printed by any other process; this is necessary, because traces of bichromate will cling to a negative, and when transferred to bromide paper will cause insensitive spots.

Carbon enlargements used at one time to be made by the use of enlarged negatives, but most of this work is now done by using a bromide enlargement as the starting point; this enables high-class work to be turned out at reasonable prices. There seems every reason to expect that the same process will be used for contact prints when "Carbro" becomes better known, but of this I cannot speak, as I have had no opportunity of testing the latest developments in this direction under practical work-room conditions.

Platinotype paper is gradually coming down in price, but it seems unlikely to be within the reach of any but really high class businesses for some years yet. It is an extremely fine paper: without having anything like the same range of effects as carbon, it has sufficient variety to make its exclusive use possible without monotony. The quality is quite as fine as carbon, but of course of a different type. One does see poor prints on platinotype, but they are almost always the product of stale paper. As the two "class" processes, it is usual to compare platinotype and carbon. Such comparisons are not of great value, but they do indicate roughly what are the most notable points in a paper. We may say that while the quality of either is irreproachable carbon has the greater variety, and platinum is the more easy to work, and lends itself better to the quick production of prints.

As there is no "film," in the ordinary sense of the word, on a platinotype paper, it presents an ideal surface for working on; for this reason, if for no other, it is the finest of all materials for high-class sketch work. The normal grey black image is a very good colour for this type of print, while the sepias obtainable are also of an excellent quality.

Satista, the platinum-silver paper, is a very satisfactory medium between platinum and bromide; it partakes more of the quality of the former than of the latter. It will attract many who are looking for a high quality material without being prepared to go so far as genuine platinotype. The sepia grade in this is also an excellent paper. In the important factor of permanence, Satista stands above bromide, which is to say that it more than fulfils any conditions imposed on it by the average user, without quite reaching the "ever-lasting" permanence of carbon and platinum. But one may say in passing, that any paper sold commercially in these days will give prints good for fifty years under ordinary conditions. The permanence

of a print depends not so much on the nature of the paper as on the proper manipulation of it.

To write on P.O.P. to professionals is a somewhat dangerous task. The fixed idea about P.O.P. seems to be that it has a glossy surface and gives purple-brown prints. This may be an over-statement, but certainly there are very few users who make the most of this paper. There are, of course, two distinct types, one with a gelatine emulsion and the other with a collodion one. The results on either are very fine if proper methods are used. In fact, a print on a matt surface collodion paper toned with gold and platinum is of as high a quality as can be desired; this type of paper is usually of a most attractive surface, whatever finish is given to it. Matt, semi-matt or glossy, the paper has a "finish" comparable to that of carbon, though not mistakable for it. The range of tones is very wide, from red chalk to black brown; they are easy to control, but it is not always easy to exactly match a print made months before.

Collodion papers are rather more delicate to handle than are gelatine ones, but they have a decided advantage in being less affected by heat; so much so, indeed, that they may be washed in warm water and dried over a fire. The greatest cleanliness is essential in dealing with any print-out-papers. They are, of course, the ideal material for use when much dodging has to be done during printing.

Having briefly reviewed the possibilities of the most important non-bromide papers there remain a few remarks still to make. I have several times mentioned the "quality" of prints. This is a most elusive factor, but a very important one. It is frequently claimed on behalf of bromide papers that they are indistinguishable from carbon or platinum; this is claiming too much, because, although their range of contrast and gradation may be identical, their physical construction, the silver being embedded and sunk in gelatine, makes just that difference in quality in the print which makes your customer content to pay a higher price for your work if it is done on a non-emulsion paper.

There is one problem which the head of any large studio will find a very difficult one to solve if a non-bromide printing process is taken up. It is the problem of the printer. Even before the war good carbon and platinotype printers were difficult to find, and now they seem to be quite unobtainable. The only way, one would say, is to train your own. This is a big undertaking, but one that will pay in the long run. An intelligent man may become an efficient bromide or platinum printer within a month of taking up the process, but it would take a good six months to train a man to proficiency in all the ins and outs of carbon or P.O.P. work. Training, or rather lack of it, is responsible for the general decline in the standard of photographic work, and it is up to us to put our house in order in this matter.

Cost of production is an important point. Under this head one may suggest that bromide is by far the cheapest process, because it absorbs less labour than any other. The actual materials for either carbon or P.O.P. cost no more, but the extra time spent on them must be charged on the cost of the print. Next comes Satista, and then platinotype at the head of the list, but these last two are becoming cheaper, and certainly are economic both in labour and in waste materials.

In conclusion, any high quality printing process may cost you more, but it enables you to obtain a big increase in price for your results, and leads to the ambition of all good workers —more work and better quality.

ARTHUR G. WILLIS

A PHOTOGRAPHIC METHOD OF DETECTING CHANGES IN A COMPLICATED GROUP OF OBJECTS

THE method to be described has been used for some time in certain branches of physics[1] and astronomy[2]. It was recently independently devised by the writer and developed in co-operation with Dr. H. E. Ives, recently of the United States Air Service, for use in military operations. The method is, however, applicable to a so much wider range of uses than the fields in which it has yet been employed that it seems desirable to describe the method and a few of its possible applications.

Fig. 1.—First photograph. This illustrates the initial appearance of the pile of rocks.

The method may be described as follows: A negative is made of the group of objects in which a change is expected. After the change is supposed to have occurred, a second negative is made with the same camera (or one of the same kind) on a plate of the same kind and from as nearly as possible the same position as used in making the first negative. A positive is printed from one of the negatives, is superposed upon the other negative so as to bring them into register, and the combination is viewed against a source of light. When the photographs are properly made, those parts of the combination which correspond to the unchanged portion of the group of objects will appear as a field of practically uniform

Fig. 2.—Second photograph, illustrating the appearance of the pile of rocks after a few changes in it have been made.

[1] Hodgson and Wilsey, Communication No. 42 of Eastman Kodak Co. Research Laboratory, J. Op. Soc., 1, Nos. 2 and 3; 1917.
[2] Harvard College Observatory Circular No. 79, p. 1.

especially the astigmatical aberrations as same has hitherto in general not been obtained with telephoto objectives. The objectives according to the invention mentioned differ from the above example of Patent Specification No. 3,096 of 1914 by the collective cemented surface and according to the invention, with a view to obtain a sufficiently large collective effect, the difference between the two refractive indices of the glasses on the cemented surface must be at least 0.02 for the D line of the spectrum: besides the absolute value of the radius of the cemented surface should not exceed the value of the focal length of the telephoto objective.

The drawing shows an example of the objective.

In the following table are enumerated the dimensions with respect to the constructional example as represented in the drawing which apply to the focal length 100, and the numerical values of the different kinds of glass.

$r_1 = +18.091$		$d_1 = 3.329$	
$r_2 = -38.834$		$b_2 = 0.130$	
$r_3 = -36.679$		$d_{II} = 0.83$	
$r_4 = +38.740$		$b_1 = 5.66$	
$r_5 = -10.393$		$b_2 = 18.25$	
$r_6 = -9.426$		$d_{III} = 1.89$	
$r_7 = -17.130$		$d_{IV} = 0.75$	
	I	II	III	IV
$n_D =$	1.59234	1.59704	1.62410	1.49300
$n_C' =$	1.60464	1.61718	1.64732	1.50840

A telephoto objective corresponding to the example given may suitably be employed up to an aperture ratio of 1 : 6.3, which is comparatively large for a telephoto objective.—Carl Zeiss, Jena.

The following complete specifications are open to public inspection before acceptance:—

LENSES.—No. 158,902. Photographic lenses. Optische Anstalt C.P. Goerz Akt.-Ges.

New Books.

CASH FROM YOUR CAMERA.—A little book with this title reaches our table from the American Photographic Publishing Co., Boston, Mass., by whom it is published, price $1. Its text deals with the somewhat old theme of selling reproduction rights in photographs here and there to magazines, or for issue in postcard, advertisement and other forms, but it gives a good deal of useful advice to the amateur commercialist seeking recompense in these directions. Its most valuable part, however, and also the largest, is the directory of such buyers of rights in the United States. These are chiefly magazines, from each of which the author of the book has obtained brief information of the kind of photograph, both as regards subject and printing process, which is acceptable. The list includes also firms buying photographs for the illustration of their products, and there is a separate list of magazines and various undertakings who did not reply to the letter of inquiry.

TELEPHOTOGRAPHY.—A second edition of the very useful practical manual, "Telephotography," by the late Cyril Lan-Davis, has been issued by Messrs. George Routledge, with revisions by Mr. L. B. Booth, scientific optician for Messrs. J. H. Dallmeyer. It contains a brief biographical notice of Mr. Lan-Davis, who disappeared whilst on service with the Royal Naval Air Service in Gallipoli, and is supposed to have perished at sea on a journey from Gallipoli to Malta in a small boat. Mr. Booth has made comparatively little alteration in the work, his revisions and additions relating chiefly to commercial types of telephoto lens which have latterly been introduced, notably by himself. The manual remains an excellent guide to the optics (in simple form) of the telephoto lens and to the practical use and usefulness of these objectives. There is not a point of any importance to the practical telephoto worker which is not treated in it. The price is 3s. 6d. net, bound in stiff boards, or 4s. 6d. bound in cloth.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, MARCH 14.

Bowes Park and Dist. Phot. Soc. "Toning" (Hypo-Alum). F. C. Hornsey. "Toning" (Sulphide). A. H. C. Roberts.
Bradford Photographic Society. Members' Print Night.
Cleveland Camera Club. R.P.S. Portfolio. Fred Judge.
Cripplegate Photographic Society. "Transferrotype." J. Brown.
Dewsbury Phot. Soc. Y.P.U. Members' Lantern Slides.
South London Phot. Soc. "British Landscape Portfolio."
Willesden Phot. Soc. "Truth in and about Photography." T. H. B. Scott.

TUESDAY, MARCH 15.

Royal Photographic Society. (1) "The Design and Construction of the Reflex Camera." A. S. Newman. (2) "The Use of the Reflex Camera." Adolphe Abraham, O.B.E., M.A., M.D., B.Sc.
Birmingham Phot. Soc. "Stories of Dartmoor." F. W. Pilditch.
Bournemouth C.C. "X Ray Photography." A. Thomas.
Exeter Camera Club. "Carbro Printing." Fred Walker.
Hackney Phot. Soc. "The Possibilities of a Small Camera." E. Human.
Leeds Photographic Society. Members' Lantern Evening.
Portsmouth C.C. "With Allenby through Palestine." W. Butcher and Sons.
Rotherham Photographic Society. "The Gum-Bichromate Process." J. M. Fitzclarke.
Sheffield Photographic Society. "Portraiture." T. Lee Syms.
Stalybridge Phot. Soc. "Mounting Photographic Prints." W. Harwood.
Walthamstow and Dist. Phot. Soc. Affiliation Print Portfolio (1919).

WEDNESDAY, MARCH 16.

Accrington Camera Club. Whist Drive.
Borough Polytechnic Phot. Soc. Lantern Slide Competition.
Croydon Camera Club. "Truth in and about Photography." T. H. B. Scott, F.R.P.S.
Dennistoun Amateur Photographic Association. "Autochrome Slides." W. Partridge.
Edinburgh Phot. Soc. "Enlarging and Toning." G. Ritchie.
Halifax Scientific Society. Rambles with "Nature, the Old Nurse." H. Waterworth.
Ilford Photographic Society. Visit to South Essex Camera Club.
Partick Camera Club. Lantern Slide Competition.
Woodford Phot. Soc. "Amiens Cathedral." E. W. Harvey Piper.

THURSDAY, MARCH 17.

Birmingham Phot. Soc. "Lantern Slide Making." R. Hancock.
Brighouse Photographic Society. Members' Prints and Slides.
Camera Club, The. "An Excursion Down the Rhone from Lyons to Marseilles." C. E. Keyser.
Everton and District Phot. Soc. Members' Print Night.
Gateshead and District Camera Club. "Bromoil." G. Tennant.
Hammersmith (Hampshire House) Photographic Society. "A Ramble in the English Lake District." A. J. Linford.
Hull Photographic Society. Members' Slides.
Kryn and Lahy (Letchworth) Phot. etc., Soc. "A Dive into Belgium."
North Middlesex Phot. Soc. "How we saw Lugano." Messrs. Fincham and Ridge.

FRIDAY, MARCH 18.

R.P.S. Pictorial Group. "Pattern in Pictures." T. H. B. Scott.
Bedford C.C. A.P. and P. Slides, with Criticisms. (Ladies' Night.)
Birmingham Photographic Art Club. Annual Exhibition.

SATURDAY, MARCH 19.

Walthamstow and Dist. Phot. Soc. Visit to Wallace Collection.

ROYAL PHOTOGRAPHIC SOCIETY.

There was an undertone of unrest in the gathering of members at the annual general meeting, held on Tuesday evening last, the president, Dr. Rodman, in the chair. The signs of it were not evident on the surface, but had come before every member in the shape of the names on the ballot paper for election of council of those forming a "dark-room group," and banded together for the purpose of providing greater facilities for practical work in the Society's house. A number of junior members occupying back rows of seats were pointed out as this dark-room group of reformers. But nothing was heard from them during the formal proceedings. It was the tamest of annual meetings. The president suggested that the report of the council should be taken as read, and discussed paragraph by paragraph. Then he read almost every line of it, but without a word of comment being forthcoming. A

wearisome quarter of an hour followed, during which Mr. C. H. Oakden recited the income and expenditure account and the balance-sheet item by item. A single objection by Mr. Gear to a description of one item provoked a short discussion, which ended in the motion that a line of type should be placed one-eighth of an inch lower down; and that was all

Mr. J. B. Portway then read the report of the scrutineers of the ballot for the election of members, which had resulted as follows:—President, Dr. G. H. Rodman; vice-presidents, Sir W. J. Pope, F.R.S., and Mr. W. L. F. Wastell. Ordinary members of council, Messrs. A. J. Bull, D. Cameron-Swan, G. Bellamy Clifton, C. P. Crowther, G. I. Higson, J. Dudley Johnston, Ernest Marriage, F. Martin-Duncan, E. W. Mellor, C. H. Oakden, F. F. Renwick, T. H. B. Scott, E. Sanger-Shepherd, W. F. Slater, J. C. Warburg, S. H. Wratten, and Major F. C. V. Laws.

Owing to the death of the treasurer, Mr. A. H. Lisett, having taken place after the ballot paper had been issued, in which he was the only nominee for the treasurership, the council, on the advice of its solicitor, had decided to elect a treasurer at its first meeting. A motion that it should do this was proposed, seconded and carried.

The most interesting part of the proceedings was the presentation to Mr. F. F. Renwick of the Progress Medal of the Society, which had been awarded to him. The president referred to previous distinguished recipients of this honour, such as Abney, Hurter and Driffield, and MM. Lumière. Mr. Renwick, who was present to receive the medal, was greeted with loud applause.

Votes of thanks to the officers and staff followed, and also the motion that the auditors, Messrs. Calder Marshall and Ibotson, should be re-appointed and receive an honorarium of 5 guineas; and with this business concluded, the president declared the meeting closed.

Were the proposals of the dark-room reformers, defeated at the ballot, to go unspoken? No, up sprang Mr. C. P. Crowther, all persuasive smiles, and from the front bench appealed to the president, that the views of his "constituents," as he called them, in the back rows should be heard. "Quite irregular," said Dr. Rodman, "but let us hear them." Then one after another made known an awful state of things. A lack of heating in the dark-rooms and studio, a dilapidated condition of these premises, the absence of adequate equipment, and a state of unfitness which one speaker instanced by pointing out that the Society's print-trimming desk was used for crushing chemicals. Another speaker urged that the facilities should be such as would enable the junior members to produce works worthy of the Society's exhibition. He appeared to think that this object would be secured by the provision of a dry-mounting press. The "Royal" title of the Society was given much emphasis in these appeals. It seemed to be the view of the speakers that a Royal society is one having everything on a lavish scale. It was pointed out by several members that those able to use the Society's dark-rooms formed a very small proportion of the membership and that the funds of the Society required to be expended in the interests of members as a whole. The president also made it known to the "reformers" that certain of the things which they had asked for in a memorandum to the council had actually been ordered before the memorandum was received, but it appeared to be the settled view of the dark-room group, and one from which they derived much satisfaction, that the things they wanted had not been taken in hand until, as one speaker amiably put it, "a shindy had been kicked up." However, the president having declared that the equipment of the work-rooms should have the attention of the council, Mr. Crowther performed soothing gestures in the direction of his protegés, and the informal proceedings were at an end.

ROYAL PHOTOGRAPHIC SOCIETY—PICTORIAL GROUP.

Mr. J. J. Butler presided at a meeting of the above group, when Mr. R. H. Lawton opened a discussion on "Chiffon: Its Use and Abuse." Mr. Lawton made a humorous reference to the wide application of the title of the subject, and presumed he was expected to speak on its application to enlarging. He thought chiffon was one of the greatest friends of the photographer, but that it was fatal to the true rendering of light, especially when its effect was exaggerated. True halation, as distinct from the effect of reflection from the back of a plate, was a natural phenomenon often desirable in pictorial work, and was an encroaching of the lights upon the darks. The tendency of chiffon was to spread the darks over the lights and to produce a general fog; hence it seemed that the use of such a diffuser was more desirable in the making of the negative than in the making of the positive.

Mr. Lawton thought that chiffon was extremely useful in portraiture, as it tended to reduce contrast and gave a softening of contours, while retouching marks were almost entirely eliminated. Soul could be imparted to a picture by its use with discrimination, and Mr. Lawton showed several comparative prints in support of his contentions.

Mr. Weston exhibited a test negative of an ingenious character especially made for the purpose of ascertaining the effects produced by a number of diffusing screens. These were generally of a regular mesh and varied in pattern and mesh. A copper gauze gave a different effect when blacked, and a perforated zinc screen increased contrast, while a screen of chiffon with an open centre produced marginal diffusion only. Mr. Weston did not approve altogether of some of Mr. Lawton's conclusions, and contended that chiffon properly used gave breadth, roundness of edge and retained the vibrating edge which was so essential to sunlight effect. He thought that diffusion in itself was not a merit, and certainly should not be adopted in the representation of a busy scene.

Mr. Dell caused a slight flutter by declaring that chiffon was used by some workers to camouflage an untrue rendering of tones, which it did by causing a general fog. This statement, however, did not meet with general approval. An interesting suggestion was made by Miss Venables, who uses chiffon in the diaphragm slot. This, she claims, gives the best results, with none of the objectionable features obtained by using it in front of the lens. Mr. Banfield showed a 1/16-in. brass gauze which he places in the diaphragm slot when making the negative. This arrangement can only be carried out when using a rectilinear lens, owing to lack of room in an anastigmat.

Several members spoke on the relative merits of differently-coloured diffusing media, but there seemed no concensus of opinion in favour of any particular colour, except to denounce the use of white material.

Miss Warburg showed up the usefulness of portfolio criticisms by saying that when one used a single thickness of chiffon the critic said, "Use chiffon," but when a double thickness was used the critic asked, "Why use chiffon?"

Mr. Wormald had experimented with chiffon behind the lens in making the negative, and found that, with a white bust as a subject, a white line was formed round the contour.

The discussion proved entertaining and most instructive, and also indicated a field for experiment by pictorial workers who aimed at definite results.

CROYDON CAMERA CLUB.

It has been told, on the usual undoubted authority, that a genial investigator, with no leaning to prohibition, on returning home late one night distinctly saw a procession of blue peacocks, all playing trombones. Mr. F. R. D. Onslow in his lecture last week on "Sea birds" had nothing approaching this phenomenon to record. Nevertheless, with the happiest colloquial style, fund of humour and set of slides, both instructive and technically excellent, he kept a large audience interested and amused for nearly two hours.

The Scilly Isles, Devon and Cornwall, Lundy Island, and the Bass Rock furnished his main hunting grounds for splendid sport involving no slaying. Many slides depicting the same characters were neatly woven into "tabloid" romances of the O. Henry order. One out of many is selected as conveying a moral. It dealt with the love affairs of two seagulls, finally merging into the fatal trio. All went smoothly at the start, the hen evidently being favourably impressed by the attentions of her wooer. This, in turn, favourably impressed the cock bird with a sense of his own worth, and confident of a conquest made he flew to an adjacent rock and complacently preened his feathers, omitting to keep an eye on his fiancée. But there was an observant rascal round the corner who seized the opportunity so successfully that the old love was speedily forsaken for the new. The last sad scene depicted the abandoned male (as Grundy has observed, "never an attractive spectacle") furious but impotent, being heartily laughed at by his pals.

The lecture attracted two bird specialists from afar, and in the discussion Mr. C. B. James, who once travelled 300 miles to examine a gullery and yet appears perfectly sane, narrated some experiences. Mr. E. G. Gilbert-Cooper gently chided Mr. James for stealing eggs, and said that the intensely interesting lecture they had heard represented patience amounting to genius. Mr. Onslow, in reply to a hearty vote of thanks, modestly remarked that patience did not enter into a pursuit when one was absorbed in it. He had heartily enjoyed himself all the time.

News and Notes.

HOUGHTON'S PROFESSIONAL BULLETIN, in its current issue, illustrates a selection of the new styles in mounts, to which Messrs Houghtons, Ltd., are just now giving prominence by offering to send a set of specimens for half-a-crown.

THE GLASGOW HERALD is now publishing, in its issue of Wednesday in each week, a column of notes on "The Art of the Camera," and is fortunate in having as its contributor Capt. Owen Wheeler, since there are few who, like him, unite an experience of nearly half a century in all branches of photography with the gift of writing "readably" even on matters of a technical kind. In the first instalment of these notes, published on March 2 last, Capt Wheeler has some good advice to give on buying large-aperture lenses, and promises us something fresh on the eternal question of depth of focus.

CAMERA CRAFT.—A pamphlet from the office of "Camera Craft" informs us that Mr. Fayette J. Clute, whose death we announced last week, will be succeeded in the editorship by Dr. D'Arcy Power, who for many years has been associated with Mr. Clute as a regular contributor to the magazine, and, as readers of our pages know, is the author of many original contributions to photographic practice. A notable one of these is the vertical enlarger, of which Dr. Power, if not the inventor, is the modern reviver who has given this apparatus a practical form corresponding with present-day requirements. We wish Dr. Power well in his new office, which we are sure will be excellently discharged, for he is one of the best writers connected with photographic journalism in the United States, and, moreover, one who is a first-rate practical man and fully informed in photographic processes. With Dr. Power will be Mr. Edgar Felloes as associate editor.

TRADE WORK FOR COMMERCIAL PHOTOGRAPHERS.—Messrs. Lilywhite, Ltd., West End, Halifax, send us some specimens of their commercial photography in the shape of some altogether excellent photographs of machines, motor vehicles, mechanical fitments, and other manufactures. In every instance the technical quality into which blocking-out, working up, etc., largely enters, is of the highest class. Messrs. Lilywhite point out that they specially lay themselves out to do the printing from photographers' "commercial" negatives, undertaking the necessary preparation of these for prints of the effective kind which they themselves supply. This is a special branch of trade work for which undoubtedly there is a considerable demand. Many portrait photographers who undertake commercial commissions find the chief obstacle in the necessity of retouching methods to which their staff are unaccustomed. If they could get it done and prints made as well as Messrs. Lilywhite evidently can do these things, many of them, we are sure, would be able to make commercial work a larger part of their businesses.

JAPANESE LANTERN SLIDES.—Mr. J. F. Mitchell Roberts, who has returned to London after a five years' residence in Korea and Japan, showed at last week's meeting of the South Suburban Photographic Society a series of 200 of his photographic lantern slides coloured by Japanese artists. Many of the slides were coloured in Prussian blue, but the colouring was so artistically and lightly distributed as not to be monotonous or really noticeable. Slides of this colour throughout—seascapes, etc., by "moonlight"—gained the loudest applause from a meeting to which non-photographers were invited. Comment was made upon the few colours used and the sparseness of the same, indeed some of the slides were so lightly tinted—though most effectively so—as to appear almost devoid of colour until contrasted with black and white slides, the Japanese apparently getting the most artistic effects by using as little colour (aniline dyes, it is supposed) as possible, and putting that little in exactly the right place. It was pointed out by some artists and students of colour present that in many instances the placing of the chief colour or colours could be more clearly seen when the picture on the screen was looked at with but one eye, and that partly closed; in one noteworthy example, a forest scene, examined in the manner described, it was seen that the actual dye work consisted of but five fairly well-defined patches of brown dabbed on the foliage, the dabs being so artistically and scientifically placed and balanced that the whole of the foliage appeared to represent autumnal tints. The Japanese are past-masters in the art of slide colouring, and the many amateur colourists who were at the lecture no doubt learned many useful lessons, thanks largely to the ease with which the screen could be approached and the 6 ft. pictures examined. Mr. Roberts has an extremely valuable collection, and one that should be seen at the Royal Photographic Society, and probably would be, were not Mr. Roberts such a busy man in the engineering and mining world.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given of the dissolution, by mutual consent, of the partnership between Benjamin Foulkes Winks and Herbert Irving Bell, carrying on business as camera manufacturers at 662b, Seven Sisters Road, N., under the style of Adams Manufacturing Company. All debts due to and owing by the late firm will be received and paid by Benjamin Foulkes Winks, who will continue the business.

Notice is given, pursuant to Section 242 (5) of the Companies (Consolidation) Act, 1908, that the names of the undermentioned companies have been struck off the Register of Joint Stock Companies, and the companies have been dissolved:—Colourgraphs, Ltd.; Progressive Pictures, Ltd.; Trade Photographers, Ltd.; Victor Photographics, Ltd.

NEW COMPANIES.

H. SLADE (AGENCIES), LTD.—This private company was registered on March 1 with a capital of £2,000 in £1 shares. Objects: To carry on the business of lithographers, photographic printers, etc. The subscribers (each with one share) are: H. Slade, 14, Paternoster Square, E.C.4, manufacturers' agent, and Mrs. M. A. Slade, 161, Brockley Rise, S.E.23. H. Slade is the first director.

MARGARET EDGAR STUDIOS AND PHOTOGRAPHIC SUPPLY CO., LTD.—This private company was registered on March 3, with a capital of £3,000 in 10s. shares. Objects: To carry on the business of artists, photographers, printers, art publishers, artists' colourmen, artists' supplies stores, etc. The permanent directors are H. Mansell, Lightcliffe Bank, Alcombe, Minehead; Margaret E. Mansell, Lightcliffe Bank, Alcombe, Minehead. Secretary, H. Mansell. Registered office: Friday Street, Minehead.

UNDERWOOD AND BARKER, LTD.—This private company was registered on February 25 with a capital of £1,000 in £1 shares. Objects: To adopt an agreement with Leon C. Underwood for the sale to the company of certain chemical formulæ, and to carry on the business of manufacturers of and dealers in chemical, optical, photographic materials, etc. The first directors are: L. C. Underwood, 10, Little St. Andrew Street, W.C.1; F. G. Barker, 14, Parklands, Surbiton Hill. Registered office: 10, Little St. Andrew Street, St. Martin's Lane, W.C.

AUTOMATIC ADVERTISING CO., LTD.—This private company was registered on March 1 with a capital of £50,000 in £1 shares. Objects: To carry on the business of automatic advertising contractors, advertising agents, photographers, publishers, printers, etc. The first directors are: A. Mitchell, 51, Elsham Road, Kensington, W.14 (director, Mitchell's Pictures, Ltd.), and E. T. Simpson, 52, Belsize Park Gardens, N.W.3. Qualification, £2,000. Remuneration, £200 each per annum. Secretary, R. J. Muxworthy. Registered office: 66, Shaftesbury Avenue, W.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

PLATE PRICES AND ORDERS.

To the Editors.

Gentlemen,—I think most of your readers will agree that, considering the falling price of silver and glass, it is more than time that plates followed suit. I suggest to my fellow professionals that they adopt a ca' canny policy, and in place of ordering plates in bulk for future requirements order frequent parcels in minimum carriage-paid lots. This will entail more trouble, but will have the advantage that when the drop does come they will not have large stocks at the present excessive prices, and it should persuade the "unanimity" that it will be better business to present their customers with a reduction rather than pay the money to the railway companies.—Yours faithfully,

W. Foster Brigham, F.R.P.S.

15, The Promenade, Bridlington.
March 7.

FACTORIAL DEVELOPMENT.

To the Editors.

Gentlemen,—The correspondence on this subject is both interesting and useful, and I should like to "butt in" with my small experience and raise a question which perhaps some of your more experienced readers can answer.

What is the permissible percentage of error in both factorial and time and temperature development not perceptible in the result?

That excellent book, the Watkins Manual (5th edn.), makes two statements which hardly seem to agree. One is that two developers—the same, but one with bromide and one without—at the same temperature will give the same steepness of gradation in the same time. The other is that the temperature coefficient of a developer is much higher with bromide than without. Pyro is given at 1.9 with bromide and 1.5 without.

I made one or two small experiments to find which of these statements is correct, but got no definite result, and as the variation in time of development was about 10 per cent., I came to the conclusion that an error of 10 per cent. is immaterial.

My usual developer is a one-grain pyro, without bromide, used with a factor varying with the subject of 9 to 12 for direct printing and 6 to 9 for enlarging. The suggested Watkins factor is 18.

In spite of Mr. Watkins' good advice not to fall between two stools, I frequently use the time and temperature method for developing six to a dozen plates in a dish, and from an experimental record I find that of eight similar outdoor subjects developed for six minutes, three were of 30 seconds appearance, three were 40 seconds, and two 45 seconds. The results were good, though one or two were too harsh for enlarging, but developed factorially there would have been a variation in development time of 12 to 50 per cent.—Yours faithfully,

A. E. Avent.

Hartland Road, Kilburn, N.W.6.
March 5.

To the Editors.

Gentlemen,—The discussion certainly clears the air and has served a good purpose.

If I had to give a working definition of a "Watkins' Factor" it would be "The total time of development which gives the contrast in the negative considered right by the photographer, divided by the time of appearance of the high light."

But it is obvious that anyone (like myself) publishing factors cannot tell what type of printing process, subject, and therefore negative, the man who reads his information requires. In giving factors, therefore, an instruction book or leaflet can only give them for a definite degree of contrast, and in my trials of years ago that contrast was a steepness of .9 on the H. & D. system.

Here is the warning on the point which I have issued with factors in every one of the nine editions of my "Watkins' Manual" printed in the last 19 years: "It must be clearly understood that although I give definite figures for different developers, they are a guide for the first trial only, and may require modification to suit other photographers' fancy as regards contrast. The best amount of contrast (a steepness of gradation) for one printing process is probably not the best for another, and here, again, the experience of the old photographer may lead him to modify the factor."

What Mr. Green considers to be a difficulty and objection peculiar to factorial development is really an equal difficulty and objection to any other possible way of giving information on development.

I, for one, am very grateful to Mr. A. G. Willis for stating exactly how he modifies a factor for different types of studio lighting and printing processes.—Yours truly,

Hereford. March 6. Alfred Watkins.

DOCTORING APPARATUS THAT STICKS.

To the Editors.

Gentlemen,—Most photographers at some time or other have trouble with those parts of their apparatus which slide together. The remedies for sticking and jamming are various—black-lead, glycerine, grease, glass-paper, etc. However well-seasoned wood may be, it is liable to swell and shrink if exposed to damp or heat. Take one example first. The slide of the studio back begins to be troublesome. Often the first thing done is to take it right out and sand-paper the part that enters, and also the part that is entered first. This makes matters worse. The slide should be perfectly parallel, and the part into which it slides a little smaller at the entrance than at the other end. The difference is very small, but there must be a difference, which can be ascertained by inspection or by cutting a piece of wood the length of the width of the slide and passing it along. Few photographers have tools or skill suitable for cutting hard mahogany, and it is seldom any are needed, except a small file or two and some fine glass-paper. The latter should be used very sparingly, as the glass gets embedded in the wood and soon wears out the slide. This can be partly avoided by gluing it on to pieces of wood of suitable shape.

The files should be "flat," and one of them thin enough to go into the groove. Files are harder than glass and won't bend very much; they should be used with discretion, both as regards themselves and the work to which they are put.

Stop removing wood before the slides go easily enough for working and apply an anti-friction preparation, made as follows:—Make or procure a stout cardboard box, about 1½ in. × 1 in. and ½ in. deep. Into it put spermaceti wax and warm gently on a hot plate. When melted, put in more wax until the box is quite full, making it as hot as possible without setting it or the house on fire, and let it cool. The wax can be applied to any part as required while still in the box. The wood may be warmed very slightly. Any fragments of wax should be rubbed off with a cloth (not fluffy). In doctoring up a sticky sliding part it is necessary to use a little brains, in addition to the articles mentioned, but if these hints are attended to no harm can result.—Yours faithfully,

C. Goodwin Norton.

DARK BACKGROUNDS.

To the Editors.

Gentlemen,—You speak in your editorial paragraph on "Dark Backgrounds" (page 121) of "a singular lack of depth" in modern examples of portraits taken against a black background, but is not this lack of depth to be praised and sought after rather than condemned? Dead black grounds are certainly not natural, and are most inartistic, as well as being difficult to print by some processes because of "bronzing." I dislike seeing a portrait head or figure stand out against a real "nothingness"—a "depth" such as you appear to advocate.

The best type of black or very dark background is surely that which can really be seen, and the most satisfactory method of getting a blackness of this description is to use a plastered wall

distempered black, or very nearly so. Properly lighted with a side, or even a top light, the roughness of the distempered ground catches a certain amount of light, and gives a body or a solidity which a suitable exposure will render on the negative. It is, I think, this "body"—a blackness one can see as being "something" behind the figure—we require, rather than a Stygian gloom none can fathom.

When a blackness is impenetrable, it is impossible to get a shadow upon it, but a shadow—and very often a helpful one to a composition—is easily obtained upon what may be called a visible blackness, i.e., one with a body, because of the possibility of getting something darker than the blackest "solid" by simply casting a shadow upon it. And the sitter—if placed near enough to the black background—can be made to cast a shadow that will often help a picture very considerably.—Yours faithfully,

GODFREY WILSON.

THE PROBLEM OF HALATION.

To the Editors.

Gentlemen,—One evening last week I happened to drop in at a photographic society's meeting, where I heard a capital lecture given by one of our best known trade lecturers, who dealt with lenses, exposure, development, halation, and many other things, using a blackboard and chalk to illustrate his remarks. Two of the sketches he used are enclosed.

Fig. 1 was used to illustrate the action of light upon a film, and the proportions of film and glass are, of course, exaggerated in order to make the points clear. F represents the film upon the glass G, and the "crystals" represent the silver in the film. The lecturer explained that in cases of under-exposure only the particles in the upper part of the film (A) were acted upon; if the exposure was correct, the light went deeper (say to B), while in cases of over-exposure light went all the way through (to C) and reached the glass, the silver being blackened by the developer accordingly. He used the well-known diagram (fig. 2) to explain halation, F being the film, G the glass, and L the ray of light from the lens which went through the film to the glass at the back, where it was reflected back again, and so caused halation, he recommending, of course, the use of backed plates, because of the danger of halation.

The amateurs in the audience were greatly interested, and asked several questions before the lecturer had to rush away to catch a train. After the meeting had closed, an amateur who had just started photography was seen to approach the board and carefully study the two diagrams. He was asked by an old hand what interested him and what his difficulty was—he looking so puzzled. His inquiry and criticism started a heated debate, as beginners' questions sometimes do.

"Judged and explained separately," said the tyro, "these two diagrams are quite all right, they explaining the points perfectly. They, however, are not in agreement, and, to my mind, quite contradictory. Assuming fig. 1 to be correct, light only reaches the glass when over-exposure is met with; therefore you can only get

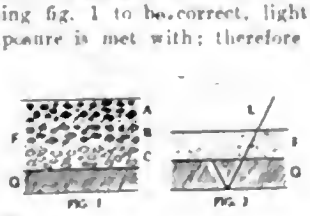

FIG. 1. FIG. 2.

halation when exposure has been excessive. By exposing correctly—or even a trifle more—the light-ray never reaches the glass, and cannot therefore cause halation. Why, then, over-exposure? If, as some say, you get the effect shown in fig. 2, whatever the exposure may be—under or correct—then fig. 1 cannot be correct."

The beginner's comments on the teacher's diagrams set me thinking, and I have done much more of it since reading your editorial paragraph (p. 106) on "Window Portraits," in which you say: "For such subjects backed plates or film should always be used. There is a natural tendency in such conditions (taking portraits with window background) to under-expose, with the result that the high lights are blocked up in the attempt to secure some trace of detail in the shadows, but this may be avoided if means are taken against halation; what is mistaken for over-exposure in a *properly-exposed plate is really halation*."

Assuming halation to be possible with a correct or fairly correct exposure, cannot such halation be stopped (on an unbacked plate) by developing in some particular way? I think—I might even say I know—it can; but how? I have, in the course of my thirty years' practical work, met many experienced photographers who scorn backed plates, and claim that by exposing and developing properly no halation need appear. And I believe it, after an experience I once had.

Twenty years ago I was making ready to start on the task of taking interiors of the most famous of the Italian picture galleries for one of the leading Parisian view-publishing firms, and when discussing apparatus, etc., with my chief, I asked for backed plates of a special make. "Backed plates!" he cried. "We have now twenty-one operators at work in various parts of the world, all engaged upon important tasks, and not one of them ever asks for or uses a backed plate. You give the correct exposures necessary, and return the plates to our developers to be developed; they'll see that no halation appears on the negatives." I did as requested, all exposed negatives being sent to headquarters for development, and no halation was to be found upon any of the negatives.

At intervals since that experience I have made many experiments to prevent halation by development, but have never been successful, and yet the many who I have heard say they can do it say that there is no secret. Obviously we have yet a lot to learn about halation.—Yours faithfully,

GODFREY WILSON.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 6-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

K. J. P.—For frame making appliances apply to Imperial Moulding Works, Macclesfield.

A. A. P.—The postcard is printed from a half-tone block. Cards of this kind can be supplied by Messrs. Hood and Co., Ltd., Sanbride Works, Middlesbrough.

R. P.—The best and neatest method is that described on page 448 of the current "Almanac," namely, of photographing the titles on a process plate and stripping them with hydrofluoric acid on to the negatives.

R. G. A.—The spots may be due to defective paper, but from their appearance under a magnifier it looks as though they may have been caused by air bells on the prints whilst in the fixing bath, due perhaps to overcrowding in this bath.

D. E.—Zinc, which the metal appears to be, does not last very well when used for developing solution, although it has a fairly long life as a washing tank. Unless you can get the earthenware tanks, the best thing in the long run is to have a tank well made of hard wood. Messrs. F. Brodrick, Ltd., 50, High Street, Bloomsbury, London, W.C. 2, is one firm which lays itself out for the making of such tanks.

H. K.—If the enlargement has been perfectly fixed, say in three successive hypo. baths, we think the process would be without harmful effect, either immediately or with lapse of time. But if the enlargement has not been thoroughly fixed (and papers nowadays are not so readily fixed as formerly), then we think the

process is liable to cause the appearance of silver stains, not perhaps immediately, but in course of time.

H. J.—A very good preparation for backing is made by mixing strong gum solution, about 1oz., with crystal caramel 1 oz., and finest lamp black (ground in the minimum quantity of water) about 2 ozs. To this is added about 2 fl. ozs. of alcohol, preferably pure spirits of wine, not methylated spirit. The crystal caramel is that made by Lichtenstein, of Silvertown, London, E., who supplies, we think, only in large quantities, but you could get a small lot from a firm such as Johnson's, of 23, Cross Street, Finsbury, London, E.C.2.

S H. G.—Of course it is possible that the comet-shaped markings are defects in the plate, but such are a rare defect of manufacture, and in other respects the plate certainly does not show evidence of being stale. Without knowing anything to the contrary, we should make a guess that these spots may have been caused by developer dust settling on the plates before exposure, or between exposure and development. Perhaps you can decide whether you find the markings appear at about the same time that you have been making up fresh developer.

D J.—(1) Brass fittings from the Photographic Supply Co., Shepherd's Lane, Leeds. (2) You do not say the size of the camera, nor whether hand or stand. Generally speaking, we should prefer to recommend the *f*/6 lens. (3) Messrs. Houghton's sell an excellent series of diaphragm shutters under the name of "Ilex," one or other of which should be suitable. (4) Negative attachments have long been supplied by optical firms, particularly Messrs. Dallmeyer, although the separate negative has largely gone out of fashion for telephoto work since complete telephoto lenses have been introduced.

C J. K.—Under present copyright law we have no doubt that the map would be regarded as an original work of yours, for it evidently includes indications and marks as well as notes which are not to be found on existing maps, and represent your own knowledge of the islands. In these circumstances we think it is a work entitled to copyright. There is no need whatever for you to register it or do anything in order to establish your copyright in it. Under the present Act that is assumed to be created automatically by the fact of your having produced the work "on your own," that is, without being paid by somebody else.

W. R. H.—You can buy sodium metal from scientific chemical merchants, such as British Drug Houses, Ltd., 22-30, Graham Stree , City Road, London, N.1. There are one or two small books on chemicals, *e.g.*, "Chemistry for Photographers," by C. F. Townsend, and "Photographic Chemicals," by W. Taylor, obtainable, if in print, from Messrs. Iliffe, 20, Tudor Street, London, E.C.4. But probably the best work for your purpose is a rather old book, namely, "Materia Photographica," by Clement J. Leaper, published in 1891. We see a copy of this is offered by Messrs. Sotheran, 140, Strand, London, W.C.2, price 2s.

B A.—(1) Plates for direct positives are supplied by the Magna Gelatine Plate Co., 2, Eastborough, Scarborough; by the Quta Co., 252, Haydons Road, Wimbledon, London, S.W.19; and by the Victoria Frame Co., 103, Anglesey Street, Lozells, Birmingham. (2) A formula for combined development and fixing is as follows :—

Water, to make	40 ozs. fluid.
Hydroquinone	½ oz.
Soda sulphite	4 ozs.
Soda carbonate	4 ozs.
Hypo.	8 ozs.
Liq. ammonia, .880	2 fl. ozs.

Addition of more ammonia to the developer gives more vigour. The plates develop (and partly fix) in 2 or 3 minutes. They can then be examined by daylight and fixed in plain hypo.

D. M. A.—We can find very little fault with the portrait, which is a very nice piece of arrangement and lighting. If we have any criticism to make it is that the line of the shoulder and neck and the "sleeve" of the dress is rather hard. A firelight effect if this kind can do with being softer both as regards outline and contrast, and we think it is worth your while to print it in sepia (and perhaps stain the print to a pale orange colour), and also to introduce a certain amount of diffusion by means of thin celluloid between the negative and the paper. The background also seems to us to want a little relief, such as we judge from the print could easily be done on the glass side of the negative.

N. S.—(1) There have been a very great many different processes of reversal—that is to say, conversion of a negative image into a positive. In the "B.J." of November 17, 1916, we gave the working details for a few of the best of these processes which have been brought out within the last ten years or so. But really none of these methods are thoroughly practical for regular use in comparison with the making of a negative and the printing of a positive on paper or glass from it. (2) The tiny photographs were made in some cases by wet collodion, but we believe the best (made in Paris) were done by a form of albumen process. The latter has gone out of use, although we believe the little photographs are still to be obtained in Paris through a trade house in touch with the few craftsmen doing this work. As regards the albumen process, about the best reference we can give you is to a paper by Miethe, describing working details, which appeared in the "B.J." of September 13, 1912. We have not these old issues in print, but very likely you could see it in your public library.

R A.—(1) You can get several patterns of printing box for use with oil light from Butcher, Kodak, or Marion, as well as from other makers, and for printing on bromide the oil light, which has to be reflected from a mirror in the printing box, is powerful enough in ordinary circumstances, that is to say, unless you are dealing with negatives of heavy density. But for printing on gaslight and for dense negatives on bromide the best plan is to use daylight, by fixing the printer to an aperture in a shutter which is mounted in the window preferably of a room which receives a north light. The exposure would then require to be made by a sliding panel outside or by a shutter placed inside the printing box in the pattern of a pair of opening flaps. As you do not tell us the sizes of negatives we cannot suggest any dimensions, but, generally speaking, any commercial box could be adapted for use in daylight. (2) As regards artificial light in the studio, the only recourse is to a battery of incandescent gas mantles, sold by Griffins as the "Howellite." It is fairly satisfactory, but it gives out a good deal of heat, and if the studio is small and not very well ventilated, may make the place unbearably hot in the summer. Nevertheless, unless you are ready to fit up a chamber for flashlight it is the best thing you can have.

THE BRITISH

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Contents.

SUMMARY.

In consequence of the Easter holidays the "B.J." will be published a day earlier next week, and, therefore, line advertisements for insertion in next week's issue (March 25) must reach our publishers not later than 12 (noon) on Tuesday next, March 22.

In a leading article we draw attention to some of the æsthetic amenities which require to be observed if photographs from the air are worthily to take their place with those from the ground level. In the case of aerial cinematography, the obstacles to securing a film with the necessary movement in it appear almost insuperable. (P. 150.)

In a recent paper before the Royal Photographic Society, Mr Julius Rheinberg described much interesting experimental work of his in the field of applying the changes in the physical properties of colloid substances to photographic processes. (P. 153.)

The prices of dry-plates were reduced by about 18 per cent. as from Monday last. On page 160 we print a table tracing the fluctuations in price since the disappearance of the popular shilling standard a year or two before the war.

The unconventional in lighting is among the little explored present-day possibilities of portrait photography. A doorway opening upon a sunlit garden provides opportunities for some exceedingly fine lighting effects. (P. 150.)

In reference to Mr. Willis's article on the *de luxe* printing processes, one correspondent emphasises their advantage from the standpoint of hygiene, and another questions the alleged difficulty of obtaining printers. (P. 162.)

Mr. W. Thomas, in a tribute to the usefulness of the phenosafranine process of desensitising, expresses his preference for working by a bright yellow or red light rather than by a very much weaker white light. (P. 151.)

Mr. A. Thomas describes a useful fitment for the enlarging easel consisting of a frame provided with a series of flap shutters. The frame can be pinned in front of a test strip of paper, and successive trial exposure very quickly made. (P. 161.)

At the South Suburban Photographic Society a youthful experimenter gave an excellent demonstration of the preparation and use of Kallitype paper. (P. 160.)

A hint on the making-up of the very useful single solution mercuric-iodide intensifier is given in a paragraph on page 150.

The usefulness of adding an even tone to a print by "sunning down" is of service chiefly with print-out papers, but can be usefully applied to development papers. (P. 150.)

A recent patent specification of Mr. Harold Hood's describes an improved mounting of half-tone blocks, providing greater security of the metal, and allowing of type being set closer to the printed impression in consequence of the narrower width of the "beard" of the block. (P. 157.)

In photography, and particularly in cinematography, there is still the need of a better knowledge of underlying principles. (P. 149.)

EX CATHEDRA.

Plate Prices Reduced. Photographers everywhere will receive with much satisfaction the announcement on Monday last of a reduction in the price of dry-plates. On another page we print a table showing the present reduction in relation to the successive fluctuations in price since 1913. The degree of the present decrease varies within narrow limits in the different sizes, but taking half-plates as a standard of comparison the reduction from 7s. 4d. to 6s. is just over 18 per cent. This reduction brings prices to the level at which they stood from February 5 to August 1, 1918, and makes the present price exactly 2 1-5 times that prevailing at the outbreak of war. We see that French dry-plates have also been reduced in price 10 per cent., and the advice received from one plate-maker in this country announces also a reduction in the price of development and print-out post-cards. This declension of the abnormally high prices of sensitive material will certainly be received as an encouraging and stimulating fact in all sections of the photographic trade, and will do much to restore activity in certain branches.

* * *

Technics. Despite the great volume of information contained in books and periodicals which deals with the underlying principles of photographic processes, we fear it must be admitted that photographers as a body have little inclination to look below the surface at the causes which are inherently associated with practice. Much less are they inclined to apply such of those principles as are susceptible of numerical expression to the control of photographic operations. Probably there are not many in the mental state of a studio photographer who had purchased a lens much too large for his working space and returned it to the seller with the complaint that it had no focal length. Nevertheless, an acquaintance with the more elementary optical and chemical principles which in great measure are a helpful guide to practical work and are reasonably comprehensible is, we are afraid, the possession of few. Perhaps some consolation may be derived from the fact, as we believe it to be, that in the allied cinematograph craft the average acquaintance with the technics of the subject is at an even lower level. We had two instances of this recently. A specially-skilled projection operator, the pick of the firm's staff, was sent to fit a new lens which had been purchased for a theatre, and in default of a proper mounting for it, thought it sufficient to extemporise a holder for the objective, which actually left it free to wobble when the machine was working. The other instance, which is mentioned to us by a correspondent, is that of two projection operators with whom a discussion was held on a means for increasing the period of time during which each picture, whilst stationary, is illuminated on the screen. Neither of these operators could see any useful purpose in such an inquiry, for, said they, the film never does stop. How could it,

when we are turning the handle all the time! Evidently there is still a field for the labours of the technical writers in our cinematograph contemporaries.

* * *

Unconventional Lighting The average studio operator is apt to become more or less stereotyped in his method of lighting, and thus often misses an excellent effect, because the sitter is not at the moment in the regulation position. It is a good plan to keep the eyes open for striking effects of light, whether in the studio or elsewhere. The rapidity of gelatine plates has increased to such an extent that exposures can be made under conditions which even a couple of years ago would have been fatal to success. It is quite a mistake to suppose that only a hard result can be obtained from a strongly-lighted subject. We know of one photographer at least who obtained excellent portraits of children, and sometimes women, by posing them in an open doorway leading into his garden in full sunlight. Correct exposure and judicious development reproduced the lighting as it appeared to the eye, and did not yield the "soot and whitewash" effect which is usually associated with direct sunlight pictures.

* * *

Mercuric Iodide. The mercuric-iodide intensifier is gradually growing in favour, and will in time probably oust the old favourite mercury and ammonia altogether. As we have already given formula and working instructions, it is not necessary to repeat them, but there is a little point which deserves attention in compounding the solution. It was first raised by Mr. Welborne Piper, and is, in our opinion, of some importance. It is, that the mercuric iodide should be made by pouring a solution of mercuric chloride into one of potassium iodide, and not *vice versâ*. Also it is preferable to clear the solution by using a few drops or a small crystal of potassium iodide instead of the hypo usually recommended. Although a trace of hypo in the negatives to be intensified does not interfere with the process, it has a tendency to convert a portion of the mercuric iodide in solution into an inert salt and so to waste it. It is not perhaps generally known that after well washing a negative treated with mercuric iodide may be further strengthened by treating with amidol, as is done in chromium intensification.

* * *

Sunning Down. Many photographers are not aware of the fact that a much better effect may be obtained when printing from harsh negatives by giving the paper a short exposure to light out of contact with the negative after it has been taken from the frame or printing box. This is of particular value when dealing with over-dense negatives that tend to give blank expanses of white paper, such as the sky portion of a landscape. When printing upon one of the daylight papers the extent of the light-action is readily observed and controlled, but even with development papers much better results may be sometimes obtained through the means indicated above. Care must be taken not to allow the action to go too far, or the effect of the attempted cure will be worse than the original defect. Very little exposure only is needed, and it should be so adjusted that its effect is hardly visible. This "sunning down," as it used to be called, may be general, or its action may be controlled locally according to requirements. If only a little depth of tone is needed, as in the case of the sky in a landscape negative, the action of the light may be regulated in the following simple way, though this applies only to print-out papers. The exposed print is replaced in the printing frame and a piece of thick opaque paper, slightly larger than the print, is taken and torn roughly to form a mask to serve in protecting those portions of the print where no light-action is required. The frame is then taken out into the light and the mask rapidly moved over the print while the paper is allowed to darken, the movement preventing the formation of a harsh line. This method is not, of course, confined to landscape subjects, though it is among these that it is found most generally useful.

LIMITATIONS OF AIR PHOTOGRAPHY.

When in the summer of 1839 the great French *savant* Arago communicated to the Academy of Sciences the working details of the Daguerreotype process the Parisian public became rapturously excited, and the artists in particular were filled with generous enthusiasm. Paul Delaroche, for instance, having obtained a Daguerreotype from the inventor, exhibited it everywhere, exclaiming, "Painting is dead from this day!"—an observation which succeeding generations of artists and art critics have done their best to make the world forget. The incident is instructive as an example of the doubtful perspective in which new ideas are commonly viewed, and something may, perhaps, be learnt from it in connection with the art of aerial photography, now in its childhood, and giving promise of a healthy adolescence. In a good many quarters the tendency has been to exaggerate the importance of this new departure quite outside its importance from the military standpoint, and as an aid to surveying and exploration. A useful corrective to this tendency is a visit to some such exhibition as the "Travelogue" of the Ross-Smith flight from England to Australia, now "showing" at the Philharmonic Hall in Great Portland Street. It is quite an interesting performance, and some of the photographs taken from the air, notably those of the Alps, are of distinct merit. But it is quickly realised that, if these had not been supplemented by pictures obtained on what aviators call "the floor," mostly during the return journey, the photographic record would have been disappointing, even if time conditions had enabled a much fuller series of exposures to be made.

In particular, aerial cinematography leaves a good deal more to the imagination than the average spectator likes, unless it is carried out under specially favourable conditions. Flying low over an area in which there is a certain amount of life, or a succession of strongly marked features, a film may doubtless be secured by a shrewd operator, which will show well on the screen and keep an audience interested for a few minutes. But, ordinarily speaking, a cinematograph record from a considerable altitude is, not to put a fine point on it, hopelessly dull, even more so in fact than the average run of films made up of exposures from a moving train. This is hardly surprising, in view of the distance from "the floor," and the extensive area included in the view-angle of a short-focus lens. The desideratum in cinematography, namely, a sequence, as far as possible unbroken, of actions, movements, gestures, processes, or scenes peremptorily arresting the spectator's attention, is wholly lacking in a film in which even objects of magnitude, such as a great camp or mosque, are so insignificant that they hardly relieve the general monotony.

It goes without saying that some very fine single photographs have been made from aeroplanes and airships, and in this direction a good deal of success should be achieved in the future. But even skilled operators have probably a good deal to learn in this connection, and it may well be that in the course of the next few years some important improvements will be introduced in the apparatus employed in aerial work. As things are, it is only

occasionally that a photograph from the air is at all satisfying, and very frequently indeed it is frankly hideous. There is no reason why it should not be in its way a work of some artistic merit, for many a fine picture has been drawn or painted from a very elevated standpoint. But no artist, of course, would attempt a sketch from an eminence if he had to look down at the angle at which some aerial photographers seem to delight in taking their "pictures." There is plenty of room in this respect for improvement, and no obstacle to progress in the way of deficient optical equipment. Perhaps a useful guide to the operator would be an attachment to the camera showing graphically and conveniently the extent to which the camera was being tilted during exposure, and in not a few cases a record of the tilt would be an interesting aid to the study of the resulting air photograph.

These few observations only touch, of course, the fringe of a large subject, but we have said enough, perhaps, to make it clear that for many years aerial photography is not likely to be a serious rival to photography on the ground, except for the particular purposes for which it is invaluable. Some day, possibly, when we all spend a large proportion of our time in the air, there will be a general demand for pictures as seen aerially from considerable altitudes, and the most ordinary form of full-length portrait will be of a "sitter" in his or her private aeroplane, the latter, of course, being "snapped" in motion. Aerial "studios" in such circumstances will be rather serious problems, and one imagines that double-printing will usually have to be resorted to in the matter of backgrounds. Cloud-studies for this particular purpose will no doubt be forthcoming in great variety and at moderate prices, but there will always be clients dissatisfied with such simple aids to pictorial effect, and more inclined to favour, say, the Parthenon or Vesuvius in eruption as a suitable "setting." Those will be days when anything not seen from a more or less sublime standpoint will appear comparatively strange to a race spending, maybe, a great deal more time in aeroplanes and airships than we do in railways and buses. But the restless prospect thus indicated should be—let us hope it is—fairly remote, and in the meantime there is no need to imitate the premature pæan of Arago on the Daguerreotype, and to imagine that photography on *terra firma* is seriously menaced, whether as a profession or a recreation, by photography from the clouds. Coincidently, it would be well if air photographers took more careful stock of their limitations, and endeavoured to gain fuller advantage from their exceptional opportunities by approximating their renderings to the requirements of ordinary human vision. Some results recently printed in "The Times" show progress in the right direction, and it should not be long before we see the last of photographs taken with the camera held vertically, and similar freaks, which, except for reconnaissance and survey purposes, have no real interest or value.

THE NEW WONDER WORKER.

It looks very much as if the newly-introduced desensitiser will prove one of the greatest boons possible to those photographers who, either from choice or force of circumstances, use panchromatic plates. Particularly now that the speed of this class of plate has been almost doubled by at least two makers of them, the extreme care needed to protect them from light-action, when handling in the dark-room, has become still more necessary.

Having used panchromatic plates constantly since Messrs. Wratten first introduced them to the photographic world, it has become, from practice, quite simple to handle them in complete darkness, and in the ordinary way it is when removing the negatives from the fixing bath for washing that they the *seen* for the first time.

This, when exposures given had been correct, proves quite satisfactory, and usually good negatives are the result; it certainly gets rid of fogged negatives, but there is an entire lack of that interest felt when one can watch the progress of development, from time to time, under a flood of safelight, such as is employed in using slow ordinary plates.

This working in complete darkness, or a condition which at best can only be described as darkness made visible, has doubtless been one of the prime causes which prevented all but a comparatively small number of photographers using panchromatic plates, but this should now be a thing of the past, since by the introduction of their "Desensitol" (to give it its trade name) the Ilford Company have simplified the use of all these delicate colour-sensitive plates to such an extent that, except for first soaking the exposed plate for one or two minutes in the solution in *complete darkness*, all the rest—developing and fixing—can be done safely with such a flood of red or orange light as would normally only be used for slow negative plates.

The manufacturers state that after the plates have been given the required time in the Desensitol bath, all that follows may be done safely in *white light* under certain conditions. Personally I fail to find this method gives such clean negatives as when a safe screen is used in the lantern. Certainly that is so when very rapid plates or the panchromatics have been tried, and really it seems difficult to imagine what magic benefit is to follow using a weak white light in preference to a pale red or bright orange one. The object in either case is to be able to see the progress of development, for which purpose one form of light is as effective as another of similar intensity. As the result of a series of experiments made with different plates, and after desensitising, developing some under reflected white light, and for others using different safelights, the following has been found the most convenient procedure when the fastest panchromatic plates are being handled and perfectly clean negatives desired.

All dark-slides are filled in complete darkness, quite a simple performance after a little practice. When about to start developing, a dish of the Desensitol, ½ oz. to 25 ozs. of water, is put on a corner of the table, and when ready the lamp is switched off, and, in complete darkness, the first plate is slid into the solution and left there for a couple of minutes. Then the lamp, with a No. 1 Wratten safelight, is switched on again, and from this point all the rest may be done safely, just as if handling a slow ordinary plate. But here again there seems no particular advantage in leaving the plate uncovered all the time. Therefore, after flowing on the developer, I cover the dish for one or two minutes, then take out the plate and clean off the black backing. I return the plate to continue development, and when it seems finished rinse and put it to fix.

The comfort of doing all this in a room flooded with bright red light is obvious, as is also the lesser risk of damaging the wet, tender film when passing the plates from one tray to another.

The solution being of a deep intense red colour, it is as well to abstain from dabbling about in it with one's fingers, which seem to absorb it with avidity and to part with its

results as reluctantly. As walking about with red-stained finger-tips is not pleasant, a little care in handling the plates is advisable in order to avoid this.

The negatives themselves are all stained red, but this clears away during washing, though some plates seem to hold the dye longer than others, and it is better therefore to follow the Ilford instructions and bathe the negatives in a clearing bath made up of hydrochloric acid, 4 parts; alum, 2 parts; water, 100 parts; then washing as usual for a short time. This is a simple and effective way of discharging all trace of colour, for the negatives become crystal clear, and it takes but a few minutes to accomplish.

It is a wonder worker, this Desensitol, for it transforms the handling of extremely rapid and colour-sensitive plates from a work of some difficulty to one of ease and certainty, and does away with all risk of light-fog during development.

There is another matter which, at times, gives rise to trouble when using plates of such extreme sensitiveness as to require handling in complete darkness or the deepest of ruby or green safelight in the dark-room lamp, and *especially when a quick-acting developer is used*. Unless the solution is flowed evenly and quickly over the entire plate in one sweep it is likely to produce markings, more or less pronounced, on the resulting negative, which requires some amount of dodging when printing is done, or even ruins the plate for this purpose. The larger the size of plate, the more easily may this trouble arise; the preliminary soaking of exposed plates in this desensitiser gets rid of all risk of trouble from uneven flowing on of developer, for the whole proceeding is done in a flood of safe light, and trouble from markings and air bubbles becomes a thing of the past.

It will prove itself a boon and blessing to all photographers, but to none more than those of us who pin their faith, in all critical work, to the fast panchromatic plate.

W. Thomas.

THE POINT TO FOCUS ON.

It is often stated that depth of field in focus depends only on the diameter of the aperture, and is independent of the length of focus of the lens used. While this statement is correct, it requires to be qualified by the remark that the print taken with a lens of short focus must have been enlarged to the same size, as the print taken with a lens of long focus.

The alignment chart, fig. 1, enables us to solve the problems of depth of field in focus (usually called "depth of focus") in an elegant and simple manner. Having decided the distances, measured in feet, of the remote and nearer objects which are desired to be "sharp," draw a straight line between the two corresponding points on the left-hand scales headed "Remote" and "Nearer," and continue this line to meet

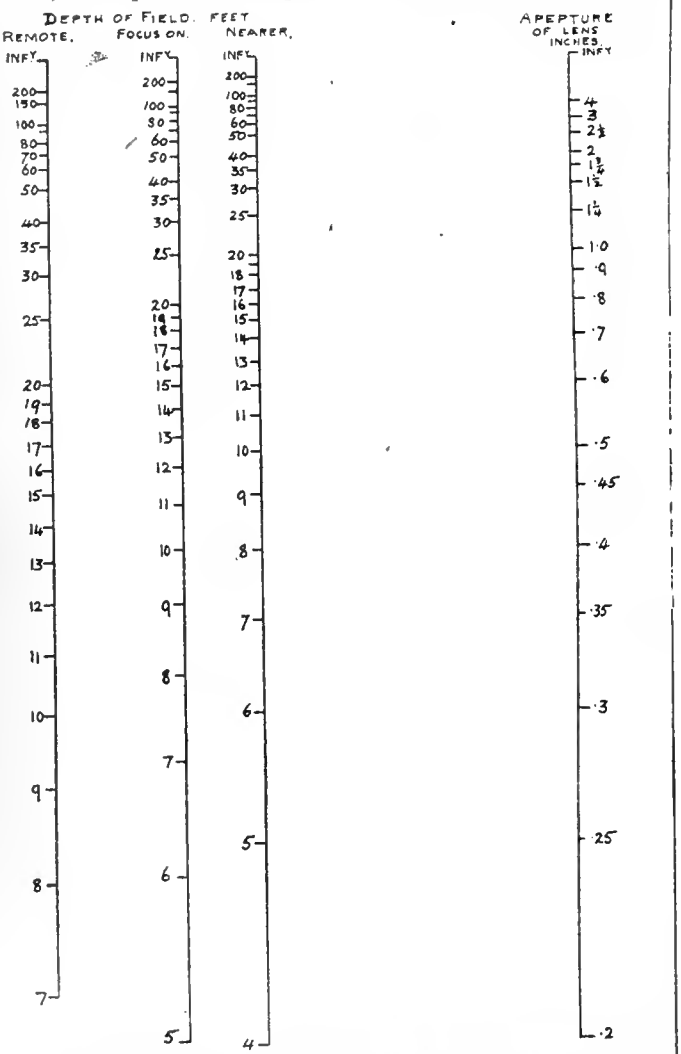


Fig. 1.—Chart showing actual diameter of lens diaphragm for maximum depth of focus of near and distant objects at given distances: also showing point to focus on.

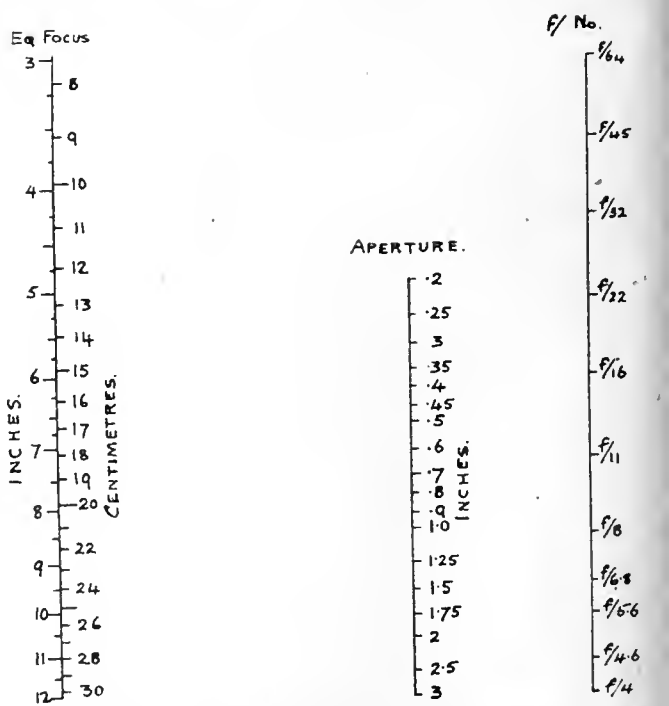


Fig. 2.—Chart showing actual diameters of diaphragms corresponding with various conjunctions of focal length and *f* No.

the right-hand scale headed "Aperture of lens." This last-found point will be the diameter of the aperture in inches, to which the lens must be set. The line just drawn will also cross the middle of the three right-hand scales headed "Focus on," and the point where it does so will indicate the distance on which the camera must be focussed in order that the remote and nearer points may be equally sharp.

It will be objected that the diameter of the aperture is not

marked in inches, but only by *f*/ numbers. Fig. 2 enables the diameter of any stop to be found. The left-hand scale is graduated to represent equivalent foci between 3 inches and 12 inches, with corresponding values in centimetres. The right-hand scale is graduated from *f*/4 to *f*/64 with the usual intermediate apertures, and the centre scale is gradnated to indicate diameter of the aperture in inches. Straight lines from the point representing the equivalent focus of the lens proposed to be used to the points representing the *f*/ numbers will determine by their intersections on the centre scale the diameters in inches of these stops

For convenience of use, these values for lenses in constant use should be marked off on fig. 1 so as to avoid reference to fig. 2 on each occasion.

The circle of confusion on which the design of fig. 1 is based is taken as being 1/1200 of the actual focus of the lens, which is conjugate to the distance focussed on. This means that, using a lens of 12-inch focus, the circle of confusion is 1/100 inch, which is usually considered as a standard, while with a 6-inch lens the circle of confusion is 1/200 inch, and so on, in proportion. If it is desired to work with a larger circle of confusion, the diameter of the aperture should be increased proportionately; if with smaller circle of confusion, the aperture must be decreased. For example, the lens to be used is of 6-inch focus, the remote object is 30 feet away and the nearer object is 12 feet away. Fig. 1 shows that an aperture of .4-inch must be used, and that we must focus upon an object 17 feet away. Using fig. 2, we find that *f*/16 nearly equals .4-inch aperture for a 6-inch lens. Therefore, if the photograph is to be enlarged two diameters and not appear fuzzy when viewed at a distance of 12 inches, the stop just found must be used. If, however ,a contact print only is going to be made, the circle of confusion can be 1/100 inch diameter; that is, twice as large as the designed circle of confusion, and we can therefore use an aperture twice the diameter, or *f*/8 instead of *f* 16.

The formula, on which fig. 1 is based, and which gives the relations between the distance focussed on, the remote and nearer points in focus, the diameter of the aperture, and the circle of confusion, is:—

$$\frac{1}{F} = \frac{1}{N} - \frac{1}{x \times A} = \frac{1}{R} + \frac{1}{x \times A}$$

in which—

F is the distance of the point focussed on.

N is the distance of the nearer point.

R is the distance of the remote point.

x is the ratio of the back focus of the lens (which is conjugate to F) to the diameter of the circle of confusion. In fig. 1 this ratio is 1200.

A is the diameter of the aperture (entrance pupil) of the lens.

Care should be taken when using this formula to keep the quantities F, R, N and A in the same units of length.

Those who take a pleasure in deriving these formulæ for themselves are referred to the eleventh Traill Taylor lecture, that by Dr. E. Wandersleb on "The Regulation of the Rays in Photographic Objectives," which was published in the "B.J." for February 12 and 19 of 1909 (Vol. LVI.), p.p. 116 and 139. They should ponder over the significance of fig. 14 (p. 122).

R. Savory.

SOME NEW DIRECTIONS FOR PHOTOGRAPHIC RESEARCH.

(A paper read before the Royal Photographic Society, and reprinted from the Society's Journal.)

Photography as we know it originated with the observation of the fact that the action of light produced chemical alterations in a light-sensitive film, and it is not unnatural, therefore, that the study of photography and photographic processes has in the main been the study of making use of these chemical changes to best advantage. Research on the preparation of emulsions, developers, toning and fixing agents, and the methods of using them, has been chiefly concerned with the utilisation of the *chemical* changes by light on the light-sensitive film and turning it to best account to obtain the desired results.

The *chemical* action of light on the photographic film, however, is nearly always accompanied by some *physical* change in the colloid vehicle also, or perhaps it would be more correct to say that it is invariably accompanied by some such physical change. The physical changes may be of various kinds, and not being usually very pronounced, this side of the subject appears to me to have perhaps received less attention than it deserves. I propose this evening, therefore, to bring to your notice some observations and results obtained in investigations which I have carried out at various times for specific purposes, showing how these physical changes in a photographic film, which accompany the chemical changes brought about by the action of light, may be made use of in new ways. I am hopeful that this may stimulate discussion, and serve to show that it points to new fields of inquiry worth following up in other directions.

A few instances of marked physical changes in a film accompanying the action of light are familiar to everyone present: they have been known for a very long time, and have been exploited in various practical photographic processes. Perhaps the most familiar instance is that of the action of light on gelatine or albumen containing the proper amount of potassium bichromate. The bichromated gelatine becomes insoluble when acted on by the light, and the portion not acted upon remains soluble and may be washed away, and there are various important processes dependent on this fact. Although in this case the whole nature of the sensitised film has been physically changed by the action of light concomitantly with the chemical change that has occurred, attention would not usually be focussed on this physical alteration, as I suppose that questions of solubility and non-solubility would usually be regarded rather from the view-point of chemical change.

A more pronounced case of physical change is afforded by the instance of the difference in the swelling properties of photo-sensitive gelatine films, the reliefs so obtained having been exploited for various photo-mechanical processes.

Again, certain processes, as instanced by collotype, have been founded on the differential adhesive power of the exposed and unexposed parts of bichromated gelatine films, the differential adhesiveness for greasy substances being itself dependent on the differential power of absorbing moisture of the exposed and unexposed parts.

Lastly, it has been found that by chemically treating exposed films, the exposed and unexposed portions may be made to absorb certain dyes selectively, and certain processes have been founded on this fact. This, however, again would probably be regarded rather from the chemical than from the physical standpoint.

So far as I am aware, the instances named illustrate the chief directions in which the physical alterations caused by the action of light on photographic films have so far been utilised, although very likely some other ways may be pointed out by members present, in the discussion.

I now come to a different way in which the physical properties of a photographic film may be markedly affected by the action of light accompanying chemical change. It is a way I set out to obtain, and was successful in obtaining and utilising in researches on a new method of colour photography, to which I devoted several years' experimenting just prior to the outbreak of war.

Without entering into any special details of this process of colour photography itself, I need only say that one of the problems that presented itself in connection with the same was how to obtain three-colour line or dot screens, somewhat similar to the Paget screens, from which the colour lines or dots might subsequently be selectively extracted, *e.g.*, the red dots might need to be extracted wholly, the green dots partially extracted, the violet dots left in, and this selective extraction would require to be brought about at the same time by immersion in a single bath. Now, I was unable to make use of the Paget plates themselves, or rather I should say of plates made by the Paget process, because this process depends on coating the collodion, which is the vehicle of the coloured dots, with a photographic resist of bichromated albumen. The Paget process of screen making, as is known, is to expose the collodion film covered with the bichromated albumen resist under a dot screen, then wash away the unexposed parts of the resist, and the collodion on immersion in a dye solution is then dyed up selectively where the unexposed film has been washed away, leaving the collodion free, but is protected from taking up the dye, under the exposed dots of the resist, because these form an insoluble protecting surface. In the final Paget screen plate, of course, the dots in two of the three colours have this transparent insoluble bichromated albumen resist left upon them, and that was fatal for my special purpose. Naturally, I first tried by all sorts of ways whether it was not possible to get rid of the bichromated resist which remained on, but was not successful. I then went on the tack of trying to find some sensitiser for the resist, other than a bichromate: one by which insoluble resist dots might be obtained temporarily which could be converted into soluble ones subsequently and then washed away. On this tack I was also unsuccessful; moreover, I found that the washing away of the soluble part of the resist, so as to leave nice, clean, insoluble dots, was not quite such a simple thing as it reads. I then conceived the idea, Why not attempt to dye up or extract dye from the colloid vehicle, right through the superimposed resist film? This idea seemed attainable provided the permeability of the resist film to the solvent of the dye could be changed by the action of light, whilst the resist film remained soluble, whether exposed to light or not, in some other solvent which would not affect the underlying vehicle of the colour dots.

This problem, after innumerable trials, was not only successfully solved, but solved in quite a number of different ways, using various colloids as the vehicle for the colour screen and the resist. It will probably serve to make matters clearer if I describe in detail a specific case.

A plate was first coated with a collodion film dyed red, for example. This was coated with a photographic resist made up as follows:—

Gum arabic—I part in 5 of water ...	1 volume.
Green ferric ammonium citrate—I part in 2 of water	1 volume.
Uranium nitrate—I part in 2 of water	1 volume.

This resist is entirely impermeable to alcohol (industrial spirits) acidified with a few drops of HCl in the unexposed state, but after the action of light on it, it becomes permeable to the spirits.

If, therefore, the plate is exposed for a few minutes to light under a line screen, consisting, say, of 200 opaque and 200 clear lines per inch, and subsequently immersed a few seconds in the acidified alcohol, the whole of the red dye is extracted right through the gum resist, under the lines exposed to light, and a screen consisting of 200 red lines and 200 white lines per inch results.

Next, the plate is immersed in an alcoholic solution of green dye, and the white lines are then dyed up green through the resist. The plate then consists of 200 red and 200 green lines per inch.

Next, the plate is immersed in water, which washes away the whole of the resist, and it is coated with fresh gum resist as before. It is again exposed to light under a line screen; this time a line screen of 200 per inch with the opaque lines double as wide as the clear lines is used, and this screen is placed with the lines at right angles to the red and green lines already on the plate.

It is then again immersed a few moments in acidified alcohol, extracting the dyes from the collodion, corresponding to the clear lines of the line screen, and then immersed in an alcoholic solution of a violet dye, which dyes these clear lines up.

Lastly, the plate is again immersed in water, which at once dissolves and washes away the gum resist.

The final result is then a plate with violet lines, and red and green rectangles, all three colours occupying an equal area of the plate.

A few specimens of screen plates of the pattern described and of other patterns which were made by this process in 1913-14 by myself and Mr. G. C. Laws, who was assisting me at that time, are exhibited this evening. The process, I may say, is patented so far as screen plates are concerned, but has not been offered anywhere, and if any enterprising firm wishes to take it up and will communicate with me, I shall be delighted.

However, to revert to my subject. In the method described with the gum resist, the resist was washed away after the underlying collodion film had been dyed up in two colours, and a second resist applied before proceeding to re-expose and extracting the dye and then dying up in the third colour. But gum arabic is by no means the only colloid that can be employed for the photographic resist film. Fish glue could also be used, likewise albumen, and when employing albumen it was even found possible to leave the albumen coating intact after the first dyeing up, simply washing out the water-soluble chemicals in the resist, and sensitising it again by immersion in water containing 7½ per cent. green ferric ammonium citrate and 7½ per cent. uranium nitrate, and then proceeding with the process as described. This perhaps brings home more than anything else that it is purely a case of utilising the physical properties of the colloid film to bring about the desired result.

It will be seen that when once the general principal of the idea is grasped it is simply a matter of time and patience to work out all sorts of variations, so long as a few main conditions are borne in mind. These are simply:—

(1) The colloids of which the upper and underlying film consist should be of a different nature; for example, the one should be water-soluble, the other spirit-soluble, or soluble in some other solvent or mixture of solvents.

(2) The solvent chosen for conveying or extracting material from the underlying film must be one which does not harmfully affect the upper film.

(3) The light-sensitive chemicals in the upper film must be such that only the unexposed parts or the exposed parts, as the case may be, are affected by this solvent, or at all events the action must be very differential on the exposed and unexposed parts.

(4) The solvent for removing the upper film or light-sensitive chemicals must be one which does not affect the underlying film, or dyes or materials in it.

The general idea of action on an underlying material through a superimposed resist is one which I doubt not is capable of extension in quite a number of directions. I will instance one application of it to quite a different problem than the one already referred to.

Shortly after the outbreak of the war I had, unfortunately, to give up my experiments in colour photography, as Professor Cheshire, of the Ministry of Munitions, asked me to

see what could be done in the way of devising some good process for the production of "Graticules" (which, as most of my audience know, are the glass discs or scales with extremely fine lines on them, used in military and other sighting instruments). It was an urgent problem, since we had been chiefly dependent on Germany for these products, and, except for some very primitive methods, not at all suitable to mass production, the processes, monopolised by one or two German firms, were kept secret.

Some photographic method appeared to be the only feasible one, and, after first attempting a dyeing-up method which, it was quickly seen, offered no prospects of success, I decided to attempt an etching method, based upon the idea of differential action through a resist, which was subsequently to be washed away. The principle was, of course, just the same as in the previously described method, but the factors were much changed, because now the underlying film was the glass itself, and the solvent to act on the underlying film would no longer be a fluid, but hydrofluoric acid gas. I need not dilate at length on the matter; suffice it to say that after a great many experiments it was found perfectly possible to apply the principle.

In this case it turned out that the most suitable upper resist film was collodion containing an iron salt, and subsequently sensitised in an alcoholic solution of silver nitrate. A few specimens, prepared by myself or Mr. J. W. Purkis, who was acting as my assistant at the time, are exhibited this evening. Results were also obtained with water-soluble resist films on albumen, fish glue and gum arabic, but for the purpose in question the collodion resist gave the best results.

Now, it is quite true that these graticules were not eventually used, because, firstly, it was found impossible to get the resist so perfect as to prevent some microscopic pits on the surface of the glass, where they were not wanted; secondly, because the nature of the etched lines did not meet the optical desiderata; and thirdly, because very shortly after these experiments all desiderata were fulfilled by the method of grainless photography, examples of which I had the pleasure of exhibiting at the Society's annual exhibition. That, however, does not alter the fact that the principle of etching in this way has been found quite workable, and, for aught I know, might usefully be applied to work of a less delicate and exacting description than that demanded by graticules.

The last matter to which I will refer this evening is the different physical properties of colloid films according to the solvents with which they have been produced, and with which they may be treated. From the theoretical standpoint there is little, if anything, new in what I have to say: it is the practical applications which I wish more particularly to refer to, because I venture to think that certain simple fundamental facts, often very helpful in dealing with photographic problems, are not infrequently apt to be overlooked.

Now, the physical properties of the film resulting from a colloid in solution depend, amongst other things, on the rate of evaporation of the solvent or solvents, as well as on temperature. When two solvents which evaporate at varying rates are employed together, the resulting film has a tendency to be deposited in a more irregular manner than when it is evaporated from a single solvent. This principle is occasionally made use of in producing matt screens with fine grains or particles in the colloid varnish: the greater or less regularity of distribution of the grains of which the film is formed can be regulated by varying the two solvents and varying the ratio of one to the other. Another point is that thick colloidal solutions with two such solvents do not flow so smoothly or easily as solutions of similar concentration in which a single solvent is used; they tend to form ripples, or thicker and thinner places. Now, that is just one of the difficulties which occurs with collodion, which for photographic purposes is almost invariably made by dissolving the pyroxyline in a mixture of ether and ethyl alcohol, neither of which separately will dissolve it. Further, the considerable difference in the rate of evaporation of the ether and alcohol also varies with difference in temperature, and it is well known that the proportions used are different in winter to summer. And the resultant film has varying degrees of density or porosity according to the ratio of the solvents. To coat plates by hand with such collodion mixtures is an art. It can, of course, be done, and done very perfectly; for example, I had reason to admire Mr. G. C. Laws' adeptness at such work. But, personally, I could never coat a plate properly with ordinary collodion.

It is now seven or eight years ago that it seemed to me very desirable to find another way of making collodion for photographic work, either with a single solvent, or at least with two solvents having a much smaller difference in the rate of evaporation than ether and ethyl alcohol. A suitable single solvent was found in the use of pure methyl alcohol, which will by itself dissolve celloidin, or any of the usual photographic forms of pyroxyline. The collodion film formed by such a solution is, however, slightly opalescent, showing that the structure is comparatively coarse, that it is very porous and not as dense, therefore, as ordinary ether-alcohol collodion. This, it was found, could be altered by adding to the made-up solution a certain quantity of ethyl alcohol, the rate of evaporation of which is comparatively close to that of methyl alcohol. The more ethyl alcohol, up to about 50 per cent., that was added, the denser, the less porous and the clearer became the film. It is, therefore, easy to produce a film having controlled and regulated physical properties in these respects.

As to coating plates in a smooth and regular way, it is as simple and easy to do it with either the methyl alcohol collodion or the methyl alcohol plus a moderate proportion of ethyl alcohol collodion as it is difficult to do it with the ether alcohol collodion—a novice can do it at once. But to have a film which possesses known properties as regards density and porosity is not sufficient, for it may be highly desirable that during the processes of photographic development or intensification such physical properties should be varied or made the most of—I have found this extremely necessary in the case of several processes worked out during the war—and with a collodion film of the nature described nothing is simpler. If you require the film to be temporarily more porous, all you have to do is to put it in a bath of water and spirits, the amount of spirits determining the degree of porosity you will obtain. The time of immersion is not of great importance, as it very soon swells to the amount it is going to swell. As spirits, i.e., ethyl alcohol, will not dissolve the film by itself, you may immerse it in spirits alone for obtaining a fairly considerable increase in porosity. If that does not suffice, methyl alcohol may be added to the spirits, up to 25 per cent., to produce increased swelling or porosity. But if you go very much beyond this, although you do not dissolve the collodion, you begin to disintegrate it, and with spirit baths containing 15 per cent. or 20 per cent. of methyl alcohol, the time of immersion does tend to become a factor.

I have recently patented the use of methyl alcohol for certain special photographic emulsions, to which I have not referred this evening, but it seems to me that with the necessary research it might easily be found very useful and adaptable for other purposes, one which suggests itself immediately being the wet-collodion processes, for example.

However, my main point this evening is to suggest that the whole subject of the physical properties of the colloid films, with which photographers have continuously to deal, the bringing of these properties into greater service, or new ways of utilising these properties, is a field of research which will well repay greater attention than has perhaps been devoted to it.

JULIUS RHEINBERG.

To MR. W. B. FERGUSON we must express our regrets that by a clerical error his name was not included in the list of those elected to the Council of the Royal Photographic Society. No one on the Council has rendered so long and valuable service to the R.P.S., and therefore we have the more reason for removing any misapprehension among well-wishers of the Royal that he did not secure election.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Some Notes on the Use of Process Plates.

At first sight, and to the uninitiated studio worker, process plates appear to be the easiest of all brands to work—the slowness of the emulsion, the great latitude, the simple developer commonly employed, and the not having to bother about the rendering of delicate shadows and fine gradations—are all factors which so successfully "camouflage" the process plate as to make it appear to be the easiest thing in the world of photography to use. Habitual and successful users of the "black-and-white" (process) plate, however, know very well that, in spite of the apparent simplicity of the plate and operations connected with it, it is at first a little difficult to understand, having peculiar characteristics of its own; when, however, its idiosyncrasies have been mastered, it will be found to be an ideal plate for many purposes other than that it is intended for, which, as most operators know, is the copying of letterpress, pen-and-ink line drawings, and other purely black-and-white work.

We learn a lot from our failures, are told when we fail to try and try again, and few workers, I feel sure, have had in their early experiences with process plates, more disappointing failures than I met with, and it was not until I adopted a certain plan—one in which the factorial system of development is most prominent—that I now feel sure of getting a good result from every exposure I make. Indeed, for a long time when doing black-and-white work I chose to use ordinary slow plates and the hydroquinone-formaldehyde developer, but good as the latter plan undoubtedly is, it is both slow and unsatisfactory in comparison with a proper process plate properly exposed and developed.

Most, if not all, plate makers issue a process plate, and there is very little difference between them, all giving equally good results when properly exposed, and—what is most important—developed with the developer advocated by the makers. The average speed is H and D 25, though the plate made by the Barnet firm is as high as H and D 75. It is always said that the slower the plate the better it is for copying black-and-white originals, but this saying does not hold good to-day, because the extra speed of the Barnet plate is no detriment to its good qualities, but rather the reverse, as by its speed it becomes a very useful plate for use on ordinary subjects, *e.g.*, dull and flat interiors, architecture, and for copying ordinary photographs, when increased contrasts are wanted.

The developer is far more important than the plate, and since the introduction of process plates many formulæ have been advocated, *e.g.*, pyro-ammonia (Mawson), pyro-soda, metol-hydroquinone, glycin, and hydroquinone. To-day most authorities are in favour of hydroquinone, with, perhaps, glycin as an alternative, but in my experience there is nothing better than hydroquinone, post-war glycin not appearing to be quite so good as the pre-war product; but it may have improved since I used it. Process plate developing formulæ have changed considerably during recent years. Wellington, for example, advocated until recently a solution containing equal amounts of hydroquinone and potassium bromide (100 grs. of each to a pint of developer), as, I believe, the officials at Bolt Court do, but to-day the Wellington formula contains but 10 grs. of bromide and 80 grs. of hydroquinone to the pint. Multiplicity of process-plate developers, however, need not bother the photographer in the least, because a secret of success with any one of the makes of process plates is to use the formula advocated by the maker, and no other. The worker cannot—if he wishes to get really perfect results—ring changes with process-plate developers, as he may, and usually does, with others, and it is for this reason, I suppose, that no commercial ever-ready dry or liquid "universal" developer, no matter what its base may be, will give a result with a black-and-white plate equal to that obtainable with the formula specially recommended by the maker of the plate. Any one developer will, it is true, give an image upon a process plate, and such an image may satisfy some workers, but there is not the chance of getting a perfect black-and-white negative that one has when using the right developer. There is a great likeness between some of the formulæ, the Barnet and the Ilford differing but little, but small as this difference is, I would never use the Ilford formula for the Barnet plate, or the Barnet formula for the Ilford plate. A really serviceable universal developer may, however, come along in due course: it would be most welcome if it could be relied upon.

Most errors are probably made in the exposing of process plates, for in spite of the enormous latitude—mainly theoretical, however—accurate exposures are essential if the blackest of deposits and clearest of shadows are required. One may sometimes secure the necessary density and clearness on a wrongly exposed and developed plate by use of the mereury-ammonia intensifier or the ferricyanide-hypo reducer—using both in some cases—these after-baths being commonly used, but it is a saving of time, trouble, and expense to get a perfect negative by direct development.

Exposure meters serve very well for calculating exposures when the necessary additional calculations for eamera extension, etc., are made. If the increased distance (beyond the normal) between lens and plate is less than one-fifth the focus of the lens, it may be ignored, greater extensions, however, need attention, and the extra extensions and the necesary increases in exposures (the latter in parentheses) are as follows:—1¼ (1½); 1½ (2); 1¾ (5); 2 (4). Thus when using, say, a 6-in. focus lens at 9 in. from the plate, double the meter time is required. There are, I believe, other methods of calculating meter times for copying, but I know little or nothing of them, because I prefer to sacrifice a plate in the making of a test exposure. This testing I do by focussing a piece of newspaper and giving eaeh column of print, or marked sections to represent the same, a different exposure, using a blackened card for covering or uncovering the columns as required during exposure. If, I think, say, 30 secs. is a correct exposure, I arrange that exposure for the centre portion, giving sections on one side of it more, and portions on the other side less, exposure. I prefer this system to the meter, as one is enabled to see more clearly the degrees of density given, and can repeat the desired result with a big degree of certainty. Even when a meter is used it is no uncommon thing to have to repeat an exposure owing to something having gone a little wrong and the negative not being exactly of the type required.

Development is easy enough if the exposure is right, but most difficult if it is wrong. Uninitiated users of process plates are usually of opinion that by under-exposing and forcing development the necessary density can be obtained, but this is not the case, as only by giving sufficient exposure can one get the much-desired opacity of developed image. The great problem users of process-plates have to solve is that of getting a perfectly opaque deposit without blocking up the finer lines and veiling the whites. The factorial system of development may have its weak points when applied to the development of negatives of ordinary subjects, but for process plates it is the thing, and, using a factor of 6, one cannot go far wrong when using the hydroquinone developer. A shorter factor number (assuming, of course, the exposure to be fairly accurate) will not give the required density, while a higher one will result in the lines being blocked up. Thus, if the image appears in, say, 30 secs., developmentwill be complete in 3 minutes, and it is next to useless to develop for a longer or shorter period (with 30 secs. as the time of appearance), unless, of course, it is intended to use a reducer or intensifier, or both, as many workers are in the habit of doing. The usual factor for normal hydroquinone developers, when used for ordinary plates, is 5, but 6 is better for process plates, and even 7 or 8 may be used in some instances, *e.g.*, when originals are flat, if no danger of elogging the finer lines or veiling the shadows threatens. For glycin, a factor of 10 is, I find, suitable, but modern glycin in my hands tends to give a brownish-black image of insuffieient opacity.

Little need be said about fixing baths for process plates, as any kind of hypo fixer appears to serve equally well. I generally use the hypo-alum-acetic acid fixer, as I keep it made up for use with gaslight papers, and this particular bath is specially recommended for the Barnet process plates. In any case, an acid-fixer is to be preferred.

Brief mention has been made of the use of process plates for work other than the copying of black-and-white originals, and more attention might be paid to their uses in what may be termed ordinary photography. Mr. Harold Baker twenty-three years ago, when process plates were usually of a H and D 10 to 15 speed, called attention to their uses in other directions, and now that all

process plates are quicker—particularly the Barnet make—there is all the more reason why they should, in certain instances, be used for ordinary work when the increased exposures called for can be given without any inconvenience.

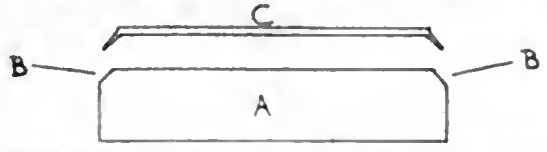
For interiors, when there is a nasty flattening haze in the air, and for architectural exteriors in smoky towns, process plates will give unusually bright results because of their "blindness" to haze and contrast-giving properties. For shop-fronts in busy streets, when there is a lot of traffic past the shops, and for interiors when people are walking about during the exposure, they are ideal because of their slowness, and operators would do well to take advantage of this method of overcoming the drawbacks of traffic, haze, and smoke, as, given the necessary long exposure, process plates will render half-tones quite as well as other plates, though, of course, the steps from black to white are steeper, a peculiarity—exactly like that of gaslight paper—operators can make very good use of.—L. TENNANT WOODS.

Photo-Mechanical Notes.

Mounting of Half-Tone Blocks.

A recent patent specification, No. 158,628, of Harold William Hood and Hood & Co., Ltd., Sandbride Works, Middlesbrough, describes an improved method of mounting half-tone blocks. It consists in providing a bevel or rebate on the wood mount for the purpose of allowing the bevels or lugs of the plates to be depressed below the printing surface to a greater depth. The copper or other metal bevel may be bent downwards out of the way of the inking rollers, and by so doing they may, if expedient, be made to miss being inked altogether by the rollers, and thus not print an unsightly mark or smudge, as frequently happens with inferior papers or loose cylinder-packing. Even if it is not found convenient for the rollers entirely to miss the bevelled edge of the half-tone thus depressed, it will be found in practice that that depression is so great that under no ordinary or even careless condition will it impress either the bevel or the nail head upon the paper round the edge of the picture formed by the half-tone block itself.

Another advantage of this mode of mounting a half-tone block is that of reducing the width of space required for the "bevel" -



in itself a marked advantage so that type matter may be brought so much the nearer to the illustration proper.

A further advantage of the method of mounting blocks is that the nails have a considerably reduced tendency to rise, owing to the fact that their position is far from the vertical and therefore the upward tendency much reduced; this in itself minimises the danger of rising nail heads.

In the drawing A represents a section of an ordinary mount for half-tone work, and BB represent the bevels, while C represents a half-tone plate with bevels arranged to fit the sloping bevels prepared for it on the wood or other substance on the mount.

The usual mounting nails could be used, or, if preferred, very small screws; indeed, the latter are preferred, because owing to the greatly increased security of the plate to its respective mount the difficulty of safely removing a plate mounted by the method is a serious one, which in itself goes to show the increased tenacity of hold that the plate has to the mount, and the reduced likelihood of the danger of the plate coming away during printing, as frequently happens, especially on old blocks.

The following patents have been applied for :—

COLOUR REPRODUCTION.—No. 6,908. Preparation of originals for photographic or photo-mechanical reproduction in colour. A. E. Bawtree.

INTAGLIO PRINTING.—No. 7,047. Process of printing from intaglio plates. Waterlow and Sons, Ltd.

PRINTING-PLATES.—No. 6,697. Production of gelatine printing-plates. H. Renck.

PRINTING PROCESSES.—No. 3,974. Photo-mechanical, etc., printing processes. Dye Impression Photos, Ltd., and W. H. Edridge.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, February 28 to March 5 :—

COLOUR PHOTOGRAPHY.—No. 6,859. Colour photography. F. W. Donisthorpe.

X RAY PHOTOGRAPHY.—Nos. 6,901 and 6,902. X-Ray photography. N. E. Luboshey.

CINEMATOGRAPHY.—No. 6,936. Cinematograph projection apparatus. A. R. Buttery.

CINEMATOGRAPHY.—No. 6,685. Cinematographic apparatus. G. S. James.

CINEMATOGRAPHY.—No. 7,066. Cinematographic apparatus. O. Messter.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

ONE LENS COLOUR CAMERAS.—No. 141,368 (January 8, 1919). The invention has for its subject an apparatus whereby separate films or plates, having the necessary colour screens placed in front of them, are exposed to rays of light emanating from a single objective.

Two mirrors are provided for each of the films or plates to which the rays of light are to be reflected so that the films may

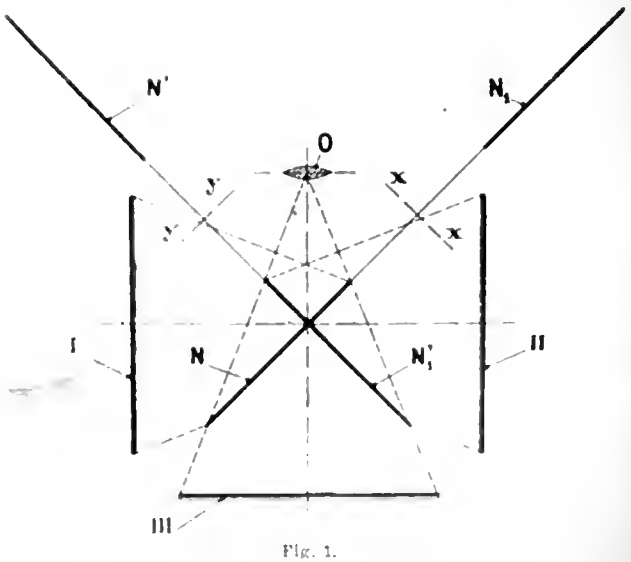


Fig. 1.

be exposed at a higher speed. These mirrors are driven by a common shaft by means of bevel gearing, all the driving mechanism being provided above the level of the objective.

The system comprises two pairs of mirrors N, N_1, and N' and N_1', turning respectively on the axes $x—x$ and $y—y$. The mirrors N, N_1 direct the image from the objective to the plate I., whilst the mirrors N', N_1' direct this image to the plate II. The plate III. receives the rays of light direct from the objective.

Each pair of mirrors N, N_1 (or N^1, N_1^1) is mounted on a hub A, carried in brackets B secured to a plate F. On the axes x—x, y—y are keyed bevel pinions C, D, which gear with a bevel wheel E. This bevel wheel E is keyed to a shaft G mounted in a bearing H provided on the plate F and in a bearing J provided in the top of the casing of the apparatus. On the shaft G is also keyed a toothed pinion K which may be driven by a suitable

Fig. 2.

clockwork or other motor. The plate F is adapted to be adjusted in position on the front wall of the casing so as to bring the mirrors into proper position relatively to the films or plates.

The two pairs of mirrors are mounted in such a manner that the system may turn continuously without collision between the mirrors N, N_1, N^1, N_1^1.

With the system in question it is necessary for the object to remain stationary on the plate during the exposure of the sensitised plate. This result can only be obtained if the mirror moves in a plane perpendicular to the plane formed by the axis of the objective and by its reflected image. The mirrors are inclined to

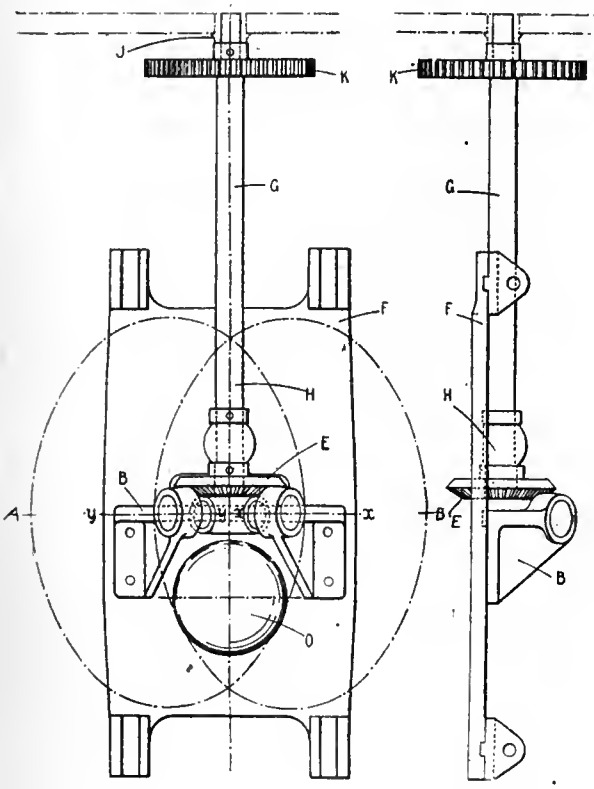


Fig. 3.

Fig. 4.

the axis of the objective at a suitable angle so as to reflect upon the sensitised surface an image, which is not distorted, during its movement.

With this method of construction any number of sensitised plates (2, 3, 4, 5 or more), each corresponding to a colour of the solar spectrum, may be printed upon. The selecting screens are placed immediately in front of the negatives.

This method of construction presents advantages for certain purposes; it permits of rapid displacement without any jerks and it is particularly suitable for colour cinematography.

For this latter purpose it would suffice to substitute for the three stationary plates I., II., III. three films unrolling in the same direction, the movement of the films being effected intermittently in the well-known manner.

The apparatus for taking photographs in colours (by means of rotary mirrors) lends itself to the stationary projection of images in colour, the mirrors being subjected to a rapid rotary movement during the projection. A similar arrangement may be used for

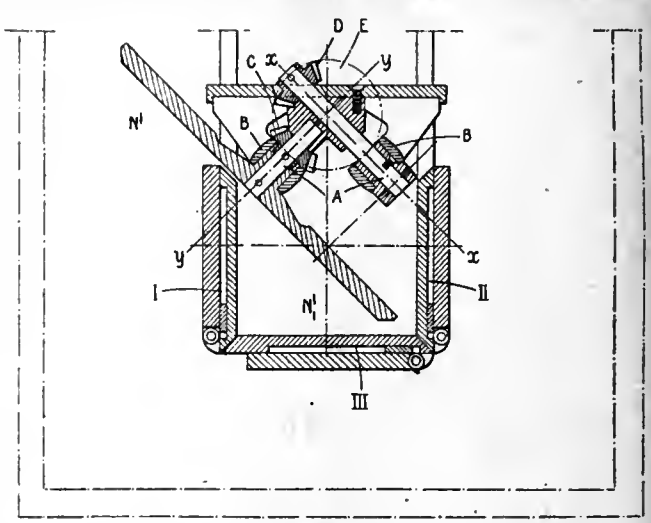


Fig. 5.

the projection of animated images in colours.—Jacquea Dourlen and Marcel Chretien, 64, Rue des Vignes, Paris.

The following complete specifications are open to public inspection before acceptance :—

STEREOSCOPY.—No. 159,192. Stereoscopic methods and apparatus. Optische Anstalt C. P. Goerz Akt.-Ges.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

TICOL.—No. 411,548.—Chemical substances used in photography, photographic plates and photographic films. Thomas Illingworth and Co., Ltd., Cumberland Avenue, Park Royal, Willesden Junction, London, N.W.10, manufacturers of photographic papers.

FORTHCOMING EXHIBITIONS.

March 14 to 26.—Dennistoun Amateur Photographic Association. Hon. Secretary, Wm. F. Macpherson, 152, Craigpark, Dennistoun.

March 16 to 19.—Hackney Photographic Society. Particulars from the Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Professional Photographers' Association, at the Photographic Fair. Horticultural Hall, Westminster, S.W. Latest date for entries, April 7. Hon. Secretaries (Correspondence), Marcus Adams, 43, Dover Street, Piccadilly, London, W.1; (Exhibits), R. N. Speaight, 157, New Bond Street, London, W.1.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary. A. Benson Ray, 8, Agur Street, Bury, Lancs

April 28 to 30.—Nottingham and Notts. Photographic Society. Latest date for entries, April 13. Particulars from the Hon. Secretary, A. Beeston, 103, Nottingham Road, Nottingham.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, MARCH 21.

Bradford Phot. Soc. Members' Lantern Lecturette Night.
Catford, Forest Hill and Sydenham Phot. Soc. "Pictorial Ideals" M. O. Dell.
Cleveland Camera Club. "Pictorial Work in Great Cities." A. H. Blake, M.A.
Cripplegate Phot. Soc. "One-Man Show" of Works by L. J. Steele.
Dundee and East of Scotland Phot. Soc. "Intensification and Reduction." V. C. Baird.
Glasgow and W. of S. Amateur Phot. Assoc. "Demonstration of Projection Microscope." J. R. Thomson.
South London Photographic Society. "Experiences and Experiments with Bromide Paper." H. C. Beckett.
Willesden Phot. Soc. "Improving the Print." W. Bullock.

TUESDAY, MARCH 22.

Royal Photographic Society. Lantern Lecture. "Russia, Past and Present." Vladimir Poliakoff and Dr. C. T. Hagberg Wright.
Birmingham Phot. Soc. Annual Auction Sale.
Doncaster Camera Club. "Lincoln." J. Tremayne Blackshaw.
Exeter Camera Club. Competition (Set Piece).
Leeds Photographic Society. Annual Meeting.
Manchester Amateur Phot. Soc. "Illustrated Essays." H. E. Johnson.
Portsmouth Camera Club. "Amateur Photographer" 1918 Prize Slides.
Sheffield Photographic Society. "Elementary Architectural Photography." J. R. Wigfull, A.R.I.B.A.
Stalybridge Phot. Soc. "Amateur Photographer" Prize Slides
Welfare Camera Club. "Orthochromatic Plates and Filters."

WEDNESDAY, MARCH 23

Accrington Camera Club. "By Road and Water in Norway" C. L. Fauntherpe.
Croydon Camera Club. "Spiders: Their Structure and Habits" Dr G. H. Rodman, F.R.P.S.
Ilford Phot. Soc. "After-work on the Negative." G. C. Weston
Partick Camera Club. Whist Drive.
Photo-micrographic Society. Members' Evening.
Rochdale Phot. Soc. "Old Italian Masters" H. B. Carpenter.

THURSDAY, MARCH 24.

Brighouse Photographic Society. Y.P.U. Print Portfolio.
Everton and District Photographic Society. "With Allenby Through Palestine with a Watch Pocket Carbine."
Hammersmith (Hampshire House) Photographic Society. "May time at Lake Geneva." W. Sanderson
Hull Photographic Society. Discussion on Summer Syllabus, etc
Kryn and Lahy (Letchworth) Phot., etc., Soc. Demonstration by D. W. Brunt.

FRIDAY, MARCH 25.

Bedford Camera Club. "After-treatment of Negatives."

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, March 15, the President, Dr. G. H. Rodman, in the chair.

The President announced that it had been decided by the Council not to permit smoking at the Society's meetings.

Mr. Arthur S. Newman delivered a lecture on the design and construction of reflex cameras, illustrated by blackboard drawings. He first sketched briefly the historical development of the reflex camera, which he attributed in its first practical form to R. J. Edwards. In the Vanneck camera the mirror acted as the shutter, and incidentally gave a four-fold exposure to the sky. The mirror did not form a light-tight seal with the focussing screen, which therefore was of yellow ground glass. A camera designed by Major Lysaght had a mirror which had a downward sliding movement. Mr. Newman referred to his own inventions of a jointed mirror, guided by slots, as means of avoiding fouling of the lens, and of the design of a camera to work with a shutter on the lens, and embodying an opaque flap, which followed the mirror, and released the shutter after the mirror had closed it. He referred to the making of a folding reflex camera as mechanically a most difficult problem if permanent precision of action and full range of movements were required.

In the design of a reflex camera the chief optical requirement was that the mirror surface when in the down position should bisect the angle between plate and focussing screen. It was not necessary that the angle should be 90 deg. A greater angle had been used giving an inclined position of the focussing screen, but surface defects in the mirror then became much more serious in their effect. The mirror should subtend the full cone of rays from the lens. Mechanically a chief problem was to balance the jerk of the mirror, the effect of which was to angle the lens axis, and therefore was much more destructive of definition than a shake which moved the axis parallel to itself. A constructor therefore sought to move the mirror slowly at first, then very quickly, and finally to bring it slowly to rest. Mr. Newman described various types of link movement effecting this acceleration and deceleration.

A brief discussion followed, in which Mr. J. C. Warburg and Mr. Walter Thomas took part, the latter referring to the many years an N. and G. camera had been in his continuous use without need of adjustment.

Dr. Adolph Abrahams delivered a lecture on the use of the reflex camera in reference to high speed photography. He explained that in photographing rapidly moving objects it was necessary to anticipate the moment of release of the shutter by a certain period of time in order to compensate for the human inertia. With a non-reflex camera the period might be 1-10th of a second; with a reflex, say, 4th of a second longer. It was necessary to know the camera in this respect; he had used a Videx for many years. He referred to the advantage of a swing front on a reflex and of long-focus lenses, in particular the Telecentric. Much of what Dr. Abrahams said was special pleading, and at times plausibility got the better of consistency.

At a somewhat late hour, reflex cameras were shown and briefly described by representatives of Messrs. Houghtons, Butcher and Sons, Kodak, Ltd., Ross, Ltd., and Adams and Co. Mr. R. Fonkes Wilks, of the last named firm, dwelt upon some of the points raised by Mr. Newman, and referred to the late Mr. A. L. Adams as having been the first to issue a commercial focal-plane reflex. He showed the box and folding patterns of Adams' reflex.

A late hour votes of thanks to lecturers and demonstrators brought the proceedings to a close.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Meeting held at 116, Hanover Street, Edinburgh, on Monday, March 7. Present:—Messrs. Campbell Harper, Ayton, George Beaman, Norman Thomson, Melrose, Fergusson, Laing, Yerbury, Moffat, John Thomson, F. D. Young, and Swan Watson.

Mr. J. Campbell Harper was called to the chair in the absence of the President, Mr. F. D. Young, who afterwards presided.

The meeting considered minimum prices for making negative and supplying proof for commercial photography, there being an unanimous feeling that some of the prices of prints, which had previously been approved of, were too high. Mr. Moffat suggested that the price should be fixed by taking the operator's time, *plus* the cost of material and a percentage over the whole transaction, but this proposal appeared to some of the members to be somewhat complicated, and necessitate additional book-keeping. After considerable discussion, the meeting unanimously recommended the following prices to be charged as a minimum for commercial photography meantime, and it was further resolved to remit the matter of fixing prices on a costing basis to a committee for further consideration and report. The following members were appointed to the committee:—Mr. Moffat, Mr. Yerbury, Mr. Norman Thomson, Mr. Ayton, and Mr. Campbell Harper. Mr. Moffat being appointed convener:—

For making negative and supplying one print	Duplicate Copies, Unmounted and Rough Trimmed. Each.	Mounted Each.	Large Mounted. Each.
	s. d.	s. d.	s. d.
15 × 12, £1 11s 0d	5 0	6 3	7 6
12 × 10, £1 1-	4 0	5 0	6 0
10 × 8, £1 1s	3 0	4 0	5 0
8½ × 6½, 12- 6d.	2 0	2 6	3 0
6½ × 4¼, 7s 6d	1 0	1 6	2 0

The meeting thereafter discussed the minimum prices for groups (black and white), which had been approved by the Society some time ago. The members felt that the Society's previous recom-

mendations were too vague and lacked detail. The President stated that it was distinctly understood and agreed to by the members when these prices were fixed that they did not include the price of printing nor mounts, and that the prices to be charged for a series of school classes or groups of workmen should be slumped. It was agreed, after the above explanations, not to make any alteration in the price meantime, but to continue the discussion at the next meeting of the Society.

It was agreed to hold an informal meeting of the Society at the Victory Café on Monday, March 21, at 8 p.m. A vote of thanks to the chairman terminated the proceedings.

SOUTH SUBURBAN PHOTOGRAPHIC SOCIETY.

At a recent meeting of the Society, Master Ivor Nixon, the sixteen-year-old photo-chemical student who last year surprised the members by giving a learned talk on the chemistry of printing processes in general, devoted an evening to Kallitype, giving his experiences with all the published formulæ, demonstrating where possible, and showing results—possibly the finest Kallitypes ever seen—obtained by the many systems of working. Master Nixon appears to have quite mastered the process, and although he was not able to publish anything really new concerning the preparation of the paper and development, his remarks were eagerly followed by many of the older hands, who had failed to get the results expected. The demonstrator had experienced considerable difficulty in getting a suitable paper, and had come to the conclusion that Whatman's "A.l.m." water-colour paper (series N) was the best, though expensive. The only chemical that had given trouble was the ferric oxalate, the commercial samples being quite unsuitable. However, he made the ferric oxalate at home, and found it to be the thing required to produce really perfect prints. The method he used is as follows:—Take a 20-oz. bottle, pour into it 4 ozs. of water, and mark the height of the water by means of a piece of paper stuck on the bottle. Pour out the water, and place in the bottle 400 minims of .880 ammonia and 8 ozs. 160 minims of water, then pour into the bottle a solution of 2 ozs. 80 grs. of iron ammonia alum in 8 ozs. of water. Allow the precipitate to settle, and wash it about ten times by decantation; allow the precipitate to settle well below the 4-oz. mark on the bottle, and syphon off the water above it. Next add to the mixture 420 grs. of oxalic acid, and allow to digest for about thirty minutes, by which time all the precipitate should have dissolved, and a clear, greenish solution should be the result. If necessary, filter the solution, make up to 5 ozs., and label "Ferric oxalate. Stock solution." If the proper ferric oxalate can be bought, the stock solution should be made by dissolving 75 grs. of it with 1 or 2 grs. of oxalic acid in each ounce of water. The solution should be kept in the dark to prevent decomposition, and it should give no blue colouration with a solution of potassium ferricyanide. The sensitising solution is made by dissolving 30 grs. of silver nitrate in each ounce of the stock ferric oxalate solution, and filtering; the sensitising solution does not keep good for more than two or three hours. The paper to be sensitised is pinned to a board, and the solution applied by means of a sponge or cotton wool, using strokes from left to right, and working from the top of the sheet, the board with the paper being placed at an angle of about 45 degrees. The paper, after coating, is allowed to stand for about ten minutes, and then dried very gently by heat; the paper is then ready for exposing. The sensitive paper should be stored in a chloride tin, like platinotype paper, although the paper will keep good for about a month without any special precautions. The paper at this stage is very much like platinotype paper, and is exposed in the same way, the printed image appearing faintly upon a yellow ground, and afterwards developed out. As is fairly well known, a large number of developers are advocated, each giving a different tone. Some developers need more care than others, and all were shown by the young demonstrator, who described their good and weak points. His favourite developer, and the one he considered the most reliable, was: Sodium acetate, 1 oz.; tartaric acid, 12 grs.; potass bichromate (10 per cent. sol.), 10 to 100 minims; water to 8 ozs. The potass bichromate acts as potass bromide in negative development, the more used, the slower the development and the greater the contrast; the black tones obtained were most pleasing. In the opinion of his hearers, however, the purple-black tones obtained with the borax developer were the most effective: Borax, 1 oz.; Rochelle salts, ½ oz.; ammonium acetate, 40 grs.; potass bichromate (10 per cent. sol.), 50 to 100 minims; water, 12 ozs. One set of prints produced with an oxalate developer ranged from black to a rich sepia, the demonstrator describing this as the most "sporty" developer because of the worker never being really sure what the final colour of the print would be, much appearing to depend upon the quality of the negative. The actual formula used was: Potass oxalate, ¼ oz.; potass bichromate (10 per cent. sol.), 5 minims; water, 2 ozs. The old hands present strongly advised the young enthusiast to abandon all developers in favour of the rather erratic oxalate solution, and devote his energies to the finding out the reason of the various tones obtainable with the one solution, and to devise a method of securing at will any tone from black to warm sepia with the simple solution. A detailed account of the sodium citrate and the Rochelle salts clearing baths and the hypo fixing bath concluded a very instructive lecture, the youngster being complimented on his photo-chemical knowledge and the excellence of his results. Until quite recently Master Nixon made all his own dry plates, and a lecture on the subject was promised for this season, but owing to the gelatinous condition of his parents' furniture and domestic utensils, his plate-making operations have been suspended by order.

Commercial & Legal Intelligence.

LEGAL NOTICES.—At a recent extraordinary general meeting of the members of Boyde's Studios, Ltd., held at 108, Strand, W.C.2, a resolution was passed to the effect that the company be wound up voluntarily, and that Mr. Richard William Simmons, corporate accountant, of 27-28, King William Street, E.C., be appointed liquidator.

NEW COMPANIES.

FRANK HUGHES, LTD.—This private company was registered on March 4 with a capital of £300 in 5s. shares. Objects: To carry on the business of printers, publishers, photographers, etc. The first directors are: F. W. Edmondson, 8, Clarence House, High Holborn, W.C., financier, and Mrs. M. P. Edmondson, 8, Clarence House, High Holborn, W.C. Registered office: 7, Southampton Row, High Holborn, W.C.

News and Notes.

REDUCTION OF PLATE PRICES.—As from March 14 last makers of dry-plates, which have been sold since about a year ago on the basis of 3s. 6d. per dozen quarter-plates, have reduced prices to the basis of 2s. 9d. per dozen quarter-plates. Half-plates are now 6s. per dozen, as against 7s. 4d.; whole-plates, 11s. 6d., as against 14s. On the basis of one dozen quarter-plates for 1s., which was the standard price up to the middle of 1913, the successive changes which have taken place in the price of plates are shown as follows:—

	s.	d.
Before June 16, 1913	1	0
June 16, 1913	1	3
March 13, 1915	1	6
February 29, 1916	1	10
March 1, 1917	2	3
February 5, 1918	2	9
August 1, 1918	3	8
March 11, 1919	3	0
February 16, 1920	3	6
March 14, 1921	2	9

It will thus be seen that the present reduction cancels the successive increase of 11d. on August 1, 1918, decrease of 8d. on March 11, 1919, and increase of 6d. on February 16, 1920, bringing the price again to the level to which it was raised by the advance of 6d. on February 5, 1918.

Mr. Thomas Illingworth, head of the Willesden firm of that name, has been appointed a Justice of the Peace for the County of Middlesex.

Kodak Postcards.—Messrs. Kodak, Ltd., announce that as from Monday last, March 14, the price of bromide, Kodura, Velox and Solio postcards has been reduced to 57s. per thousand: 55s. per thousand in lots of 5,000 and over. In the case of self-toning Solio the price has been reduced to 60s. per thousand.

The Australasian Photo-Review has once again—for the seventh time—appeared in a special issue in which all the contributions, literary and pictorial, are by Australians or photographers resident in Australia. The display of nationalism is an eminently creditable one, and in the respective fields of pictorialism and technics marks an enormous advance on the maiden effort. One contributor discourses on tone-masses in relation to Australian landscape, and another nobly engages with percentage solutions, armed for the conflict with the B.J. Almanac. We congratulate Mr. Walter Burke on having brought together a goodly company and also on having secured as sub-editor of his journal Miss Mary S. Lawson, who for five years was chief editorial assistant in the British Journal office, and lately had occasion to make her home in Australia.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

BROMIDE STRIP TESTING APPARATUS, AND A SUGGESTED DARK-ROOM CLOCK

To the Editors

Gentlemen,—Having to make enlargements by daylight, and this being so variable, I have to make tests generally in geometrical progression. To hold a card against a strip of bromide paper on a vertical easel for 2, 4, 8, 16, 32 seconds, and sometimes a good deal more, is rather tiring, so I devised the little instrument which I illustrate. It consists of a board with six openings, with a shutter to each. The whole board is supported by two hinges, A, A provided with holes through which push pins can be passed so as to fix it in any position on the easel. A strip of bromide paper the length of the board is placed beneath; two joints an eighth of an inch long at each end of the board pin the strip to the easel when the board is pressed down. Before exposing all the six flaps are pulled out and hang down, then I begin the exposure while a metronome ticks seconds on a shelf near by. At two seconds the first flap is closed, at four the second, at eight the third, and so on till the last has sixty-four seconds. Then the cap is put on the lens and the strip developed.

There are several advantages in this, to my mind. First, the portion of the negative for testing is selected in advance, and the small apparatus placed there. Secondly, there is no fatigue in making the test; and thirdly, as far as I am concerned, I find it easier to judge of the density of strips of equal area separated by a small white band. I have often found in the strips shaded by a moving card that it was hard to tell, even with exposures in geometrical progression, let alone the arithmetical, where one exposure ended and the next began. In this case each part is perfectly defined, and there is no hesitation in knowing which has had so many seconds.

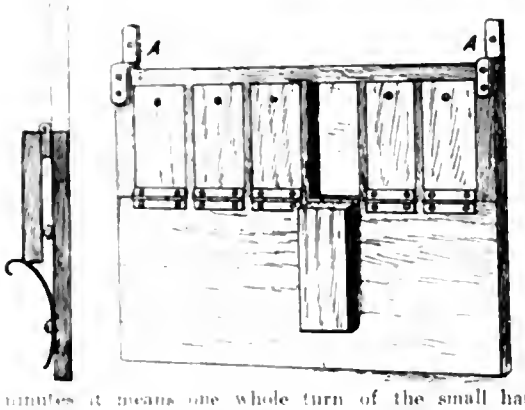
I admit that as it is the apparatus is a bit clumsy, but it was made by a local joiner. If it were made by cabinet makers accustomed to camera work it could be a quarter of the size, thickness, and the weight could be reduced in proportion. An improvement might be to have the flaps held open by a catch, with a spring to close when the catch is released, as in the short exposures it requires some dexterity to close the first just in two seconds and the same for the second; with a catch it would be easier to release it just as the metronome gives its second tick. The whole thing need not be more than 5 in. long. The catch could be of the form shown in the sectional drawing.

Of course, this only applies to easels without glass to hold the sensitive surface. By the way, I should like to say I use a cork bath mat, which has a perfectly flat surface, and in which pins can be pushed to further orders, and which is very light to handle, even though an inch thick.

I also beg to submit a dark-room clock which I got a local watchmaker to make for me from an ordinary 4-inch timepiece. By taking out a certain arbor and putting in a weak spring the whole clock has been made to run sixty times faster. The minute hand runs round in sixty seconds, and the hour hand in 12 minutes.

I had a Watkins' clock at one time, but the great disadvantage of it was the decimal division 10 minutes and 100 seconds. You never knew where the seconds hand would be at the end of the minute. If you started at zero the first minute would end at 60, the second at 20, the third at 80, the fourth at 40, and it was only at the fifth minute that it was at the top of the dial again. As for the clocks that give hours, and sixty minutes (on a four-inch dial often with a bevelled front glass) they are no use in a dark-room, even with plenty of safe-light, as the divisions are too small, and when development runs into hours an ordinary watch which everybody possesses will give all the information needed.

Now, what objection can there be to a clock of twelve minutes? None whatever to people accustomed to shillings and pence, or feet and inches. Everybody knows that fifteen pence is one and three, and the same applies to the clock. If you have to develop for



fifteen minutes it means one whole turn of the small hand and three minutes, with the advantage that those big divisions of the minute can be seen in any light, and the whole minute always ends at the same place.

Unfortunately having had to put in a weak spring on account of the reduced internal resistance my clock runs down in half an hour.

I should like to see on the market a similar clock which would go for a day, and if it could be made to tick seconds audibly so much the better for those who have to work in complete darkness, or for those who, using the factorial system, watch for the first appearance when they obviously cannot have their eye glued to a clock at the same time. And if further, the hands would fly back to zero on the pressure of a lever—but that is too much to ask.

A. Thomas.

THE PROBLEM OF HALATION.

To the Editors.

Gentlemen,—This problem, like the poor, seems always with us, and I am sure we should all be grateful to Mr. Godfrey Wilson if he can find out and reveal to us the developer which will cure the complaint. But I, for one, am rather sceptical as to any such simple remedy as a special developer curing a complaint which is so complicated. I wish it could be so easily cured. Only to-day I had a bad case. I really don't see how any developer could have effected a cure, and I am afraid the amateur's idea about over-exposure being the cause, and suggesting a remedy, is no good, for he seems to think a mere reduction of the exposure would prevent the trouble. In this particular case a war memorial had to be photographed; it is oak panelling, with a carved and perforated cresting along the top. About a foot or more above the cresting is

the sill of a window, and a foot of the stained glass appeared at the top, reduced to perhaps a quarter of an inch on the negative. The day was dull and the church was dark, and a small stop was necessary to get all the names on the oak panelling sharp enough to read; some incandescent gaslights were turned up to buck up the daylight, and an exposure of one and a half hours was given. On development, the film proved to be hopelessly under-exposed, but the halation had crept a long way down the plate. The only way I can see of obtaining a successful result is to cover the bottom of the window, on the outside, for nine-tenths of the exposure, give a still longer exposure, and finally to complete the exposure and to brighten it all up, give a flare with a good flash light. But I cannot see that over-exposure is the cause of the halation. It is true that the small piece of window was over-exposed, but the rest of the plate was under-exposed, and I believe if the whole of the plate had been fully exposed, there would have been less halation apparent.

We are apt to forget that a certain amount of halation will often appear in the actual scene, especially in the dusty atmosphere of towns. But if there is a developer that will cure or stop halation, will some good, kind soul let us know if it. One method has been suggested, and I have used it, sometimes with success, sometimes otherwise. It is to start development with a restrained developer, say pyro-ammonia, with a minimum of ammonia. When the windows, which would usually be over-exposed, are fairly well developed, the plate is well washed and local development carried out with metol. Some have suggested even painting the windows with a solution of bromide before proceeding with the metol developer. But the difficulty is that the halation causes most mischief when it spreads from the windows over the dark places that usually surround them.

I am afraid there is no *one* cure for the trouble. It can only be overcome by taking a number of precautions, and one of them, I believe, is backing. But the thin red coating often sent out is not much good; the solid black backing that one gets on panchromatic plates will do much to minimise halation. Films are supposed to give less halation than plates, but my bad result of to-day was on a film.

Some months ago, in the columns of the "B.J.," a method was suggested to stop halation. It was to hang a piece of opaque paper, cut to the shape of the window, in front of the lens by a wire from the top of the camera. Some twenty years or more ago this method was sold as a great secret. I tried it then, but found it so extremely difficult to fit the mask to cover the window accurately that I gave it up. Of course, when the exposure of the rest of the plate was complete, the mask was removed for a few seconds before the lens was capped.

Even with special anti-halation plates, in which there was a stained film between the glass and the sensitive film, halation sometimes occurred. I agree with Mr. Wilson, we have a lot to learn about it.

BIFOCAL.

APPROPRIATE FRAMING.

To the Editors.

Gentlemen,—In your article on the above subject you conclude with the remark, "Home frame-making on a small scale does not pay." I beg to be allowed to differ from you on this point. There appears to be no reason that even a single frame should not show a profit, apart from the convenience in ensuring the certainty of delivery in time. This is providing, of course, that one is not cramped for space and that there is sufficient room for the materials and tools to be always ready—a place for everything and everything in its place. I recently took an order for an enlargement, framed complete in stained oak, with name plate, for a presentation. Following my usual custom, I ordered the frame from a firm that had always served me well. The frame duly arrived by rail; the name plate I had already obtained. The portrait was in my finisher's hands when the club secretary called on the morning of the great event. In the circumstances I felt in a position to promise "absolutely without fail" for that evening.

When proceeding to fit up, lo and behold the frame proved to be the wrong size and out of proportion. The heads of the local high-class firms to whom I told my woes gazed at me with lack-lustre eyes, and the best I could get was a half-promise for the following day. Like many seaside visitors looking for "digs," I was at last compelled to resort to the back streets, where I remembered seeing a notice, "Frames made while you wait." The "boss" turned out to be a thoroughly practical man, and kindly invited me to witness the performance.

A pot of glue was simmering on the gas stove. Going to the moulding rack, he drew out a length of figured oak. Laying this on his mitre block he proceeded to cut the four sides to the required size. Placing these, one mitre at a time, in position, he planed them accurately with the aid of a "shooting board." The vice was then visited, a long side placed in the jaws and a short one nailed to it, the other sides being treated in a similar manner. A box of various-coloured putties was to hand, and the holes left by the punch were soon stopped. After a slight rub with glass-paper the frame received a liberal application, using a hog-hair brush, from a bottle of spirit stain.

Glass of different sizes were in the rack, which he mentioned contained only the best quality, so extracting the diamond from his waistcoat pocket it was only a matter of a few seconds to trim the glass into the frame.

With a stout strawboard back the picture was soon complete, and mutual satisfaction obtained by my handing over a pound (£1) note, the whole transaction being completed under the hour.

I noticed that his workshop looked much the same as when I entered. After my vain attempts the room has always presented an appearance similar to the scene of Huns' hurried departure.

It would appear that this tidiness is essential to success from a profit-making standpoint, and coupled with practice it should only be a case of "the more the merrier." In this particular instance it was far better than to hear a member of the committee remark:—"That's Smithson—the man who 'let us down' with the presentation."

H. G. S.

HEALTH—AND THE PRINTING PROCESS.

To the Editors.

Gentlemen,—There is one point that Mr. Willis does not mention in his refreshing article on "Distinction—and the Printing Process," and that is that Platinotype or carbon entails no dark-room work, and is therefore far less trying for the eyesight and healthier for the worker than bromide. When so many semi-invalided ex-soldiers seem to be taking up photography this is an important factor in the choice of a printing medium.

For twenty years I have used either platinum or carbon, and when necessity made me start professionally a year ago, I decided to stick to these two processes, not only for the excellent reasons Mr. Willis gives, but also from the health and eyesight point of view. In spite of all prophesies that this decision would be impossible to carry out, I have never executed any order in any narcotic process. Platinum for a thin negative and carbon for a strong one have always met with nothing but appreciation. There seems room for a training school for printers; it is worth thinking about.—Yours faithfully,

JANET ALLAN.

Wallington, Surrey.

A SUGGESTED METHOD FOR COPYING FLAT OR WEAK NEGATIVES.

To the Editors.

Gentlemen,—I have read in your paper at odd times, articles on copying and on dealing with the making of negatives from weak copies. The best advice given seems to be that of using contrast-giving plates, viz., slow ordinary, or process. Now my opinion of the resulting negative, obtained by using process plates, is that, in general, sufficient contrast is obtained for the actual subject, but the defects in the background, due to uneven fading, discolouration, or texture of old paper, are so emphasised that the negative or print does not satisfy the critical photographer.

Here is a method of obtaining sufficient contrast, combined with softness, which I have not yet seen published.

Many years ago I had a weak faded print to copy. The first negative was too weak. I studied the negative and gave another exposure with altered exposure and development. The resulting negative was better, but still weak. The two negatives were put to wash while I considered the matter. Later on the negative was picked up from the washing water, examined, and, strange to say, found to be of an ample density or contrast. For a moment satisfaction only filled the mind, but the enquiring department of my

again soon asked "Why?" The solution was as follows:—The negatives in the washing water had slipped one over the other, and having been exposed without shifting the camera, they registered exactly, when placed one over the other, with the thickness of the glass between the two images.

Now, my procedure in cases of extreme flatness is to take a negative on an ordinary plate, criticise the exposure and development, and make another negative. Then take the best negative and retouch, place the other negative in register, and bind together as in lantern-slide making. Either negative or both, whole negative or part only, can be reduced, stained, etc. In your print you get the sharpness from the primary negative and diffused addition of density from the secondary.

I have often thought that a similar result, and, perhaps more under control, could be obtained by the dusting-on process, coating the glass side of the negative with the bichromate solution.

The next time you are up against an extremely weak print to copy, just try this method. A. CHARGOIS.

Cairns, Queensland.
January 18.

FACTORIAL DEVELOPMENT.

To the Editors.

Gentlemen,—The letter from Mr. Alfred Watkins on March 11 called attention to the influence of the printing process upon the Watkins factor to which the plate should be developed. He wrote that "The best amount of contrast (a steepness of gradation) for one printing process is *probably not* the best for another, and here, again, the experience of the old photographer may lead him to modify the factor." The italics are mine.

It is certain that the various types of printing paper (gaslight, bromide, carbon, platinum) require negatives which have been developed to very different times when it is desired to depict the same subject as a print of the same appearance upon each type of paper. The two extreme printing papers are vigorous gaslight paper and platinum. The former has an exposure range of 1-10 and the latter about 1-100. The exposure range of a printing paper is the relationship between the least exposure required to give the faintest grey upon the print, and that required to just give the deepest black. It is the business of the negative to utilise the exposure range of the paper during printing. Let us assume a subject whose range of light intensities is 20-1, an average open-air outdoor subject including bright sky. To produce a negative suitable for printing upon vigorous gaslight paper, the printing range of the negative must be about 1-10. A 20-1 subject is rendered as a 1-10 negative by development to a gamma of .77, $\left(\frac{\log 10}{\log 20}\right)$. From the same subject, however, a negative equally suitable for platinum paper must have a printing range of 1-100. To produce a 1-100 negative from a 20-1 subject requires development to a gamma of 1.54, $\left(\frac{\log 100}{\log 20}\right)$. The gamma .77 negative will, upon vigorous gaslight paper, give identically the same print of this particular subject as the gamma 1.54 negative will upon platinum, certain very minor differences excepted. With low Watkins factor developers (pyro, hydrokinone) gamma 1.54 is only reached in 2-3 times the length of time of development for gamma .77, equivalent to an increase in the Watkins factor of 2-3 times. With high Watkins factor developers (metol, rodinal), whose characteristic is a high development velocity in the early stages of development, rapidly falling off in the later stages, the factor suitable for a negative for vigorous gaslight paper may have to be multiplied by 4 or 5 in order to yield a negative from the same subject suitable for platinum.

The failure on the part of many photographers to recognise that every type of printing paper requires a negative specially made for it has led to many disparaging comparisons being made between one printing process and others. When bromide paper was first introduced, the general complaint was that it gave harsh results. Failing to recognise the comparatively short exposure range of bromide paper, photographers were attempting to print upon it with the long-range negatives which for years they had been making for P.O.P. carbon and platinum. To-day history is repeating itself. Vigorous gaslight paper stands condemned as a harsh contrasty paper. It is nothing of the kind. Accustomed at the present time to make negatives of a suitable range for printing upon bromide paper, photographers have yet to grasp the fact that these negatives are too long in range for vigorous gaslight paper. If a specially short-range negative be made for vigorous gaslight paper, the resultant print is indistinguishable from one made from an appropriate negative upon any other printing process, colour of deposit, and character of surface excepted. In his excellent article last week, called "Distinction—and the Printing Process," Mr. A. G. Willis, on page 137, line 21, column II., writes: "To many workers it would be a revelation to see a carbon alongside a bromide from the same negative." It is perfectly true that if the negative were suited for carbon, then it would give an unsatisfactory result on bromide paper, but it is equally true that if that negative had been suited to bromide paper, the result upon carbon would have been unsatisfactory also. It has for years been a popular fallacy that prints upon different papers made from the *same* negative may justifiably stand compared as an index of the "quality" of the printing process. A comparison so made is false.

When Mr. Watkins revises his manual again, I hope that he will be able to see his way to alter the words "probably not" into "certainly not."—Yours faithfully, B. T. J. GLOVER.

Sunnymere, Birkenhead Road, Meols, Cheshire.
March 13.

[We are glad to be able to say that we have in type for appearance shortly a paper by Dr. Glover dealing with the practical relationship between the subject, the negative and the type of printing paper used, and considering to what extent various methods of negative development enable the correct relationship to be fulfilled.—Eds. "B.J."]

LENSES v. CHIFFON FOR DIFFUSION.

To the Editors.

Gentlemen,—When I read in the "B.J.," of March 11, the discussion on chiffon, by the R.P.S. Pictorial Group, I had to go over it again to satisfy myself that they were not bluffing.

Why does Mr. Lawton eulogise chiffon in one sentence, and in the next scorn it with the withering remark: "It produces general fog"?

Surely general fog is a thing to be scorned like a pestilence, especially in portraiture, pictorial or otherwise. I hesitate before my next remark for fear of encroaching on their preserves, but would suggest they move with the times.

To my idea, chiffon was played out with the advent of modern lenses, whose powers of diffusion tolled the death knell to unnatural, undesirable, foggy softness. During my thirty years' experience in photography I have used all kinds of devices to obtain softness, and have come to the conclusion that there is no instrument or material equal to the Cooke portrait lens for giving a clean, sharp, or soft, foggless negative or enlargement.—Yours faithfully,
RALPH JONES.

St. Anne's-on-the-Sea.
March 14.

THE OLDER PRINTING PROCESSES.

To the Editors.

Gentlemen,—To an "old timer" it was indeed a pleasure to read Mr. Arthur G. Willis's article, "Distinction—and the Printing Process."

The necessity for extra-rapid completion of work having passed with the war, photographers generally might do much worse than turn their attention to the processes whose merits are there so ably set forth. As an assistant, I think the rage for bromide papers is largely responsible for the ousting of male labour from the ranks of photographic workers. To those unemployed it is very disheartening to see, week after week, a "lady" insisted upon, and so often for work which has generally been regarded as fit for men only. As a printer, I have no prejudice against bromide papers, but I maintain that it is impossible to obtain results thereon equal to those on carbon or collodio-chloride matt paper. And is Mr. Willis quite sure that good printers in those processes are "quite unobtainable"? I, for one, should be very glad of the opportunity to prove the contrary.—Yours truly,
"OLD PRINTER."

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

B. E.—If the Wray lens is of *f*/8 aperture and in good condition it has a value of about £2 10s.

H. N. W.—The address for which you ask is MM. Grieshaber Frères et Cie, 12, Rue du Quatre-Septembre, Paris.

G. B.—We are sorry that we have no particulars of the maker of the automatic camera. We gathered from the few particulars we received of it that it is not yet on the market.

E. H.—As the photographs of the football teams were made to order, all rights of reproduction are the property of the person or persons who gave the order. You are not entitled to any reproduction fee.

T. E. B.—We cannot find a formula in the "B.J." answering to your description, but bisulphite is a very common method of making up an acid bath, and a very suitable formula is as follows:—Hypo, 4 ozs.: soda bisulphite liquor, 1 oz. (fluid); water, 20 ozs.

P. M.—You do not require any licence or registration in order to sell post-cards or take portraits, but if you don't trade under your own name (this applies to any business), you require to register with the Registrar of Business Names, 39, Russell Square, London, W.C.1.

J. P.—In so short a studio the longest focal length you can do with for a full-length post-card portrait is 6 inches, that is allowing 3 ft. space behind the sitter and also 3 ft. behind the camera. Supposing you allow only 3 ft. for both these places, then you could use a 7½-inch at a pinch.

S. A.—A total candle power of 5,000 should be ample. Most users of electric light would prefer to divide up between 5 lamps each of 1,000 c.p. We are afraid we cannot suggest what the announcement of the opening of a studio should be. Surely you can best do that with your knowledge of local conditions.

F. P.—We don't think they can turn you out unless they can find other accommodation, but the Rent Restrictions Act is such a complicated measure that we don't profess to understand it, and suggest that you ask the question from one of the daily papers, *e.g.*, the "Daily Chronicle," which has a department specially for the purpose.

H. W.—About the most promising branch is process work, not necessarily half-tone and line block making only, but the other branches of photogravure, collotype, and photo-lithography. A youth could obtain thorough training at the L.C.C. School of Photo-Engraving, at Bolt Court, Fleet Street, London, E.C.4. Mr. A. J. Bull, the Principal of the School, would gladly give you every information by letter or at a personal interview.

R. H. W.—"Photography Made Easy" is a very good book, although it does not deal specially with tank development. Nevertheless, it is the best book a beginner in photography can have, and the chapter on development ought to be an effective guide to you in conjunction with the tables for time development issued by Messrs. Johnson, 23, Cross Street, London, E.C.2, for use with their "Azol" developer, and by Messrs. Burroughs Wellcome, Snow Hill Buildings, London, E.C.1, for use with their "Rytol." These tables can be had on application.

C. H. M.—(1) We do not know the wholesale makers of the anti-sulphuric paint. We find it is obtainable from any dealer in electrical requisites. If not obtainable in your town, you could certainly get it from the Economic Electric Co., Twickenham. (2) We recommend the "Howellite" inverted burner to be used in the ordinary position in the enlarging lantern—that is, without the mirror. Used in that way it gives an exceedingly good light, and though the angled mirror has been recommended for securing the tip of the mantle as the light-source, we do not think there is any advantage in it.

L. P.—The best type of lens for portraiture is a portrait lens of the so-called Petzval type. A suitable focal length for cabinet portraits is about 10 inches, providing you have plenty of space. But a 10-in is a big lens, and it is very doubtful that your camera, if it is one of the field kind, will carry it. We expect you will have to compromise in one direction or the other, either in the way of aperture or focal length. Better to sacrifice aperture than focal length within reason. Probably your camera would take quite well a 9-inch lens of *f*/6 aperture, which would be a very good choice, and can be made among a whole lot of lenses on the market of different prices.

A. W.—There is no useful purpose gained by stopping down further than *f*/16 for the sake of improving the definition of the lens or getting further depth of focus. We think you ought to be able to give a short enough exposure at this aperture on ultra-rapid plates to avoid want of definition from movement of the children, and if the plates are correctly exposed and developed to a thin crisp negative they would enlarge quite well. Of course, the shorter the focal length of your lens the larger relative aperture (speed) you can use for the same amount of depth of focus. There is no need to use such a long focus as 8 ins. for a negative, which we suppose is about 2 ins. × 2 ins. One of 5 ins. at the outside is long enough, and with this *f*/11 ought to give you ample depth.

W. A.—(1) Usually the F. number without a stop is somewhat smaller than when the largest stop is inserted. As a rule, there is a pair of rings within the lens-tube between which the Waterhouse stop is slid. If the aperture in each ring is larger than the aperture in the largest diaphragm, naturally the lens will then be working at a smaller F. number. However, no harm in seeing what kind of definition you get in the margins without the largest stop, but you must cover over the slit in the tube with an elastic band, otherwise there is danger of fog. (2) On no account must light leak in through the fitting of the lens-panel to the shutter. It would seem that you require to have a better fitting made, either a deeper rebate against which the lens-panel comes, or an arrangement by which the lens-panel slides in grooves, as on an ordinary camera. (3) A magnifier makes the image on the ground glass both brighter and larger, and is a great aid to focussing in both of these respects. The best form of magnifier is that sold as the Ramsden eye-piece, a good pattern of which you can get from Messrs. Sinclair and Co., Ltd., 54, Haymarket, London, S.W.1.

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Contents.

SUMMARY.

A reminder that the last day for the receipt of exhibits for the forthcoming exhibition of professional and commercial photography, arranged by the Professional Photographers' Association, is April 7 next. (P. 165.)

In a contributed article, "Thermit" discusses the seasonal problem in the development and printing of amateurs' films, and finds a solution in the production of a superior grade of print (P. 167.)

Messrs. W. F. A. Ermen and Raymond E. Crowther, in a note on the variation of the Watkins factor of Monomet developer used with different quantities of soda carbonate, suggest the formula which they consider to be the best. (P. 168.)

Mr. E. P. Wightman and Dr. S. E. Sheppard, of the Eastman Research Laboratory, review recent work on the relation of the size of the grain to the properties of an emulsion. (P. 169.)

Mr. C. H. Bothamley has been elected president of the Photographic Convention, and Bristol chosen as the place of meeting in July next. (P. 165.)

A demonstration was given last week in London of the first result of the process of colour cinematography worked out by Professor Procoudine-Gorsky. (P. 173.)

In a contribution to "Photo-Mechanical Notes," Mr. E. L. Turner gives working formulæ for methods of producing reversed blocks (as regards light and shade) without making a positive for printing. (P. 173.)

Methods of masking for making several negatives on a single plate are also described in "Photo-Mechanical Notes." (P. 173.)

A correspondent, as the result of his experience of the "professional" developer recently recommended by Mr. P. M. Jones, recommends a revised formula. (P. 179.)

An extension box should serve a double purpose: if made reversible it allows of a short-focus lens being used in copying. (P. 166.)

Some of the considerations which require to be given to the use of a studio, the bearings of which expose it to sunlight, are dealt with in a leading article on page 166.

Mr. A. Lockett gives a simple rule for finding the diagonal of a plate. (P. 172.)

Failure in maintaining customers for special work may often be due to so low a scale of charges that the work cannot be satisfactorily done at a profit. (P. 166.)

A convenient plan for the comfortable and effective accommodation of the retoucher is described in a paragraph on page 166.

EX CATHEDRA.

Fair and Congress. On the eve of Easter we must not omit to remind our readers of the opening of the Photographic Fair at Westminster in three weeks' time and of the Congress of the Professional Photographers' Association which runs concurrently with the latter part of the period of the Fair. We understand that large measures will be taken in the daily Press for bringing the Fair prominently before the public. The exhibition of professional and commercial photography is to be on view on the opening day of the Fair, namely April 15, so that little time now remains for those who wish to try their fortunes in being represented in it. The entry form is obtainable from Mr. Marcus Adams, 43, Dover Street, London, W.1, and requires to be sent, together with the exhibit, so as to reach Mr. R. N. Speaight, at 157, New Bond Street, not later than Thursday, April 7. We endorse Mr. Lang Sims's appeal, which appears in the P.P.A. council report on another page, that those intending to take part in the Congress should send in their names (and subscriptions) to him without delay. It will then be possible to publish a list of names and their respective badge numbers in advance of the opening of the Congress—a little piece of organisation which in previous years has been shown to be of great value in making members known to each other, and which, therefore, deserves to be carried out as completely as possible.

* * *

The Convention. The forthcoming meeting of the Photographic Convention, which will be the thirty-third held by this association, is to take place at Bristol from July 4 to 9. At a council meeting of the Convention, which was held last week, Mr. C. H. Bothamley, F.I.C., was unanimously elected president and Mr. Walter Potter and Mr. F. J. Mortimer were re-elected hon. treasurer and hon. secretary, respectively. In electing Mr. Bothamley to the presidency, the Convention council is choosing one of the oldest and most enthusiastic "conventioners." We think Mr. Bothamley must have attended every meeting; at any rate at the second meeting, held in Glasgow in 1887, he read a paper on orthochromatic photography, and has frequently made notable contributions to the proceedings of the Convention over which in 1890 at Chester he presided. We understand that at Bristol his desire to make the Convention the occasion for the presentation of technical contributions to photography may bear fruit. He has our wishes that it will, for we have always been firmly convinced that the Convention cannot live by holiday making alone. Among other excursions which are planned in connection with the Bristol visit is one which, it is hoped, it will be possible to make, viz., to Fox Talbot's home in the village of Lacock, near Chippenham. That certainly ought to be done. Lacock is the Mecca of English photographers, and, moreover, the buildings of its quiet stone streets are

a delight to the eye. It was while living at Lacock Abbey that Fox Talbot began his photographic experiments. The window can there be seen which figured as the subject of a paper negative which he made in the year 1836 and which we believe is still in existence. His early photographs included numerous views of the picturesque abbey.

* * *

Fixing Prices. We are often asked by those opening new businesses to suggest a scale of charges. This cannot be done, for much must depend upon the nature of the locality; high prices are prohibitive in a poor neighbourhood, while low ones are viewed with distrust in a wealthy one. A safe plan is to adopt the highest scale of prices which are being obtained in the district and to make sure that the work offered is worth it. It is a bad policy to cut prices and send out inferior work, as this does not tend to keep customers after their first experience. Low prices mean an unwise economy in plates, the use of inferior mounts, and in many cases the issue of prints which should be destroyed. A conversation, which was repeated to us, points a moral. A young photographer, watching an old one doing a difficult copying job, remarked that with such an expenditure of time and plates no profit could be made. The old hand said, "What would you charge for this?" and received the answer, "About seven and sixpence." "Ah!" was the reply, "I get two guineas for it, so can afford to do it properly."

* * *

Light for Retouching. The usual retouching desk is often an inconvenient article in the work-room, blocking up a great part of the window and preventing the use of the bench for trimming, spotting and other work. We have recently seen an arrangement which obviates this difficulty and enables the retoucher to work in greater comfort. In a dark corner of the work-room a curtain is suspended so as to cut off all daylight, and in the little cubicle so formed, the retouching desk is placed close up to the wall. Behind the opening an incandescent electric lamp, screened with bluish glass or tissue, is fixed. The advantage of this is that the retoucher is not enclosed in a small hood and that the light is always uniform. It also does away with the necessity for moving the desk for any other work. When a special room can be devoted to retouching it is a good plan to dispense with hoods and to fit dark blinds to the windows so that the only light which enters comes through the negatives. In one establishment the remainder of a room so fitted is used for the storage of negatives, and this arrangement was found to be very satisfactory.

* * *

Camera Extensions. Although most modern studio cameras have an adequate length of bellows, there are many serviceable instruments which have too short an extension to allow of large heads being taken with the long-focus lenses which are now generally recommended. In order to overcome this defect it is a good plan to fit a reversible box front, by means of which a foot or more may be added to the working length. The fitment consists of an extra sliding front or lens panel carrying a box of the desired length, the front of this being made to receive the ordinary lens panels. It should be arranged so that the box may either project outside the fixed camera front or be put inside the bellows, so that in addition to facilitating the use of long-focus lenses, it also permits of those of short focus being used as well. This is very useful when making very small copies or portraits, when the bellows does not close up sufficiently to allow of a carte or quarter-plate lens being used. A slight difficulty may arise when a shutter is fixed inside the ordinary front, but if the rebate is cut away from one edge of the normal front and two or more buttons substituted, the front can be removed carrying the shutter with it.

SUNLIGHT IN THE STUDIO.

It is generally believed that it is impossible to produce good portrait negatives in a studio which is so situated that the direct rays of the sun fall upon the glass during any considerable portion of the day, and many photographers pass over otherwise eligible positions on this account While a northern aspect is highly desirable, it is by no means indispensable; by the exercise of a little ingenuity it is quite possible to work successfully in a studio which faces due west or even south. The main difficulty to be overcome, especially in large towns, where the atmosphere is always more or less foggy, is the flood of light between the lens and the sitter which entirely precludes the obtaining of clear shadows, and also tends to shine directly into the lens and still further flatten the lighting.

A lengthy experience in a studio which receives its light directly from the west has shown that the difficulty is more easily overcome than might be imagined. There are two methods of doing so, the older being by the use of screens or louvres inside or outside the glass, and the other that of employing diffusing media which prevent the direct rays from entering. The former method depends upon the use of frames arranged upon the principle of the domestic Venetian blind, which only permit light to enter in one direction, and when these can be conveniently used, is extremely efficient. These frames, which are of the full length of the side and top lights, are covered with opaque material and hinged to the sash bars, being controlled by cords or rods so that the angle may be altered to suit the varying conditions of light. When viewed from the sitter's position the edges of the frames only are visible, while the operator cannot see the glass at all. In this way the working light is quite unobscured, and no increase of exposure is necessary. The objection to this system is that if the screens are placed outside they are not easy to manipulate, and, moreover, offer considerable resistance to a strong wind, while, if placed inside, they are liable to interfere with the easy working of the ordinary blinds unless the studio has a lofty roof. For this reason the simpler method of diffusing the light is now more generally adopted. Operators who are experienced in artificial light work will find it quite easy to use direct sun-light through a white blind or similar device.

The selection of a suitable diffusing medium is an important matter, as many devices have been suggested and some of these are noticeably inferior to others. Glazing the studio with ground glass seems to offer the easiest solution of the problem, but in practice it is the least satisfactory; although it prevents sharply-cast shadows it does little to minimise the general glare. A better way is to stipple the glass with zinc white paint, but still better is to employ a movable screen of translucent material, such as tracing paper or cloth or waxed paper. These control the light effectually, and can be dispensed with on dull days or after the sunlight has passed away. If the festoon curtains, which we have so often advocated, are used it will be found that the white nainsook section renders any further diffuser unnecessary, all that needs to be done is to see that the white curtains are quite clean.

Inside the studio all unnecessary light should be

screened off by backgrounds or some similar device, so that the space between the lens and the sitter is well shaded. A necessary, but often neglected, precaution is to shade the lens, especially if it be of the modern anastigmat type. The best way of doing this is to erect a framework either upon the camera itself or upon the stand, and to cover this with a curtain, which serves also as a focussing cloth. A projection of eighteen inches from the camera front is not too much for a 12 x 10 camera. Two small curtains on the front of the frame will be of great service when working against the light, as these can be adjusted so as to cut off all light not intended to reach the plate.

In sunlit studios the colour of the walls should be appreciably darker than when working with a north light, a rather dark grey or sage green being most suitable. Care should also be taken to avoid reflections from the floor, rugs being laid over polished linoleum or wood.

In working with such a diffused light as we have described it is quite easy to obtain portraits with strong contrast by reducing the area of illumination and bringing the sitter close up to it. If a white curtain brightly lighted by the sun is the source of illumination, it can be handled in very much the same way as an electric-light installation, and one accustomed to the latter will find no difficulty in getting any desired lighting.

The apparatus used in a brightly-lighted studio requires a little more attention than is usually given to it, as there is more risk of interior reflections causing fog. The lens tube and hood should be kept a good dead black; for large lenses velvet is a better lining than varnish. The interior of the bellows, and particularly the edges of any woodwork should be treated with a dead black varnish. The cases and frames of exposing shutters should also be looked to, as these may reflect unwanted light upon the plate. These precautions are not out of place in any studio, but they are exceptionally desirable when there is any tendency to flatness in the lighting.

THE SEASONAL PROBLEM IN "AMATEUR FINISHING."

For the man with the requisite knowledge and capital, amateur finishing should prove an exceptionally good line.

But, like everything else, "amateur finishing" has a characteristic that is not exactly an unmixed blessing. It fluctuates. From next door to zero at the New Year, it rises to unmanageable heights by August or September, to drop back to insignificance in a couple of months. The employer's problem of "What to do with surplus staff" becomes "How to obtain competent help," and with employees it is a case of "How to find or keep a job" becoming "How to see a bit of daylight."

Now the present is a significant time for the photographer who caters for this business. Dealers, chemists, and others who specialise in the line are already getting busy putting things shipshape for the coming season, and I have no doubt that those photographers who have previously undertaken this kind of business are doing the same. Considering the amount of work that should be done between now and Christmas it is quite likely that more studios will branch out on developing and printing this year, especially in view of the abnormal slackness in portraiture that is being experienced in many parts.

But I am not concerned at present with new and prospective exponents of the business, and I won't attempt to describe here the equipment and system necessary for success. It has already been done and information in detail is always to hand from manufacturers who are interested in the supply of apparatus and materials. I will therefore pass on with the hint that now—and not May or June—is the better time to get all into working order.

From a fairly deep consideration of the rush problem I am convinced that it might be greatly alleviated, if not totally eliminated, by application of certain business tactics. In this line, as in others, there can always be found a firm or an individual willing to do work at ridiculously low charges and to turn it out in impossible time. It is a mistake to fear the opposition of such people unless it so happens that they can do better work than we can, and in that case well, we had better quit. But rush work at cut prices will not approach the standard of any respectable workshop, and it can be ignored. There is a kind of customer capable of expecting a film developed and printed for about a shilling, and that between Saturday evening and Monday morning. But why cater for them? There is a demand for better work than this, and my argument is that by catering for the latter at the expense of the former—instead of the reverse process—we may solve the fluctuation problem.

The main items of amateur finishing are the development of exposed spools and the printing of the same in a mechanical stereotyped manner on gaslight paper. The bulk of the printing is untoned black and white, most of it is untrimmed; much is unmasked, and little or none is spotted or mounted. This is the kind of work that invites rush and fluctuation. On the other hand, work printed with an eye to pictorialism—selection of negatives' best parts, straightening, elimination of waste and faulty passages, etc.—toned, tinted, spotted and mounted might find a more steady market at more respectable prices. The well-known type of amateur print is well worth doing if done well, but it should not be the one and only style shown or advertised. With superior lines in hand, the common style could at any time be dropped to ease an overload. By way of example we might start off at the present time with the following lines:—

Exposures developed, one grade, standard.
Negatives printed, two grades, ordinary and double-weight (toned if desired).
Prints mounted, selected styles offered.
Enlargements, selected styles offered

At first there might be practically no demand for anything but ordinary developing and printing, but the others would follow gradually, and in July or August, instead of starting overtime and struggling with a smother of cheap work, it would be an easy, pleasant and dignified thing to notify the public that "Owing to the great demand for our Quality Printing we are reluctantly compelled to withdraw our other styles for the present," etc., etc.

The result of such a move, if carefully engineered, would be that instead of doing about 10,000 prints (on overtime and against time) for £100 income, it would only be necessary to do about 500 double-weight, warm black or toned prints on which the profit in £100 might be greater. Considering the release from working under pressure, it certainly should be well on the right side. Consider the thin edge of the wedge. We commence merely by dropping thin, unmounted prints. The standard style of printing becomes masked and trimmed work on double weight. This means giving the customer much better value, as anyone who is in the habit of carrying snapshots about in his wallet or in her satchel—will agree. It should also prove an advertisement for the photographer. Such prints are worth all of 35 to 50 per cent. more than

the ordinary article, but they do not cost 20 per cent. more to produce, as though the double-weight paper is 20 per cent. extra, the chemicals, light, labour and overhead costs are approximately the same. Therefore if we do double-weight prints exclusively at 35 per cent. over, say, the Kodak prices, a bigger margin of profit will be obtained, and we can afford to dispense with overwork.

The production of good substantial work in preference to shoddy has another beneficial result. It encourages the right kind of customer rather than the camera-mad film destructor, who is often more of a nuisance than he (or she) is worth. It may be argued that film wasters spend an appreciable sum on photography, and so from a business point of view should not be ignored. I can admit the truth in this, but still contend that the more serious and discriminating camera-users among the public are likely to be the finisher's best customers if properly catered for. I am not referring to the genuine amateur, whose interest will compel him to do his own printing, etc., but to a type of camera-user who comes midway between him and the film destructor and has something in common with both. Anyone who is familiar with the trade will recognise the customer who combines the amateur's keen interest with the button-presser's desire to have the finishing done by somebody else; who is responsible for much good photography, and spends quite a lot on it. This is the customer who can be kept and cultivated. He may not, as a class, create a demand for millions of prints, but what he does want he will want good, and he does not expire with the summer holidays.

As with double-weight prints—or any other simple style calculated to benefit both customer and producer—so with toned, tinted, and mounted work. The better the class of work done, the less work and the greater profit and reputation. Enlargements and lantern slides are in demand from customers' negatives, and their supply can do much to level out the twelve months' business.

Here again quality should pay better than quantity. Anybody can make an "enlargement" or a "slide" from a snapshot film for a shilling or so, but such work is no advertisement, and can hardly bring in a decent profit unless done wholesale. The making of a "picture," or a slide that will threw a "picture" on to the screen, is a different thing—a thing that will bring a reputation to the house capable of it, and such work finds a demand at fair prices among the better classes of camera-users.

And these lines lead to others. Satisfied customers bring all kinds of photography to the man who can do really good "amateur finishing." They are the public, and to get a reputation among the public is no mean or empty achievement, and I am inclined to believe that a reputation for "amateur finishing" is a broader and more fertile thing than a reputation restricted solely to studio work.

THERMIT.

SODA CARBONATE AND THE MONOMET WATKINS FACTOR.

IN the course of an investigation on which we are eugaged we have had occasion to examine the effect of alteration of carbonate concentration on the behaviour of Monomet. Some of our results, since they have a direct bearing on the subject of factorial development—a matter which is at present engaging the attention of photographers—appear to be of sufficient interest to warrant publication apart from the larger investigation.

A stock solution was made by mixing two solutions containing respectively 3.2 gms. of Monomet and 10 gms. of anhydrous sodium sulphite in 100 c.c.s. of solution. The mixture of the two solutions gave a thin cream of suspended amidocresol base of very great stability, owing to the preservative action of the sulphite present. Development tests were made on Imperial special sensitive plates which had been appropriately exposed (200 candle-metre-seconds) behind a step wedge.

For the first test, 10 c.c.s. of the monomet base mixture were diluted with 90 c.c.s. of water, solution of the base occurring rapidly at this dilution. When poured on the exposed plate the image appeared in 5 minutes, and development was allowed to proceed for 50 minutes at 65 deg. F. The result was a beautifully graduated, clean negative with densities rising from 0.25 to 1.3. A second plate was treated with 100 c.c.s. of developer containing 10 c.c.s. "stock" solution and 2 c.c.s. of normal (*i.e.*, 5.3 per cent Na_2CO_3) sodium carbonate solution The image appeared in 76 seconds, and development was conducted for 8 minutes. The resulting negative was exceedingly thin, the greatest density being only 0.8 with a developer containing 5 c.c.s. of carbonate solution, the time of appearance was 18 seconds, and 8 minutes development produced a normal negative, with densities ranging from 0.48 to 1.5. Further increase of the carbonate concentration, up to 40 c.c.s. of the normal solution in 100 c.c.s. developer, gradually lowered the time of appearance to 7 seconds without any increase in the densities; moreover, with 20 c.c.s. and 40 c.c.s. carbonate solution, the plates were appreciably fogged. On calculating the development factors, the following interesting results were obtained:—

	Sol. of Na_2CO_3 per 100 c.c.	Normality of Na_2CO_3.	Time of of appearance.	Total time of development.	Range of densities.
(1) ..	None.	—	5 mins.	50 mins.	0.25—1.3
(2) ..	0.106	N/50	76 secs.	8 „	0.4 —0.8
(3) ..	0.265	N/20	18 „	8 „	0.40—1.5
(4) ..	0.53	N/10	12 „	8 „	0.5 —1.5
(5) ..	1.06	N/5	9 „	8 „	0.55—1.5
(6) ..	2.12	2N/5	7 „	8 „	0.53—1.5

Dividing time of appearance into total time, we get the factors:—

(1) Factor ..	10	(4) Factor ..	40
(2) „ ..	65	(5) „ ..	53
(3) „ ..	26	(6) „ ..	69

It appears, therefore, that the best formula for a Monomet-carbonate developer will be the following:—

Monomet	1.6 gms.
Sodium sulphite (anhydrous)	5.0 gms.
Sodium carbonate (anhydrous)	5.3 gms.
Water to	1,000 c.c.s.

To enhance its keeping qualities, the Monomet and sulphite may be dissolved in 500 c.c.s. of water (the solution will not be quite free from suspended base), and the carbonate in a separate 500 c.c.s. equal volumes of the two solutions being mixed just before use. The normal factor for such a developer will be 35 to 40.

One of the most interesting points noticed was that of the suitability of Monomet, in concentrations up to 2 grams per 1,000 c.c.s. with three times its weight of anhydrous sodium sulphite, for tank development. At a temperature of 65 deg. F., development will be complete in from 1 to 2 hours,

according to the brand of plate and the degree of contrast desired. An appropriate formula would be:—

Monomet	2 gms.
Sodium sulphite (anhydrous)	6 gms.
Water to	1,000 c.c.s.

the Monomet and sulphite being dissolved separately, and the cold solutions mixed.

Whilst it is well known that the concentration of carbonate alkali has considerable influence on the developing characteristics of the poly-hydroxy-benzenes (hydroquinone, pyro, etc.), the above figures, indicating the concentration of carbonate alkali above which (in conjunction with an amidophenol) the rate of development (but not the time of appearance) is unaltered, constitute, as far as we are aware, new knowledge of interest to the advocates of factorial development.

W. F. A. Ermen.
Raymond E. Crowther.

GRAIN SIZE AND SENSITOMETRIC PROPERTIES OF EMULSIONS.

(A Communication from the Research Laboratory of the Eastman Kodak Company.)

Although the existence of some relation between size of grains in a photographic emulsion and the sensitiveness of the emulsion was accepted early[1], little or no attention appears to have been paid to the variation in grain size in one and the same emulsion or layer, as a factor in the photographic properties. Attention was first called to this by C. E. K. Mees[2], in a paper on "The Physics of the Photographic Process." He considers that, "inasmuch as the emulsions are not homogeneous, but each emulsion will contain grains of all sizes, the sensitiveness will depend upon the distribution of the different sizes of grains, as also will the shape of the plate curve, this plate curve being the relation between density and logarithmic exposure." Further, he states "the shape of this curve depends to a considerable extent on the distribution of the different sizes of grains in the emulsion. With a homogeneous emulsion we should have a simple curve with a short over- and under-exposure portion, as shown in fig. 1, and by adjusting the

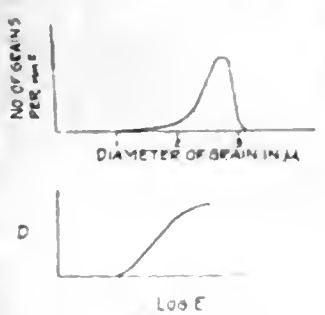


Fig. 1.

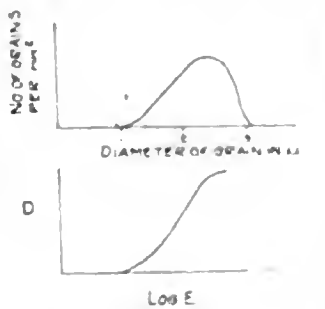


Fig. 2.

sizes of grain so that there is a sufficient number of grains distributed around the mean, we can diminish the size of the under exposure position to obtain a longer straight line (fig 2) We can therefore form a mental picture of the relation between the distributions of the grain and the sensitiveness curve." The author points out that up to that time there had been very little experimental work on this subject, and that the relations suggested were speculative. It appears that the main suggestion is that a proportionality exists between the degree of heterogeneity of the grains, otherwise the breadth of the frequency curve, and the latitude of the plate or emulsion. It is stated that any such considerations are to be regarded as limited to high-speed emulsions.

In this connection we should point out that a first result of our experimental work is to show that the frequency curve alone is of less value in relation to the sensitometric curve than the projective area curve obtained by plotting the product of frequency by the projective area of grains of a given class against the corresponding classes. This will be discussed more fully later. It seems desirable, however, to call attention to this point at this stage.

Experimental investigation of the problem was begun in June, 1919; later papers give account of the results. Meanwhile there has appeared a Paper by Slade and Higson[3], and another by T. Svedberg[4], in which the same problem is envisaged.

Slade and Higson state that "under ordinary conditions of exposure, the shape of the plate curve (as determined by Hurter and Driffield's method) is dependent on:

"(1) The relation of the different sizes of grains in the plate to each other and the quantity of each present.

"(2) The thickness and opacity of the film.

"(3) The time and method of development (though on 'infinite' development almost the same result is obtained whatever the developer and however much bromide it contains)."

They emphasise the importance of the first factor, and show by H and D curves the difference between a plate with grains nearly of the same size and a plate with grains of mixed sizes. They also give photomicrographs, which illustrate the two kinds of plates. The plates with grains of nearly uniform size have much steeper curves than those with mixed grains.

Their results are obviously only semi-quantitative, as no measurement of the dispersity of the silver halides is given. From the curves it appears that, according to their view, γ_∞ is increased by homogensing the grain, and latitude, i.e., the projection of the straight line part of the plate curve is diminished. In partial agreement with this is Lüppo-Cramer's[5] statement that plates of homogeneous grains, prepared by after-peptisation of a finished emulsion show a much earlier reversal period than plates with non-uniform grain.

In a quite recent paper by F. E. Ross[6], of this Laboratory, on the relation between photographic density and exposure, the author develops a new theoretical formula for the characteristic curve. It is pointed out that many formulæ can be constructed depending upon particular assumptions of the following types:—

a. Relative frequency of grains of varying size.

b. Relative sensitiveness of grains of varying size.

c. Variation of grain sensitiveness with light-intensity and wave-length for each class of grain.

d. Ratio of inert to active grains, depending on grain size.

e. Number of layers of silver halide.

f. Opacity of emulsion and its variation with wave-length.

The author points out that data for weighing these assumptions

1. J. Gaedicke, Eder's Jahrbuch, p. 309 (1906); Eder's Handbuch, 3, 66 (1903).
A. P. H. Trivelli, in 1911 (Z. wiss. Phot. 9, 168), had considered a certain relationship to exist between the size of grains of silver halide and the energy absorption when light falls upon them. Lüppo-Cramer (Phot Korr. 47, 468) in the same year, stated that size of grain is concurrent with sensitiveness, and is limited by visible granularity of the negative. Koch and du Prel (Physik. Z. 17, 536), in 1916, also made some important observations tending to show that the so-called coarse-grained plates are not necessarily the most sensitive. Recently, Slade and Foy (Proc. Roy. Soc. A97, 181 (1920)) have made some careful spectrophotometric measurements of the absorption of light by silver bromide. Further, a very recent article by R. E. Slade and G. L. Higson (Proc. Roy. Soc. A91, 154 (1920)) deals with the action of light on a dilute emulsion, which was said to have grains of uniform size, and was one layer thick. Others have likewise given thought to the questions of the size of grain and sensitiveness, and of the absorption of light by the silver halides. A more complete bibliography of this subject will be presented in a forthcoming monograph on the photographic theory by A. P. H. Trivelli and S. E. Sheppard
2. C. E. K. Mees, J. Franklin Inst., 179, 141 (1915)
3. R. E. Slade and G. L. Higson, Phot. J., 59, 260 (1919).
4. T. Svedberg, Z. wiss. Phot. 20, 36 (1920).
5. Lüppo-Cramer, "Photographische Probleme," Halle, 1907.
6. On the Relation between Photographic Density, Light-Intensity, and Exposure Time, by F. E. Ross, Journal of the Optical Society of America, 5, 256 (1920).

severally are lacking, hence, it is unprofitable to develop a formula on any but the simplest assumptions. As these he takes:—

1. All grains in an emulsion are divisible into n groups, each group as a whole obeying the mass action law.[7]

2. The silver mass the same for each group.

3. The sensitivity factor of the groups arranged in geometrical progression. This regards as equivalent true sensitivity difference (inherent) and apparent sensitivity differences (topical), due to thickness of emulsion. This equivalence is possible on account of the reciprocal equivalence of intensity and absorption-coefficient in a layer.

From these assumptions a formula is derived. Calling d_m the maximum density for infinite exposure (reversal neglected), k the sensitivity factor, r the common ratio of the sensitivities of the groups, the equation is obtained

$$D = d_m\left(1 - \frac{1}{n}\sum_{s=0}^{s=n-1} e^{-Kr^s It}\right)$$

$$\frac{dx}{dt} = kI\,(A - x).$$

Taking values $r = 1/2$, and $n = 1, 2, \ldots 10$, the field of practical emulsions should be well covered. A series of typical curves thus obtained is shown in fig. 3.

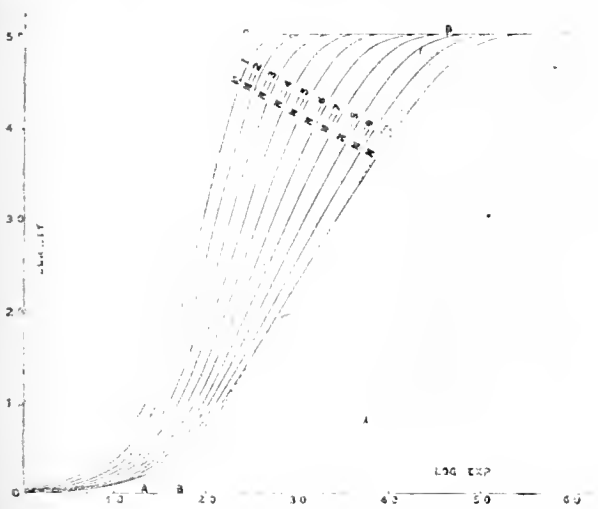


Fig. 3.

Now, it will be noticed that for increasing values of n the slope, or γ_∞, becomes less and the straight line portion longer. Instead of the H. and D. latitude Ross takes the "range," as antilog of the projection of the line A A' or B B' on the exposure axis, as measure of the reproducing power of an emulsion. The "range" increases with n, as shown in following table:—

n	*Range.*
1	15
2	17
4	35
8	290
10	1,000

Although n does not refer explicity to number of classes of different sizes, it would do so (*a*) if these had varying sensibilities, (*b*) if opacities were constsnt. In this case, Ross's equation agrees partly with Mees's hypothesis, that increasing grain heterogeneity increases latitude[8], but also agrees with Higson and Slade's contention that more homogeneous grained emulsions have steeper curves.

We may point out here, anticipating certain results given in a later paper, that the influence of size of grains is not symmetrical in respect of their effect on exposure conditions (light-intensity gradient) and development results (development factor). A great number of very small grains may contribute little on development to effective density, but they may very markedly affect the turbidity and opacity of the plate or film; hence their effect on the characteristic curve is not revealed by the density after development.

Slade and Higson were apparently ignorant of Mees's previous paper, and this is also the case with Svedberg. The latter considers that the problem at issue may be treated as, generally, relation of light-sensitiveness to size of grain, and specifically, the four following cases of this:—

(1) Every single grain has the characteristic curve of the plate.

(2) For every class of grains of nearly the same size in the emulsion there is a distinct curve.

(3) The characteristic curve is only shown by emulsions with non-uniform grain.

(4) The relation between density and exposure expressed in the plate curve is a consequence of inhomogeneity of the photo-chemical illumination inside the photographic layer.

The last case is discounted largely by results with very thin layers previously obtained by Lüppo-Cramer and W. Scheffer,[9] and confirmed by Svedberg. As to the first case, Svedberg concludes, in agreement with Sheppard and Mees, that "reactivity" (rate of reduction) of the grain depends on exposure, but not absolute reducibility. Hence, the problem falls back on the second and third cases. It is pointed out that these require statistics of distribution of size in relation to exposure on ultimate development. Instead of measuring the reduced grains of distorted appearance, Svedberg has applied the method of difference determination. Statistical measurements of grain size (or dispersity) are made first in the unexposed but developed emulsion, after treatment with a silver solvent, then they are made for a series of exposures. From these measurements two important diagrams are obtained, namely (*a*) the curves connecting exposure and percentage reduced grains for each order of magnitude of the grains (*b*) curves showing relation between size of grain and percentage made reducible after a certain exposure.

The first type of curve is comparable with the characteristic curve (since the number of grains is a factor in density). The second gives the relation of light-sensitiveness to size of grain. The determination and division of sizes of residual grains were made by direct projection and microphotography of the exposed, developed layers of very thinly coated much diluted emulsion,[10] after dissolving the developed grains. They were photographed at 1,000 diameters, and then copied on paper at 4x, giving 4,000x in all, and the mean *diameters* of circular grains were determined, and the areas of the polyhedral grains were found by means of a millimetre network. All sizes were then reduced to projective areas, and divided into four classes of magnitudes.

The results are shown in the curves in figs. 4 and 5.

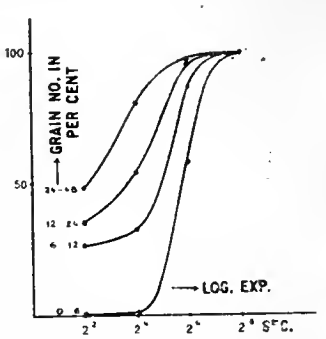


Fig. 4.

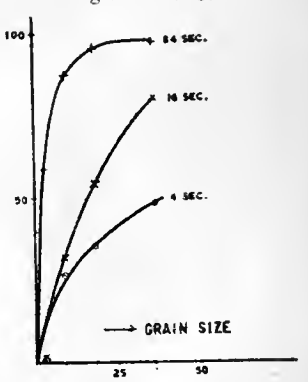


Fig. 5.

From this it appears that every class of grains has its own characteristic curve; D, however, would be proportional to Pn, where n is the number of grains, P the photometric constant or factor. Now at present we do not know precisely the function $D = f(N,S)$, where N = the number of grains per cubic mm., S = the magnitude. Assuming $D_\infty N$, we have $D = Nf(S)$, and $f(S)$ remains to be determined. The only estimation we have of this at present is that of Higson,[11] who gives a relation between size of developed grain, and P, the photometric constant. If we assume that the size of the developed grain, as a first approximation, is proportional to that of the original silver bromide grain, we can use Higson's values to calculate from Svedberg's data the actual D log E curves for his four classes of grains.

Table I. gives the mean projective areas of the undeveloped grains for Svedberg's four classes and also these areas multiplied

7. That is, the law that rate of reaction is proportional to mass of material unchanged.

8. Latitude being analogous to Ross's range.

9. W. Scheffer, Z. Elektroch., *14*, 489 (1908).

10. First should be determined the effect of dilution and thickness of coating on the plate curve.

11. G. I. Higson, Phot. J. *60*, 160 (1920)

by four.[12] The corresponding diameters and photometric constants calculated from these are likewise given.

Svedberg gives no data for the number of fogged grains, so that these could not be taken into account in the tables. In Table II. are shown (see also fig. 6) the number of developed grains (exclusive of fogged grains as stated) for each exposure, together with densities to correspond (using 4A as the projective area for the developed grain), and also the additive or total densities. These total densities, it will be seen, by comparison with the total densities for the plate given in Svedberg's paper, as shown in fig. 7 and Table III., are in the neighbourhood of four times higher than those of the latter, whereas, if Higson's method of calculation is correct and if Svedberg's method is reliable, the values should agree.

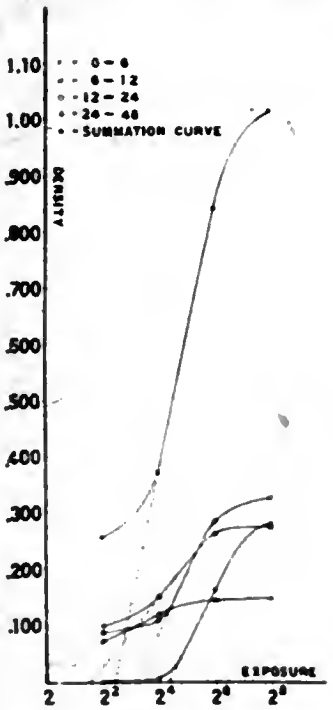


Fig. 6.

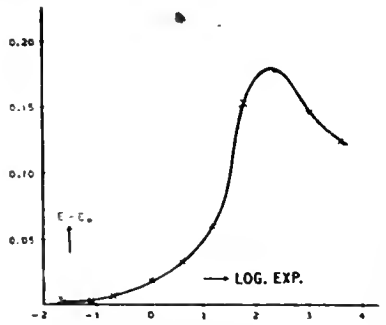


Fig. 7.

Fig. 1 from Svedberg's Paper.

TABLE III.

Time of exposure in seconds.	Density (= extinction co-efficient). Total density.	Density, less fog.
0	0.105 (= $_0$)	0
0.02	0.109	0.004
0.08	0.109	0.004
0.2	0.112	0.007
1	0.124	0.019
4	0.138	0.033
16	0.165	0.060
64	0.258	0.153
256	0.283	0.178
1024	0.250	0.145
4096	0.229	0.124

The most plausible explanation for this large discrepancy appears to be a fallacy in Higson's assumption that in general the developed silver grain has twice the diameter of the original bromide grain (i.e., 4 times the area). It is known, for instance that certain developers, such as phenylenediamine and hydrazine give developed grains considerably smaller than the original grain.

12. According to Higson, the developed silver grain is larger than the original bromide particle by this amount.

TABLE I.

Mean projective areas of undeveloped grains in mm.^{2} $\times 16 \times 10^8$ (Svedberg).	Mean projective areas undeveloped grains in cm.^{2} = A.	Mean projective areas developed grains in cm.^{2} = 4A.	Mean diams. undeveloped grains in cm. $= \sqrt{\frac{A}{.785}} = d.$	Mean diams. developed grains in cm. $= 2\sqrt{\frac{A}{.785}} = 2d.$	Photometric constant $P = 61 \times 2d.$
3	0.19×10^{-8}	0.75×10^{-8}	0.50×10^{-4}	1.0×10^{-4}	.0061
9	0.56×10^{-8}	2.25×10^{-8}	0.85×10^{-4}	1.7×10^{-4}	.0104
18	1.13×10^{-8}	4.50×10^{-8}	1.20×10^{-4}	2.4×10^{-4}	.0147
36	2.25×10^{-8}	9.00×10^{-8}	1.70×10^{-4}	3.4×10^{-4}	.0207
Sum	4.13×10^{-8}	16.50×10^{-8}	—	—	—

TABLE II.

Exposures in seconds.

4A.	0.	4.		16.		64.		256.	
	No. devel. grains.	No. developed grains[2] per cm.^{2} = N.	Density, $= 4\frac{NA}{2.3} = D$	N.	D.	N.	D.	N.	D.
0.75×10^{-8}	0	5.3×10^{-8}	.0018	7.4×10^{-8}	.0022	500×10^{-8}	.160	850×10^{-8}	.277
2.25×10^{-8}	0	87.0×10^{-8}	.085	105.0×10^{-8}	.103	286×10^{-8}	.280	329×10^{-8}	.322
4.50×10^{-8}	0	49.0×10^{-8}	.096	75.0×10^{-8}	.147	133×10^{-8}	.260	139×10^{-8}	.272
9.00×10^{-8}	0	18.0×10^{-8}	.070	30.0×10^{-8}	.117	36×10^{-8}	.141	37×10^{-8}	.145
16.5×10^{-8}	0	159.3×10^{-8}	.253	217.4×10^{-8}	.369	955×10^{-8}	.811	1355×10^{-8}	1.016

Of course, it may be argued that these developers are not capable of giving complete development, or perhaps they cause part of the silver to be dissolved. However that may be, there does not appear to be sufficient experimental evidence for Higson's assumption. Work on this point, namely, the determination of the ratio of the size of developed to undeveloped grain for various developers is much to be desired, and is about to be investigated in this laboratory by Mr. A. P. H. Trivelli.

If we assume that the fully developed grains in Svedberg's work were of about the same size as the undeveloped grains (some previous observations by one of us on the size ratio of developed to undeveloped grains using a developer similar to that of Svedberg substantiate this assumption), then the density values calculated from Svedberg's data on this basis, give D-log E values very close to those of the latter, as shown by comparison of fig. 8 and Table IV. with fig. 5 and Table III. above.

Our calculations are based on the mean projective areas given by Svedberg. The maximum and minimum values of his four classes, particularly the larger sizes, which are the most important, are quite wide apart, so that the agreement just shown is all the more striking.

Table IV.

Exposure in seconds.

A.	0	4.		16.		64.		256.	
	No. devel. grains.	No. developed grains per cm.^{2} = N.	Density, $= \frac{NA}{2.3} = D^*$	N.	D.	N.	D.	N.	D.
0.19×10^{-8}	0	5.3×10^{-5}	.0005	7.4×10^{-5}	.0006	500×10^{-5}	.040	850×10^{-5}	.069
0.56×10^{-8}	0	87.0×10^{-5}	.0213	105.0×10^{-5}	.026	286×10^{-5}	.070	329×10^{-5}	.081
1.13×10^{-8}	0	49.0×10^{-5}	.024	75.0×10^{-5}	.037	133×10^{-5}	.065	139×10^{-5}	.068
2.25×10^{-8}	0	18.0×10^{-5}	.0175	30.0×10^{-5}	.029	36×10^{-5}	.035	37×10^{-5}	.036
4.13×10^{-8}	0	159.3×10^{-5}	.063	217.4×10^{-5}	.092	955×10^{-5}	.210	1355×10^{-5}	.254

* D in this table = ¼ D in Table II.

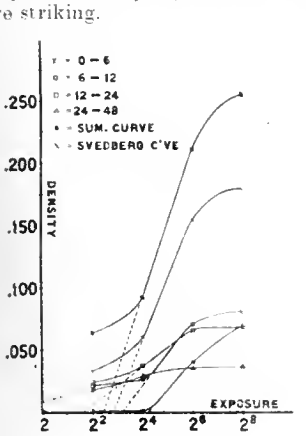


Fig. 8.

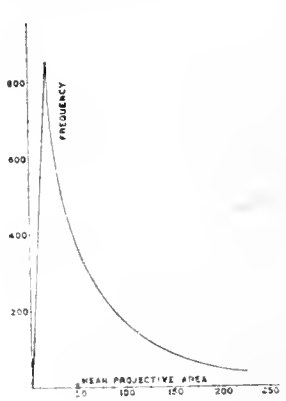


Fig. 9.

D-log E curve from Table IV.

Svedberg's work on solarisation and hydrogen peroxide action in this connection need not be discussed at present.

We reproduce herewith the size frequency distribution curve (fig. 9) plotted from Svedberg's data: this curve, of course, does not include fog grains.

Our work, which was commenced before the papers of Slade and Higson, and of Svedberg, appeared, has as its object the investigation of the relation of grain, in the statistical sense, or of dispersity, to the sensitometric properties of emulsions. This requires methods of assay and determination of the size frequency curves. A discussion of the methods already developed in this direction by ourselves and others will be published shortly.

E. P. Wightman.
S. E. Sheppard.

RULE FOR FINDING DIAGONAL OF PLATE.

It is often required to know the exact diagonal of a plate, as when obtaining a condenser for enlarging, or choosing a lens of the maximum focus desirable for all-round work. The diagonals of the more usual sizes of plates are to be found in tables, such as that given in the "B.J.A.," as a note to the "Table of View-Angles"; but for odd or special sizes one has to make a practical test, either by drawing a rectangle of the dimensions in question and bisecting it from opposite corners, or by measuring across the plate itself. Both of the latter methods are liable to error unless carried out very carefully.

There is, however, an accurate and simple rule for finding the diagonal of any rectangle or square, which, though perhaps familiar to the mathematician, will probably be new to most photographers. It is as follows:—Let A and B equal the length of two adjoining sides of the rectangle, then the diagonal will be equal to the square root of the squares of A and B added together. Or, to express it as a formula, the diagonal = $\sqrt{A^2+B^2}$.

For example, what is the diagonal of a Continental plate measuring 18 cm. by 24 cm.? Here, the square of 18 is 324, and the square of 24 is 576. Adding together 324 and 576, we get 900, and the square root of 900 is, of course, 30; so that 30 cm. is the required diagonal, practically equivalent to 11.8 in.

Or, to give another instance, what is the diagonal of a 5 in. by 3½ in. plate? (This is one of Mr. Watkins' suggested logical sizes.) Here, the square of 5 is 25, and the square of 3½ is 12¼. Adding together 25 and 12¼, the total is 37¼, and the square of 37.25 is 6.103, so that the required diagonal is approximately 6.1 in.

By many people the extraction of a square root is regarded with a quite uncalled-for amount of awe. Those, however, who are not acquainted with the method, or who wish to save trouble, can easily refer to the tables of square roots to be found in ready-reckoners, etc. These only deal with whole numbers, but that is usually near enough. Thus in the example just quoted, on looking up 37 in such a table, the square root is found to be 6.037.

For those who like proof of a rule, it may be stated that the foregoing depends on Euclid's well-known proposition that the area of a square erected on the hypotenuse of a right-angled triangle is equal to the combined area of the squares on the other two sides. The diagonal of a rectangle is obviously the hypotenuse of two identical right-angled triangles, hence its length must be equal to the square root of the added squares of the two other sides of either triangle, that is, two adjoining sides of the rectangle.

It may be remarked that the rule is also useful occasionally for testing the accuracy of a set-square, or for verifying the truthful adjustment of the gauge in a guillotine cutter, or the angles of a trimming glass. This can be done by measuring two edges or sides at a right angle, and then noting whether or not a diagonal connecting the ends agrees in length with that calculated.

A. Lockett.

THE GORSKY PROCESS OF COLOUR CINEMATOGRAPHY.

A private view was held in London last week of a short length of film, the first to be shown, prepared by the process of colour cinematography, which has been worked out by Professor S. M. Procoudine-Gorsky. The film, taken on the Riviera in September last, had as its subject a slight incident of matrimonial misunderstandings. The eternal triangle of the cinema theatres aparently is an obsession even of the technical experimenter in cinematography. So far as the technical result is concerned, it was explained that the film had been taken with the object of showing the practicability of the process, and therefore had been made at a stage of its development at which the causes of certain minor defects had still to be eliminated, whilst the mechanical equipment for the printing of the coloured films was that of the experimental laboratory, and not of the factory. With these allowances to be made, it was not the easiest matter to form a definite opinion of the process. The film was certainly very transparent, yielding a bright picture on the screen, and many of the textures, and particularly flesh tones, were well rendered.

Scarcely any technical particulars of the process are available, but it is stated that the negative is made at triple speed, and, presumably, that each successive series of three pictures on the negative is used as the set of colour-sensation negatives. From each of these three a separate colour impression is produced, and the three assembled in register, so that the film is a series of complete colour pictures on a film which can be shown in any cinematograph projector. It would seem that the several colour impressions are produced by a mordanting process of dye-toning. But presuming that the foregoing is a description of the process in general terms, it seems somewhat difficult to understand in what way identity of the images in three successive picture sections is obtained. If the subject is in rapid movement, it would seem inevitable that the image must differ from one picture section to another, even when taken at triple speed, a defect which would give rise to want of registration, and thus to the colour fringing, which is the rock on which many processes of colour cinematography have foundered. It may be that we are not fully informed of the basis of Professor Gorsky's process, which, at a luncheon following the demonstration, was described by Mr. Sanger-Shepherd as being a sound one, and as having yielded a film parts of which were technically perfect. It is clear, however, that Professor Gorsky has progressed some way towards the goal which has been his ideal for many years past, and we wish him all success in his further progress.

Photo-Mechanical Notes.

Reversal Methods for Photo-Engraving.

It is not an uncommon occurrence in photo. engraving for line blocks to be reversed, *i.e.*, the black lines are required to print as white lines on a black background, and by use of one of the following methods the operation can be easily and quickly performed without having to resort to the making of a positive. In all the cases given the negative is made as usual.

Method I.

The negative is printed on the zinc plate by the albumen method and developed out in the usual way. After drying, the plate is coated with the fish glue or enameline solution, dried and exposed without putting in a frame, by standing it up to the light. When the exposure is finished, the plate is dyed up and dried off, when the ink image can be removed by rubbing it with cotton wool moistened with turpentine. The plate is burnt in, and after cooling is ready for etching.

Method II.

An albumen print is prepared in the ordinary way and given a good pass through the graining bath. After drying it, the plate is rolled up solid with etching ink and placed in the following solution:—

Water	20 ozs.	...	600 c.c.
Hydrochloric acid (pure)	½ oz.	...	15 c.c.

This solution attacks the albumen under the original work and causes it to wash away, leaving the bare metal, whilst the ink applied by the second rolling up is left intact.

Method III.

A print is made by the enameline process, but is not burnt in. After the plate has been dried, it is rolled up with soft letterpress ink and dusted in with powdered bitumen. The plate is then placed in a 5 per cent. nitric acid bath, which penetrates the film causing the fish-glue to leave the metal. This action is assisted by gentle rubbing. When the plate is dry it is heated to set the ink and bitumen.

Method IV.

Shellac	1 oz.	..	30 c.c.s.
Dragon's blood	60 grs.	..	4 gms.
Industrial spirit	10 ozs.	..	300 c.c.s.

An albumen print is made, but not dusted with bitumen, and after flowing over with plain spirit, it is flowed over with the above solution and whirled dry. The reversed image is obtained by washing out the plate with benzole.

Method V.

This method is known as the Vandyke process and can be used for printing directly from the original as well as from a negative, provided in the former the lines are drawn or printed in firm black ink on clean paper.

The zinc plate is coated with the following solution and exposed behind the original or negative:—

Fish glue	2½ ozs.	..	75 c.c.s.
Ammonium bichromate ..	½ oz.	..	15 gms.
Ammonia 880	30 minims		2 c.c.s.
Water	10 ozs.	..	300 c.c.s.

After the exposure is made the plate is developed in water as in the case of an enameline print and the surface gently but thoroughly rubbed with a creamy paste of magnesium carbonate. The latter should be well rubbed down on a piece of glass or zinc to ensure it is free from grit, which would scratch the work. The print is rinsed under the tap and passed through the following graining bath, washed well and dried over a flame:—

Nitric acid	½ oz.	..	7 c.c.s.
Alum	60 grs.	..	4 gms.
Water	40 ozs.	..	1,200 c.c.s.

The plate is now rolled up with the following ink applied thinly:—

A.	Litho chalk ink	6 parts }
	Stick litho ink	2 parts } Mix by heating.
	Hard copper plate transfer ink ..	2 parts }
B.	Bitumen	1 part } Dissolve in chloroform
	Yellow lump resin	1 part } and benzole mixed

Thoroughly mix A and when cooling gradually add B with constant stirring. For use thin out a small quantity of the ink with turps on a slab and roll up plate, which should then have a thin grey film of ink over it. The plate is now warmed to set the ink, and when cool is placed in clean water for 2 or 3 minutes, when it is gently rubbed with cotton wool to remove the glue and ink upon it, leaving the ink adhering to the bare metal.

If the glue is difficult to remove, soak for a short period in a 1 to 400 bath of sulphuric acid. After the glue has been removed, dry and treat as ordinary line work.—E. L. Turner.

Multi Reproductions on One Negative.

Small blocks of different sizes are frequently required from an original or originals. One method is to take separate negatives of the required size and then strip the film to a large sheet of glass, and thus enable the etcher to treat them as one plate, which is subsequently cut up and mounted. By employing the following method only one negative is made, and no stripping is necessary, thus saving considerable time. To take four exposures on one plate, cut out an L shape mask of stiff card, as shown in fig. 1, the dimensions depending upon the size of plate to be used. Place the mask in the half tone screen holder as shown at 1. Focus the original and adjust the image so that it falls in the cut-out portion and make the first exposure. After this exposure, close the darkslide and remove from camera. Turn the mask as shown at 2, with the cut-out portion to the right. Move the original and re-adjust the focus, replace the slide and expose. The third and fourth exposures are treated in a similar way, only the mask is inverted, as shown, with the openings as seen at 3 for the third exposure. For the fourth exposure the mask is turned round with the cut-out portion as seen at 4, thus completing the four exposures.

Six exposures can be obtained by cutting two masks as shown

in figs. 2 and 3. It will be noticed that fig. 2 is longer than fig. 1. The procedure is the same as when using fig. 1 for the four exposures. The fifth and sixth exposures are made through fig. 3, turning from right to left. The diagram will explain the method of using these masks.

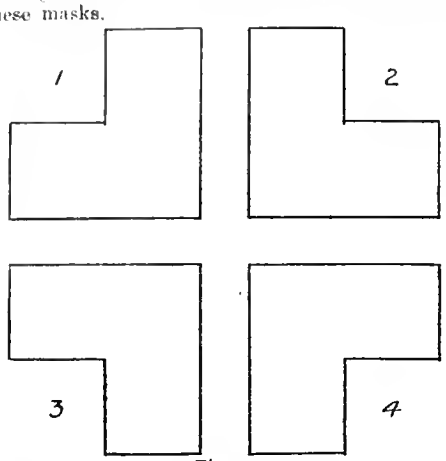


Fig. 1.

A mask with which eight exposures can be made, and which anyone of ordinary ability can construct, is shown in fig. 4. The shaded portion is a piece of cord that covers up half the opening, and works in the slides *a* and *b*, so that either half can be covered. Fig. 5 shows in section the sliders in which the card is pushed up

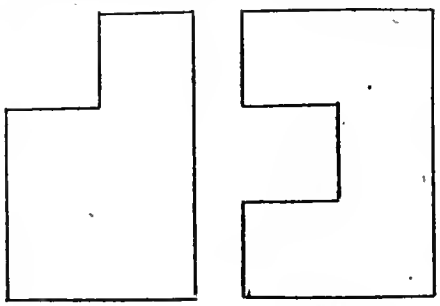


Fig. 2. Fig. 3

and down. The first exposure is made through the top left-hand opening, with the card over the lower portion. The next exposure is through the lower portion, the card being pushed up for the purpose. The mask is then turned so that the opening is on the right side, the same operations being repeated. Four exposures

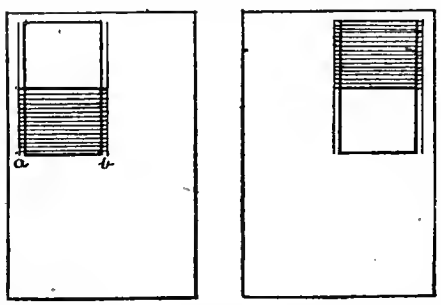


Fig. 4.

are thus obtained. The remaining four are made by inverting the card so that the openings are at the bottom of the plate, thus making the eight exposures.

A little thought and ingenuity will suggest how by adding additional covers even 12 or 16 exposures can be obtained on one

Fig. 5

plate. If the wet collodion process is used for negative making, and the exposures exceed eight minutes, it is sometimes advisable to re-dip the plate in the silver bath before developing, having previously well drained the plate from an excess of silver solution.

W. J. S.

FORTHCOMING EXHIBITIONS.

March 14 to 26.—Dennistoun Amateur Photographic Association. Hon. Secretary, Wm. F. Macpherson, 152, Craigpark, Dennistoun.

April 13 to 23.—Portsmouth Camera Club. Latest date for entries March 31. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Professional Photographers' Association, at the Photographic Fair. Horticultural Hall, Westminster, S.W. Latest date for entries, April 7. Hon. Secretaries (Correspondence), Marcus Adams, 43, Dover Street, Piccadilly, London, W.1; (Exhibits), R. N. Speaight, 157, New Bond Street, London, W.1.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs

April 28 to 30.—Nottingham and Notts. Photographic Society. Latest date for entries, April 13. Particulars from the Hon. Secretary, A. Beeston, 103, Nottingham Road, Nottingham.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, March 7 to 12:—

APPARATUS.—No. 7,646. Machines for sensitising papers, etc. B. J. Hall.

APPARATUS.—No. 7,647. Apparatus for continuous washing and drying of blue-prints, etc. B. J. Hall.

DYE PROCESS.—No. 7,788. Process for treating and dyeing photographic images and products obtained thereby. W. van D. Kelley.

LANTERN PROJECTION.—No. 7,450. Passing picture slides through magic lanterns, etc. A. E. Orr.

APPARATUS.—No. 7,538. Light-condensing device. K. de Proszynski.

CAMERAS.—No. 7,656. Bellows camera. E. J. Sark.

PRINTING.—No. 7,578. Printing machine. Chromatic Film Printers, Ltd., and L. J. Hibbert.

COLOUR PHOTOGRAPHY.—No. 7,579. Production of printing surface for making coloured screen-plates, films, etc. Chromatic Film Printers, Ltd., and L. J. Hibbert.

CINEMATOGRAPHY.—No. 7,273. Composition for treating cinematograph screens, etc. J. W. Byford.

CINEMATOGRAPHY.—No. 7,757. Cinematograph projection shutter. J. Crawley and W. Harris.

CINEMATOGRAPHY.—No. 7,295. Cinematographic apparatus. D. Kennedy.

COLOUR PHOTOGRAPHY.—No. 7,517. Direct-colour photography and/or cinematography. M. Martinez.

PHOTOGRAPHIC SUPPORTS.—No. 7,518. Double-faced photo, etc., recording supports. M. Martinez.

COLOUR PHOTOGRAPHY.—No. 7,519. Double-faced supports for direct-colour photography or/and cinematography. M. Martinez.

STEREOSCOPY.—No. 7,520. Stereoscopic and/or colour cinematography. M. Martinez.

CINEMATOGRAPHY.—No. 7,521. Multiple printers for cinematography. M. Martinez.

COLOUR CINEMATOGRAPHY.—No. 7,522. Colour cinematography by interference of rays. M. Martinez.

COLOUR PHOTOGRAPHY.—No. 7,523. Screens for colour cinematography. M. Martinez.

COLOUR PROCESS.—No. 7,524. Process for stereoscopic or/and colour cinematography. M. Martinez.

CINEMATOGRAPHY.—No. 7,863. Cinematograph, etc., projection screen. R. Wellesley.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

AERIAL CAMERAS. No. 134,851. (June 5, 1915.)—The method of taking photographic pictures of country from aircraft comprises moving intermittently a narrow strip of sensitive film in a direction transverse to the direction of flight, exposing such an amount of this film after each movement that the size of the exposure measured lengthwise of the film is a multiple of the size of the exposure measured across the width of the film, the several exposures on the film being then individually separated and suitably pasted one over the other by their longitudinal edges to form a complete panoramic or composite picture.

Fig. 1 shows a single picture, the elongation a of which transversely to the direction of flight is approximately four

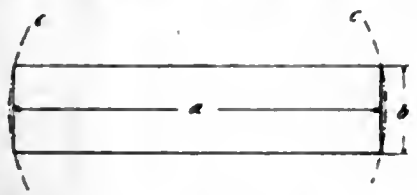


Fig. 1.

times as long as the dimension b in the direction of flight. The circular lines c denote the circle cast by the objective.

Figs. 2 and 3 show in front view and transverse section an example for the juxtaposition of the pictures. The film band is so shifted onwards transversely to the direction of flight that the picture taken at the moment in the direction of flight has as small an elongation as possible in this direction and therefore on the other hand as great an elongation as possible transversely to the direction of flight. The separate copied strips of picture a^1 which result after the subdivision of the film band are laid over each other at their longitudinal edges like the tiles on a roof so that a continuous finished panoramic picture results.

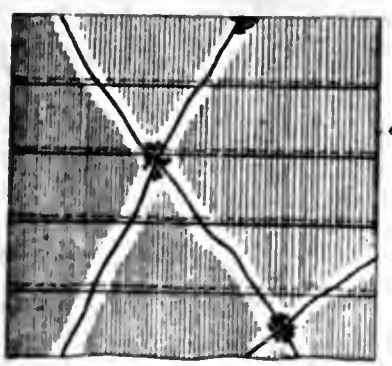


Fig. 2.

Fig. 3.

To the part d of the casing carrying the objective c is attached the casing d^1, in which are placed the means for guiding and feeding forward the film h. This film h runs from the roller g from which it is unwound to the roller g^1 on to which it is wound and is exposed by the well-known roller-blind shutter f consisting of a band with a longitudinal slit f^1 in it. The intermittent feeding forward of the film is effected by known means independently of the operation of the roller-blind shutter f, in such a way that every time the film h comes to rest the exposure slit f^1 is moved past transversely to the longitudinal direction of the film. For this purpose the following arrangement which is shown by way of example serves:

The film h is directed between a pressure roller m with a peripheral recess m^1 in it and a roller n which latter is connected by a friction cord o or the like with the core p of the roller on to which the film is wound. This roller n co-operates by friction with the roller m, but when the roller n ceases to remain in driving engagement with the roller m when passing over the recess m^1 the roller m will slip past the film which in consequence will remain stationary until the roller n again engages with the periphery of the roller m.

The intermittent feeding forward of the film produced thereby

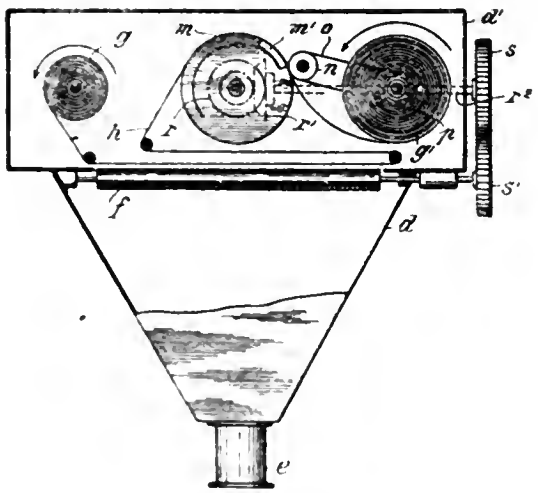


Fig. 4.

produces also the intermittent forward movement of the winding up arrangement.

The axle of the feed roller m is connected by a bevel wheel r to the bevel wheel r^1 on a spindle r^2, which has mounted on its other end a gear wheel s, which as shown in fig. 6 has teeth on only a portion of its periphery and which gear wheel gears into the gear wheel s' on the spindle t of one of the rollers for the shutter. Consequently when the feed roller m rotates the gear wheel s^1 is also set in rotation by the gear wheel s and again released whereby as the spindle t^1 of the other roller for the shutter is controlled by a spring u which is set when the shutter moves forward, the shutter is released so that it flies back and during this backward movement the slit f^1 moves over the stationary section of the film transversely to the longitudinal direction thereof and so exposes it. The instant of the co-operation of the recess m^1 with the feed roller m therefore coincides with the instant of the release of the gear wheel s^1 by the part of the gear wheel s which has no teeth, so that

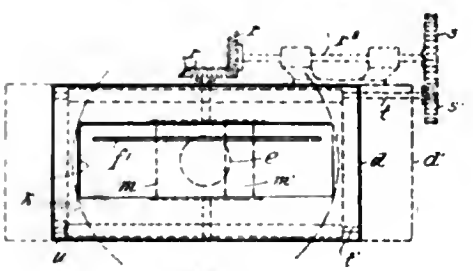


Fig. 5.

Fig. 6.

therefore the requirement that the exposure shall take place while the film is stationary is fulfilled.

It is obvious, of course, that the slit f^1 must be inoperative when the roller-blind shutter is being reset (*i.e.*, when the gear wheel s^1 co-operates with the part of the wheel s which has teeth and when the film is moving), and this can be ensured in the well-known way by covering over the slit during the resetting of the shutter by means of a slide or the like, the slide exposing the slit again when the shutter flies back. An example of this arrangement is shown in fig. 7 in which f denotes the roller-blind shutter, f^1 the exposure slit therein and t, t^1 the spindles of the rollers for the shutter. As previously

stated. the spindle t^1 is controlled by a spring u, which tends to wind the shutter f on to the roller mounted on the spindle t^1. Under the shutter f lies the slide v which is guided in lateral guides v^1 and is connected at one end to a spring w attached to a fixture w^1, which spring constantly tends to draw the slide towards the stop y^1. The other end of the slide v is provided with a recess in which a hook x, pivotted to the shutter f, is adapted to engage. Assuming the slide v to be against its stop y^1 and the shutter is being rewound during an exposure on the roller on the spindle t^1, it will be seen that when the hook engages with the edge of the slide v it will ride over this edge as it has a curved or cam-shaped contour, and engage in the recess in the slide. Thus when the shutter is moved in the opposite direction on to the roller mounted on the spindle

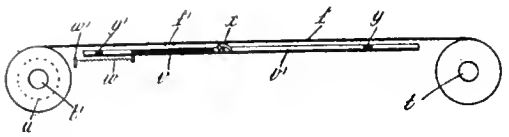


Fig. 7.

t the slide will be moved with it and will thus cover the exposure slit f^1 and render the latter inoperative. Of course the slide will be sufficiently close to the shutter to prevent light reaching and fogging the film when the latter is being moved. Now when the shutter has been moved the required distance towards the roller on the spindle t the nose of the hook x will engage with a fixed stop y, will be depressed thereby and the hook will be released from the recess in the slide which will thus fly back to the stop y^1 under the action of its spring w. Thus the slit will no longer be covered so that light may pass to the film. The operation of the parts are so timed that the slide flies back just before the teeth on the gear wheel s move out of engagement with those on the gear wheel s^1 so that the release of the slide is ensured.—Oskar Eduard Messter, 110-111, Leipziger Strasse, Berlin, W.8.

The following complete specifications are open to public inspection before acceptance :—

CINEMATOGRAPHY.—No. 159,851. Cinematographic projecting screens. J. Emlington-Darling.

COPYING DEVICE.—No. 159,828. Device for copying the surface to be obtained from a photo-stereogram of a spatial form. C. Zeiss.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

IMPEX.—No. 411,020.—Photographic plates and photographic films. The Imperial Dry Plate Co., Ltd., Ashford Road, Cricklewood, London, N.W.2., manufacturers of photographic materials. December 29, 1920.

IMPEX.—No. 411,021. Photographic sensitised paper. The Imperial Dry Plate Co., Ltd., Ashford Road, Cricklewood, London, N.W.2. December 29, 1920.

DESENSITOL.—No. 411,785. Chemical substances used in photography, photographic plates and photographic films. Ilford, Ltd., Britannia Works, Roden Street, Ilford, Essex, manufacturers of photographic plates, paper and films. January 22, 1921.

DISTAR.—No. 362,971. Optical instruments. Carl Zeiss, 2, Carl Zeiss Strasse, Jena, Germany, manufacturers of optical and philosophical instruments. August 1, 1914.

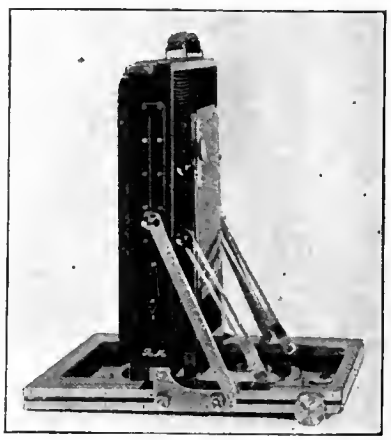
PROXAR.—No. 362,972. Optical instruments. Carl Zeiss, 2, Carl Zeiss Strasse, Jena, Germany, manufacturers of optical and philosophical instruments. August 1. 1914.

New Apparatus.

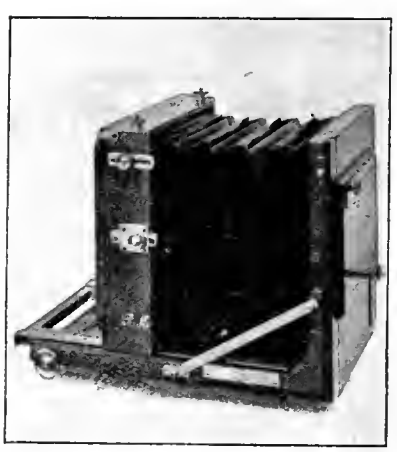
R.M. Field Cameras. Sold by the London Camera Exchange 2, Poultry, Cheapside, London, E.C.2,

Two models of field cameras, supplied as their specialties by the London Camera Exchange (Robbins, Manistre & Co.), have been sent to us for our examination. One is a light model with taper bellows; the other, of heavier square-pattern build. Both are of exceedingly good design and workmanship, and both can be obtained in teak instead of mahogany for 5 per cent. extra on the prices given below.

The light model is of double extension, 19 inches in the whole-plate size, and has a thickness of 2½ inches when folded. One special feature of it is the wide-angle movement, which is obtained by providing on the baseboard a second pair of supports for the



lens front. This allows of lenses of the shortest focus which could be usefully employed being made available. The camera is very well provided with rising front. The front as a whole can be raised inches, and a further rise of about 2 inches is obtainable by raising the lens panel, which is of ample dimensions, 7 × 3½ inches, for this purpose and for taking large lenses. The panel movement also allows of good rise when a wide-angle lens is being used. There is both front and back swing, and the brass fittings are of specially substantial make, brass binding and plates being fitted in places where there is a tendency to wear. The camera is made



with a solid baseboard, but can be supplied with turntable and tripod for a further £4. Altogether it is a high-class instrument, light yet strong. Including three double book-form plate-holders, the price in half-plate size is £13 10s.; in whole-plate, £17 10s.; in 10 × 8, £22 10s.; and in 12 × 10, £27.

In the square bellows pattern the extension in half-plate size is 19½ inches, and the rise of front 2 inches. Three is ample swing back, and also side-swing movement on the brass runners. In this

model also special commendation must be given to the solid construction of the brass and metal work. The camera is a first-rate pattern of the rear-focussing type, such as is favoured by many photographers. It is a camera able to stand much hard work in the field, and one which serves also for studio use. The prices are the same as those for the light model. In each model, brass-binding throughout of camera and plate-holders is obtainable at prices running from £2 15s. to £4.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, MARCH 28.

Croydon Camera Club. Easter Monday Outing.
North Middlesex Phot. Soc. Outing to Rickmansworth.
South London Phot. Soc. Portfolio Exhibition.

TUESDAY, MARCH 29.

Bournemouth Camera Club. A.P. and P. 1920 Prize Lantern Slides.
Bowes Park and District Phot. Soc. Informal Meeting.
Leith Amateur Phot. Assoc. Annual Business Meeting.
Portsmouth Camera Club. "Photographic Dodges." Eng.-Cmdr. Mowlam and Others.
Walthamstow and District Phot. Soc. "Pictorial Photography." G. F. Prior.

WEDNESDAY, MARCH 30.

Accrington C.C. "Manipulation of the Optical Lantern." T. Floyd
Borough Polytechnic Phot. Soc. "Portraiture." R. Coombs.
Croydon Camera Club. "My Photographic Experiences in the R.A.F." S. W. Rose.
Ilford Phot. Soc. "Devon, Glorious Devon." F. G. Emler.
Partick Camera Club. "In and Around Glasgow." W. S. Blair.
Rochdale Phot. Soc. "Cloud Photography." A. Baxter.

THURSDAY, MARCH 31.

Everton and District Phot. Soc. L. and C.P.U. Slides.
Gateshead and District Camera Club. "Carbro." W. Mitchell.
Hammersmith (Hampshire House) Photographic Society. "Stereoscopic Photography." W. H. A. Fincham.
Kryn and Lahy (Letchworth) Phot., etc., Soc. "Practical Use of Photographic Lenses."
North Middlesex Phot. Soc. Lectrettes Competition.

FRIDAY, APRIL 1.

R.P.S. Pictorial Group. "Control in Printing." N. E. Lubosher.

CROYDON CAMERA CLUB.

Mr. C. P. Crowther kindly filled a gap in the syllabus with a lecture entitled "Psychology in the Studio," and succeeded in highly interesting all.

Psychology, he said, might be deemed to be the application of experience and talent developed by years of study till the act itself was done unconsciously or subconsciously. In the studio it was compulsory to converse with sitters until they arrived at the unconscious mood. Only in such way could characteristic portraits be obtained, though no concrete directions were possible to teach a method of catching the evasive characteristics of sitters.

A capital set of slides illustrating varied professional portraiture was shown. A slide by Mr. Herbert Lambert, of Bath, well showed the pleasing diffused definition afforded by one of the old landscape lenses at a large aperture. He employs a star-shaped stop in lieu of the usual type, as affording a more pleasant quality of image. Mr. Crowther said he could offer no opinion on this, but on raising the question at the R.P.S. he had been informed that the star-shape could make no possible difference.

Granted this be true for a corrected lens free from zones, it is by no means apparent that the same remark applies to a single achromatic lens at large aperture. With the latter at *f*/8, owing to outstanding spherical aberration, focussing is so difficult that it is the usual plan to focus with smaller diaphragm and then open out. Now, if we assume a fairly small central stop good definition is secured. Next, if we enlarge this aperture by radiating V cuts, then the "quality" of the image, compared with that furnished by a circular stop of equal area, may well be of perceptibly different character, as, so to speak, the aberrations are being drawn upon in different ratios. It is quite an interesting point, and it only remains to suggest to those who may care to make comparative tests, and are not optically inclined, that the *f* value of the irregularly shaped stop may be approximately ascertained by laying it, and one of the Waterhouse regular stops (or if iris, a cut-out equivalent circle) on small squared paper, and counting the squares in each case. Exposures will be in direct ratio.

In justice to Mr. Crowther it should be said that the foregoing is but an imperfect summary of some of the points raised. The lecture was keyed in highly strung vein, and delivered from an altitude. His main contention, so far as could be gathered, was that all great achievements in art were secured sub-consciously and without much effort. On this a hot discussion arose, to which space does not permit reference; possibly little real difference of opinion existed due to misconception of definitions.

Mr. Salt, who opened the discussion, found himself in complete and cordial disagreement with the main thesis. Mr. Cavendish Morton, after pointing out to the last speaker that those who split hairs frequently were bald, cut the mundane, climbed on to the roof after the lecturer, and then held forth from the top of the flagstaff. And Mr. Crowther looked up and blessed him.

"What are we?" dramatically inquired Mr. Cavendish Morton, and supplied the answer by saying—"The products of bodies and souls wounded in countless generations." ("I suspected as much," here interjected the "office boy.") "The artist," he added, "is to be distinguished by his hyper-sense to the subtle things of life, and his art is the sacrament made to powers of good or evil." This is a mere sample from bulk, but sufficiently indicates the transcendental atmosphere kicking about. Mr. King brought all to earth with the proverbial charwoman's bump by saying that he found children, owing to their absence of self-consciousness, much easier to photograph than adults. Those accustomed to public speaking (adults), such as the clergy, actors, and bookmakers, made the best sitters. Mr. Ackroyd remembered as a child, some seventy or eighty years ago, being given some toys to play with by a photographer, mistaken for presents with eventual heart-burning. Mr. Reynolds was curious to know how the sub-conscious theory applied to scientific work.

Mr. Sellors regarded the theory as dangerous, as a lot of sub-conscious badness might be stored. Mr. Harpur regarded himself as one of the sub-conscious sort; all his finest work had been done that way. Mr. Purkis made some remarks on supplementing common sense and "following your nose"—excellent advice provided the nose is not bent sideways. Mr. Crowther, in a general reply, said he was glad to think that for once the reporter would be compelled to record that sentiment reigned over and held the members of the Croydon Club. It can be recorded with more accuracy that all thoroughly enjoyed a first-class evening, and will look forward with pleasure to hearing the lecturer again.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on March 11 at 35, Russell Square, when there were present Messrs. Marcus Adams, A. B. Basil, Frank Brown, W. B. Chaplin, A. H. Chapman, G. Chase, Alex. Corbett, T. Chidley, Alfred Ellis, R. Haines, G. Hana, W. Illingworth, H. St. George, R. N. Speaight, F. G. Wakefield, H. Wheeler, W. H. Wedlake, and the Secretary, Mr. Lang Sims.

Letters regretting absence were read from Messrs. Dickinson, Fry, Gray, Lambert, Read, Spink, Turner, and Swan Watson.

The finance committee reported that they had met that day, and recommended for payment various accounts.

Mr. Speaight reported that at the last meeting of the Congress committee it was decided to recommend the Council that each business meeting in Congress week should have its individual Chairman, and that certain guests should be invited to the dinner. These recommendations were approved.

There was some discussion with regard to the date of the annual meeting, the room in which it was to be held being required for the afternoon of Wednesday, April 20. It was agreed that the meeting take place at 2.30 p.m. on the following Friday.

The Secretary reported that the Autotype Company had offered to give a "Carbro" demonstration at the Congress, and it was agreed that the Secretary should reply that the only convenient time would be 2.30 p.m. on the Tuesday.

Mr. Crowther had written saying he would be glad to use a lantern, and he could then show examples of work by several prominent photographers. The Secretary was asked to inform Mr. Crowther that a lantern would be available.

Mr. Marcus Adams reported with regard to the Exhibition that everything was going on satisfactorily.

The Secretary reported that there was a brisk demand for Congress badges, and hoped members would follow the good example set so that the official list might be complete when printed.

The Secretary presented an unusually long list of new members, totalling 33. All were elected.

A number of interesting letters were read by the Secretary, all

having reference to matters in which members sought the advice of the Council. The replies suggested by the Secretary were confirmed, and the Council rose after a sitting of nearly three hours.

COUNCIL AT DINNER.

In the evening the members of the Council dined together at Gatti's, in the Adelaide Gallery. Mr. Frank Brown (President) genially presided, and the evening was most happily spent. Reference was made to the growth of the Association, and several lines along which development and increasing usefulness was looked for were indicated.

The health of the President was heartily drunk, as was also that of the President-Elect.

News and Notes.

TO APPRECIATE FINE ART.—A mind trained to the understanding of fine art is plainly a vital qualification of those who aspire to produce works by photography claiming to be "art," whether portraiture or landscape. Yet how seldom is that qualification found. The obstacles in the way of acquiring it are certainly great, for many have not the opportunity of attending an art school, and, after all, the average school of art is simply an institution for teaching people to draw. Therefore, it is with a good deal of pleasure that we see that Mr. F. C. Tilney has established a postal course of training in this subject as a natural issue from a general course (The Art of Life), in which the student is led to train himself in the principles of æsthetics. This latter course, as we know, has been widely appreciated, and we are sure that in seeking to guide those more particularly interested in fine art Mr. Tilney is ministering to a widely-felt need. Particulars of the course are obtainable from him at 28, John Street, Bedford Row, London, W.C.1.

HULL PHOTOGRAPHIC SOCIETY.—Once again the Hull Society has its exhibition housed in the City Art Gallery, where it has been opened by Alderman J. Pybus, the Chairman of the Art Gallery Committee and a member of the Hull Society since its inception 37 years ago. There are nearly 200 prints on view, including nearly a score of prints by Mr. Marcus Adams, of London, and Mr. John M. Whitehead, of Alva. It is satisfactory to learn that the show was a bigger and better one than last year's, which provides an interesting sidelight on the stimulus resulting from last year's publicity. There are certain disadvantages attendant on such a method, such as a financial loss, but there is no objection to the prints remaining hung until May, and they can be viewed under almost ideal conditions. The Hull gallery is one of the prettiest and best-lighted galleries in the country. The president, Mr. L. Kirk, shows some interesting multi-colour Bromoils of fine artistic taste and delicate colouring. The technique of J. W. Atkinson is very praiseworthy, and C. Oxtoby's architectural examples form a notable group. Variety of subject is very noticeable in the work of Cyril W. Rodmell, and outstanding exhibits are also shown by J. T. Dyson. W. Dalton, C. A. Manning, G. R. Langdale, R. Proudlove, and H. C. Stephenson. There is one lady exhibitor—Mrs. Rivers Freeling.

Correspondence.

STEREOSCOPIC RELIEF.

To the Editors.

Gentlemen,—I see from your "Paris Notes" in the "B.J." of March 11 that another interesting attempt has been made to give stereoscopic effects on the screen—with one picture, I suppose; otherwise there would be nothing very striking about the claim. Your patents columns from time to time give abridged specifications of similar inventions, some of which are hardly convincing, and others quite absurd. The phrase "stereoscopic relief" is often used quite wrongly, and by no one more than photographers, who ought to know better. A good lantern slide with a strong foreground is almost certain to evoke the praise, "My word! That's quite stereoscopic." And photographers will sometimes insist that by closing one eye and looking with the other through the tunnelled fingers they can see stereoscopically.

I am inclined to think that quite a fair number of people never have seen a slide properly in the stereoscope, and that this may account for the lax use of the term. Amongst my own small circle there are two who cannot see a slide properly—one man I found out quite accidentally. He was passing slides through the stereoscope with the usual "very nice," "very good," and at the finish I said, "Now look at this," and replaced the last slide by the same view with R. and L. halves transposed. It was a view through foreground foliage, but he saw—and even when told what to look for, could see—no difference.

I think there may be many people who, when looking through the stereoscope, or when looking at any very close up object, unconsciously throw one eye out of action. A sailor or microscopist does this at will when using a telescope, though he would probably describe the action as quite unconscious.

In your issue of November 26, Dr. F. W. Edridge-Green is reported as saying that a foreshortened revolver in a picture gives a striking stereoscopic effect, and he goes on to say that the perception of binocular relief is independent of double images. It doesn't sound very convincing. Apparently a man who has lost the sight of one eye may still see stereoscopically if the artist will only paint a revolver as seen from two sides at once.

I may have misunderstood Dr. Edridge-Green's experiment with a stereo-slide, but I enclose three slides, one ordinary, one cut through the distant point of sight, and one cut through a convenient foreground object. But, like the Paris spectators, I quite fail to see the slightest stereoscopic effect in the two slides so treated. And if dissimilar views for each eye are not essential I have wasted some "cursory breath" when I have bought Continental stereo-slides, and on getting home have found that the R. and L. halves were exact duplicates.

Last week you have an article on the "Photographic Method of Detecting Changes in a Complicated Group of Objects," the mathematics of which to an ordinary photographer are simply appalling. There are no less than 18 factors, and after a hearty feed on these—one is tempted to call it an indecent debauch—Mr. Stillman tops up with logarithms and graphs as a sort of liqueur. But I am afraid that by the time Mr. Stillman gets to the liqueurs the rest of us are already under the table.

Given the two pictures illustrated, all that is necessary is to mount them as a stereo-slide. The stereoscope will reveal quite clearly any changes in the heap.

R. W. BLAKELEY.

4, Seedley Park Road, near Manchester.
March 16, 1921.

THE NEGATIVE AND THE PRINTING PROCESS.

To the Editors.

Gentlemen,—It is always a pleasure to me to find that your correspondents have taken an interest in anything that I have written—even when the interest shows itself in criticism. May I be permitted to reply to that portion of Dr. B. T. J. Glover's letter in your issue of to-day, that has reference to my article on non-bromide printing processes?

Dr. Glover is perfectly correct in stating that "prints from the same negative upon different papers" cannot be usefully compared, This is a point I insisted on when writing to you on the subject of factorial development in your issue of February 25, advising different factors for negatives to be used for different papers. What I should have made clear, but evidently did not, was that when writing of the comparison of prints from the same negative, but on different papers, I was assuming the gradation remained constant in each case. One can obtain bromide paper with as soft a scale as carbon. This I think I made plain later in the same article when writing:—"It is frequently claimed on behalf of bromide papers that they are indistinguishable from carbon or platinum; this is claiming too much, because, although their range of contrast and gradation may be identical, their physical construction. . . makes just that difference-in quality in the print."

I should not trouble you to correct my statement, which, as it stood, was obviously incomplete, but for the fear that, maybe, some of your readers would imagine that if they could get perfect grada-

tion on bromide paper, their prints were necessarily of perfect quality. This is not so: Contrast and gradation being equal, a carbon or platinum print has a quality, richness, depth, call it what you will, that no silver-in-gelatine image can for one moment be compared with.

In common, I am sure, with many more of your readers, I am looking forward with great interest to Dr. Glover's promised article. The more clearly and fully factorial development is expounded in your columns the better for photography, and for photographers.

In conclusion, I wonder if "Old Printer," who is evidently not particularly satisfied with present-day assistants' posts, has ever thought of trying one of the photo-mechanical printing processes that depend on the same basis as "carbon," as a means to earn a living! I know that at one time carbon printers were welcomed by many collotype houses, and I believe there are still openings to be found in this branch.—Yours faithfully,

ARTHUR C. WILLIS.

47, High Street, Alton, Hampshire.
March 18.

THE PROFESSIONAL'S DEVELOPER.

To the Editors.

Gentlemen,—As soon as I saw Mr. Jones's article about his developer I decided to try it, but as two gallons is rather a large quantity to make up for an experiment, I reduced it about ten times and made it up as follows:—

Metol	3 drams.
Hydroquinone	6 drams.
Soda sulphite	3 ozs.
Caustic soda	1½ ozs
Water	32 ozs

It worked remarkably well when diluted to 1 oz. to 15 of water, but 2½ minutes is rather a short time for development when developing flat films, as one would bromide prints; and after a trial, as he suggests, I diluted to 25 ozs. of water and gave four or five minutes' development, with very good results. The stock solution soon showed signs of discoloration, even when kept in a stoppered bottle, but this did not seem to affect the result at all, and the caustic soda made my fingers rather like a washerwoman's, and decidedly tender. Then a week later came Mr. Jones's correction and Mr. Ermen's letter suggesting a reduction in the amount of caustic soda, so I made up another 32-oz. bottle, but with even less soda than Mr. Ermen suggested, and now it stands thus:—

Metol	3 drams.
Hydroquinone	6 drams.
Soda sulphite	6 ozs.
Soda caustic	½ oz.
Water	32 ozs.

It is now an excellent developer. Diluted to 1 oz. made up to 25 with water it gives an excellent portrait negative in five minutes. The reduction in soda makes it less objectionable to the fingers and generally improves its quality as a developer.

When developing films like bromide prints the fingers are constantly in the solution, far more so than when handling plates, so that the reduction in the amount of caustic removes the only objection I could urge against it.

The increase in the amount of sulphite is also a great improvement, as the solution remained practically colourless when kept for several days in an unstoppered bottle, and the developer after use remains quite clear even after it had been used for some time. I found when over-exposure was suspected that a few drops of bromide solution were useful. I feel sure that this developer allows a shorter exposure to be given than when using pyro-soda, but I believe the chemists tell us that all developers are alike in the final result if we only carry them to the stage when all the silver bromide in the gelatine film affected by light has been reduced by the developer. But that is just what the man who takes photographs never does, so that we are quite satisfied that we can make a difference in the final result by using a different developer, and I believe the "Professional's Developer" enables me to reduce exposure, especially in portraits, very considerably, and I am grateful to Mr. Jones for publishing his formula.—Yours, faithfully,

HALF-WATT.

PRESERVING PYRO.

To the Editors.

Gentlemen,—Those who use pyrogallol in small quantities at fairly long intervals often find that the stock solution, made with sulphite and metabisulphite, deteriorates rather rapidly. In such circumstances it is preferable to revert to the old plan of using sulphuric acid as the preservative. If three drops of pure sulphuric acid are added to five ounces of water, and one ounce of pyro dissolved therein, the solution will remain unchanged for a prolonged period. If distilled water be available it should be used, otherwise tap water which has been boiled for fifteen minutes to expel any air will answer well. The sulphite necessary to prevent staining the film may be added to the soda solution. If this be done no advantage is gained by adding metabisulphite, as the free sulphurous acid to which it owes its efficacy is immediately neutralised. It is not perhaps generally known that a concentrated one-solution pyro developer will keep for months if bottled in small vials or tubes which are filled nearly to the cork and well sealed. I have used such a developer twelve months after bottling, and found it as active as if freshly mixed.—Yours faithfully,

PYRO-SODA.

DARK BACKGROUNDS.

To the Editors.

Gentlemen,—The Ex-Cathedra note on dark backgrounds has evidently aroused a great deal of interest, and it is quite evident that it deals with a problem in which we are all interested. I am afraid I do not agree with Mr. Godfrey Wilson's suggestion to pose the sitter so close to the background as to cast a shadow up on it to give some gradation to the tone of the background. I think that when a dark background is used it is best to keep the sitter as far from it as possible, in order to give the effect of space between the background and sitter. In fact, I often place the sitter in the middle of the studio and use one end of the room, which is rather dark, with dark curtains and dark old furniture as a background. It is, of course, very much out of focus, and generally "without form and void" in the print, but with considerable variations of tone (using the word *tone* in its strict pictorial sense, which has no reference to colour).

By moving the camera it is possible to get the darkest part of the background against the light side of the figure; or if movement of the camera will not produce the right effect, a piece of furniture, such as a dark settle, can be moved until the desired result can be obtained. By this arrangement perspective is produced in the background, which gives relief to the figure and prevents the objectionable effect of the figure having been cut out and pasted upon a piece of black paper. I think the background should never be as dark as the darkest shadows in the figure, and also with light backgrounds the highest light in the figure should be lighter than any part of the background; and even in sketches (which, as a rule, have no claims to artistic effect) the background just round the figure should be darker, if only in the slightest degree, than the highest lights of the figure.

Some photographers go to the expense of constructing a cave lined with black velvet and pose the sitter in front of it, in order to make the figure stand out from the background, but this is just what it doesn't do; it produces the cut out and pasted on effect I have already referred to. When managing a studio in London I had many arguments on this point with the business managers, but, of course, I failed to convince them, and a velvet cave was constructed at great cost, and was a failure, as I knew it would be. And they also had pictorial (so-called) backgrounds painted with everything as hard and sharp as the edge of a knife, with the same result, the figure looked pasted on the background, and when I showed them sitters taken in front of a real Seavey background, in which everything was soft and broad, and the figures stood out from it in a delightful way, they weren't convinced. They tried to corner me once by bringing a beautiful print of an old man's head against a dark background, from which it stood out in fine relief, and they argued that the background was quite black, and so my contentions were wrong, but I was able to point out that the velvet collar on the old man's coat was blacker than anything in the background, but again they weren't convinced. So we each stuck to our own opinion.

When working up enlargements in which the background is dark I can lift the figure away from the background best by emphasing the shadows in the figure, especially the dark shadows in the hair, until they are darker than most of the background.—Yours faithfully, CAMEO.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

G. J. H.—We have now ascertained from Paris that the "Radius" projection lamp is constructed and sold by M. de St. Genest, 61, Faubourg Poissonnière, Paris.

S. W.—(1) This is ordinary water-colour mixed with gum, as used for finishing glossy prints. (2) A lens of 3 inches focal length would undoubtedly give more depth than one of larger size, even when the prints were enlarged, but whether the quality for Press purposes would be equal to that of direct 5 × 4 negatives it is difficult to say without an actual test.

H. N.—Theoretically a suitable light-filter is necessary, and so it is in practice if the results are to be comparable with those obtained with a filter adjusted to the plate for use in daylight. While this is so, you will certainly get a pronounced advantage from the use of the panchromatic plates with flashlight, and probably, dependent on the subject, it may not be worth while to use even a K 1 screen.

H. P. E.—(1) So far as we know there are not any restrictions on photography in Holland beyond those which apply to picture galleries and such places, where conditions are similar to those here. (2) We think there is certainly no duty where a camera accompanies the traveller as personal luggage. (3) Similarly, such a supply of roll-film as would serve for a holiday would, we think, be passed in.

S. E.—We are not lawyers, and your question is solely one of common law, but our opinion is that X. is solely liable for payment of the account. The admissions which he appears to have made to you further confirm this view, and so do the statements of the club, which we should say would not be upset in County Court proceedings, since the club appears to have advertised to the same effect. Therefore it seems that you must find X., and issue a writ for payment.

G. G.—We cannot trace a developer specially suitable for wedding groups having been recommended in our pages, and do not think there is any formula substantially better than another for this purpose, except that the developer should not be of full strength, otherwise it is liable to give too great a density of deposit in the highlights of the subject. We advise you to use ordinary pure soda diluted with an equal bulk of water, and a fairly rapid portrait plate, which is made specially for a long series of gradations.

R. M.—(1) A private company, not incorporated under the Limited Liability Act, and trading under a name other than that of its partners, requires to be registered with the Registrar of Business Names, 39, Russell Square, London, W.C.1, and to comply with the regulations of the Registration of Business Names Act. (2) Under the 1911 Copyright Act there is no further formality. The written assignment of the copyright to your firm by the artist who makes the painting to your order establishes your ownership of the copyright.

A. B.—Full descriptions of Daguerreotype are to be found only in older text-books, and particularly those published between the years 1845 and about 1860. All of them, of course, are now long out of print. The Patent Office Library has a very good collection of these early manuals, and we think your best course would be to look up those which you think would be of service to you, and then, no doubt, you could buy one or other of them from Messrs. Sotheran, 140, Strand, W.C.2, whose large catalogue, issued a few weeks ago, contains quite a number of these treatises on the early photographic processes.

G. B.—There is very little choice in studio gas lamps. One is the "Howellite," of Griffins; the other is, or was, obtainable from the Kodak Co., under the name of the "Powerful." But both these lamps give out a great deal of heat, and for a small studio like yours, unless it is very well ventilated, the heat might easily be excessive. As regards the focal length which you can use, you do not mention the size of plate, so the best we can do is to refer you to the table in the current "Almanac," from which perhaps you will be able to see the focal length of lens which you can manage to use, but in so short a run as 12 ft. you cannot use as long a focal length as you should.

J. A.—We suppose your groups are liable to extend across the full width of the studio, namely, 12 ft., or pretty nearly as much as that, in which case, in order to include the whole group on a post-card, your lens, in a 16-ft. studio, ought not really to be more than about 4½ inches focus—that is, allowing 3-ft. run for placing the group and 3 ft. for the space behind the lens. We dare say you could do with a less distance than this, and perhaps your groups also are not as wide as 12 ft., but at the outside we should say you cannot have a lens of more than 6 inches focal length. For covering a postcard sharp to the edges, you ought to be able to get an anastigmat of about *f*/6 aperture, or *f*/6.8, and of this focal length, but we should certainly advise you to have the lens on trial, and find out by actual tests in the studio whether the 6-inch focus actually enables you to include as large a group as you require on the plate.

T. T.—You appear to have an ordinary Thornton-Pickard roller-blind shutter, of which you can get working particulars from the Thornton-Pickard Co., Altrincham, Cheshire. The graduated toothed disc is a tension disc, which you wind until the required speed marked on it comes opposite to a given mark. It works by increasing the tension of the spring, and so the speed of movement of the flexible blind. The part marked I.T.B. requires to be shifted according as you wish, to give quick exposures on single pressure of the bulb, or exposures as long as you keep the bulb pressed, or exposures by pressing the bulb for opening and again for closing. It would take too long to explain how to test a camera and lenses. You need to get one of the text-books on photography, for example, "Photographic Lenses," by Andrews and Beck, sold by R. and J. Beck, Ltd., 68, Cornhill, London, E.C.3. The Beck "Symmetrical" is a good lens of the R.R. type, and ought to give satisfactory negatives over a moderate angle, say that of 5½ inches focus on a quarter-plate.

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Mr. F. E. Ives has applied his dye-mordanting process to the colour-toning of transparencies on glass or celluloid (P. 186), and had also recommended a special form of the process for the intensification of negatives. (P. 187.)

Mr. C. Brangwin Barnes, in a contributed article, gives a formula for making glazing solution, and deals at length with the several precautions which are necessary in the successful glazing of prints by stripping from glass. (P. 185.)

Dr. B. T. J. Glover, in the first portion of a paper on the comparison of development methods, offers a very lucid exposition of the relation which a negative requires to have to the subject on one hand and to the printing paper on the other. He touches upon the difficulty of fulfilling the latter condition by watching the progress of development. In the next instalment of his paper he will deal with factorial and time development from this standpoint. (P. 183.)

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"COLOUR PHOTOGRAPHY" SUPPLEMENT

Dr. E. König has given particulars of a new colour-sensitising dye having pronounced action in the green region of the spectrum, and thus facilitating processes of colour photography and colour cinematography. (P. 16.)

Mr. F. E. Ives announces a stereo-colour outfit specially designed for medical records. (P. 16.)

Full working details of the method of making colour transparencies by assemblage of three colour images have recently been given by two American workers, and serve to keep alive a process which is in danger of being forgotten. (P. 13.)

EX CATHEDRA.

Halation and Development. Referring to the correspondence upon this subject, an old practitioner writes that most outdoor workers have found out that the minimum of halation occurs when the period of development is short. He says that in the early days of gelatine plates when "tentative" development was practised, halation was a real bugbear, but that when plates which would stand quick development came upon the market, the trouble was lessened. It is certainly reasonable to assume that provided a developer is energetic enough to produce the necessary density before it has had time to penetrate right through the film, the smaller the chance of developing any light-action which has taken place next the glass. We have not had the opportunity of putting this to the test of using a weak developing solution in a tank. According to this theory the maximum of halation should be produced in this way. We can, however, confirm our correspondent's statement, that rapid development is the best method to follow. Some few years ago a good deal of prominence was given to an American developing formula which was, if we remember rightly, simply one which gave full density very quickly. It is very necessary, however, to distinguish between local over-exposure and halation, by which is understood the spreading of light-action by reflection from the inner surface of the glass plate.

* * *

Repetition. Anyone acquainted with the process of reasoning in the feminine mind will be aware of the fact that many ladies will absolutely refuse to wear a particular pattern of material or "mode," no matter how well they may realise its suitability, if someone of their acquaintance possesses an identical thing. This fact, however, seems to be ignored by many photographers, when exhibiting specimens of their work, for time and again in windows, and show cases, do we see a repetition of some particular style of posing, and lighting, with several different sitters, which shows a lack of knowledge of this trait of the feminine character. Recently, we noticed a particular chair depicted in no less than five portraits in a country photographer's window. This points to the fact that the photographer had little originality or mental perception, or he would have made an endeavour to arrange something slightly different in the matter of pose, lighting, and accessories for each of the five distinct sitters, while if a certain treatment was so good as to bear repetition, then it was a mistake to show more than one example of it at a time. In single doses, repetition of style and accessories may not be noticeable, but collectively it becomes immediately very marked. The stock of accessories should be large enough to prevent the repeating of a particular type of portrait too often, for to go back to our opening point many sitters object to being photographed in exactly the same manner as their neighbours. If, either from a lack of originality,

or from limitations in the amount that can be spent upon studio furniture, great variety is not always possible for a portrait photographer, the sitter should not know it, much less have it pointed out to her in the show case.

* * *

Legs in Portraiture. In the early C.D.V. days it was more often the custom of photographers to include in a picture the legs of a male sitter. There appears to have been some unwritten law compelling operators to picture a man from the top of his head, or hat, to the soles of his boots. Legs were as common in pictures then as they are rare to-day. Articles on posing hands have been plentiful enough in photographic literature, but information on posing legs has been rare—indeed, most rare—since the days of the late H. P. Robinson (who was in business during the leg-picturing era) and the late A. Horsley Hinton, both of whom had ideas on the subject. There is the authority of the Psalmist for the statement that "the Lord delighteth not in any man's legs," an attribute of divinity which photographers share. Limitation to head and shoulders of the sitter naturally guides the artist in the direction of concentrating his efforts on the head and face, which, after all, are the main things in portraiture. It has been stated that the "kit-cat" portraits of Kneller (36 x 28 in. half-length, showing hands) killed the art of picturing legs, and they may have done so in the world of artists of the brush, but Kneller died one and a half centuries before the C.D.V. craze. Anyway, legs and feet are now out of fashion in photographic portraiture, and may they remain so, unless, of course, someone comes along with a really artistic method of posing them.

APRIL PHOTOGRAPHY.

In all Government and in many other branches of business April 1 is the beginning of a new financial year, and, from the standpoint of general practice in this country, it might conveniently be regarded as the opening also of a new year for photographers, both professional and amateur. To both classes, no doubt, the date on which Easter falls is a consideration, and amateurs cannot but have been affected to some extent by the premature spring we were enjoying two or three weeks ago. But, speaking generally, the beginning of April marks the start of a fresh campaign for which, if the photographer be wise, he has already made his preparations, either for resuming work on last year's lines, or for striking out in some fresh direction. Whether professional or amateur he will have studied, and can hardly fail to have been influenced by, the captivating announcements with which our advertisement pages are always so freely studded in March, and this year apprehension lest some undue extravagance may have been committed is pleasantly alleviated by the reflection that at last the price of plates is on the down grade.

Apart from all these sternly practical features, April is for photographers a month of many special possibilities, some of which too often are carelessly neglected. It is a month of whims and fancies, not infrequently trying to the temper and occasionally causing material loss. "The uncertain glory of an April day" has produced many a photographic disappointment, and accounted for many a wasted hour. On the other hand, there is nothing in the year to surpass the loveliness of a fine interval between April showers, when everywhere there is that beautiful "clear shining after rain," for which more especially the telephotographer during the summer usually longs in vain. Where distances have to be rendered there is no atmosphere like that of a well-washed April morning, and in many cases much more satisfactory pictures of comparatively near objects can be taken this month than either earlier in the year when the trees are altogether leafless, or later when this or that attractive vista is closed by luxuriant foliage. For the flower photographer April caters less abundantly than May and June, but she has special gifts of blues and yellows to bestow on those who seek them discerningly, and with the right kind of light-filter. In which connection it may be wondered whether the application of orthochromatism to spring photography is yet as widely understood as it ought to be, and the occasional value of a green in place of a yellow filter fully grasped.

In April it is often possible to secure interesting lunar photographs without the aid of a costly equatorial movement actuated by a driving clock, and in this particular April we have the additional celestial attraction of an annular eclipse of the sun on the morning of the 8th. Of this not a few amateurs should be able to secure mementoes—weather permitting—and "summer-time" will in the case of habitual late risers extend the period during which exposures will be made. For it is much to be feared that if the clock were registering true time, any phenomenon short of an earthquake which began at 7.35 would drag a really creditable representation of confirmed lie-a-beds from their couches to photograph its earlier phases. To the average professional, by the way, the daylight saving which begins this month pleasantly accentuates the welcome advance from the comparatively short and unprofitable working days, even of such an exceptional March as we have just enjoyed. A calculation of the effective printing hours during the business days of April under summer-time regulations would show, we are inclined to think, an almost startling increase over the figures for the previous month.

But beyond a certain point, what may be called in the language of the Courts the case for April would be weakened by special pleading. It is a great month for photographers, largely because it is a great month for everybody, and it is a great month for everybody because it is spring, and one of those "new beginnings," the value of which is recognised by all sane persons. Shakespeare, in one of his sonnets, speaks of April as putting "a spirit of youth in everything," and it is well for photgraphers at least once a year to have a spirit put into them and their work which is as far as possible removed from senility and obsolescence. There are, as we all know, some workers who are perennially youthful, always bubbling over with fresh ideas, ever ready to keep abreast of the progressiveness of others. But the vast majority, while no doubt they would justly resent being called "back numbers," are needlessly reluctant to leave grooves in which they have been running for more years, perhaps, than has been good for them. April is the time for these to practise a little introspection, and to ask themselves seriously the question whether, either as professionals or amateurs, they are getting out of photography all they might easily get if there were more of the spirit of youth in their methods and output. We are the last to counsel fantastic new departures, and photographers ought to be the last, or nearly the last, to disregard convention to the extent of committing absurd extravagances in imitation of the younger and wilder artistic schools. But freshness is welcome in photography, even if it only be in minor things, and there is no reason why it should interfere with the expression of individuality. The note of freshness, too, is naturally best struck, and clearly struck, at a season when Nature, animate and inanimate, is responsive, and hope and brightness and the *joie de vivre* are in the very air.

A COMPARISON OF DEVELOPMENT METHODS.

Success in the development of a photographic plate involves the production of a negative whose printing range or scale either diminishes, imitates or exaggerates the range or scale of light-intensities in the subject in order to make them coincide with and utilise the whole of or an appropriate portion of the exposure range or scale of the printing paper.

The purpose of development is defined in that paragraph, and exposure completed, these are the only conditions to be fulfilled. Before considering to what degree of accuracy various methods of development lend themselves in the fulfilment of these conditions, it may avoid misunderstanding if the first paragraph be elaborated and the meaning of range or scale of the subject and the negative and the printing paper be defined.

The scale of a printing paper has nothing whatever to do with the number of tones which it is capable of rendering. The words scale or range applied to printing paper are contractions for "exposure scale" or "exposure range." The *tone* scale of every ordinary printing paper is approximately the same, and all papers which possess the same surface characteristics (matte, semi-matte, or glossy) have tones which extend from white of the same whiteness at one end to black of about the same blackness at the other end, and they have approximately the same number of shades of grey in between. Between the white of white paper and the black of a good photographic black the eye is capable of distinguishing about 100 different shades of grey. If a larger number of shades of grey be crowded in between white and black, they cease to be appreciated as separate tones, and imperceptibly run into one another. For all practical purposes photographic printing papers are equal so far as the multiplicity of the tones is concerned.

The exposure scale or range of a paper, however, varies a great deal between different types of printing paper (gaslight paper, bromide paper, etc.), and it is this variable characteristic which is referred to in the opening paragraph. The difference between one paper and another can be demonstrated in a very simple manner. If a piece of vigorous gaslight paper be placed in a printing frame and exposed to a printing light, an exposure can be found (by trial) which will, upon development, produce the faintest possible grey deposit. Call this exposure t seconds. Then it will be found that the exposure required to produce the deepest black upon the same gaslight paper would be about ten times as much, i.e., 10 t seconds. Any exposure less than 10 t seconds would produce a grey tone, and any exposure greater than 10 t seconds would be unable to produce a deeper black. The exposure range of that paper is 1—10, and it is that range of exposure which will enable the paper to exhibit upon development the whole gamut of tone from white to black. In between t seconds exposure and 10 t seconds exposure are an infinite number of possible exposures, of which 100 will produce the 100 possible shades of grey already alluded to. The exposure scale of vigorous gaslight paper is approximately 1—10.

If the same experiment be tried with a piece of bromide paper a different result is arrived at. If t' seconds be the time of exposure required to give rise to the faintest grey upon development, then about 40 t' seconds exposure is required to give the deepest black, a black practically no different to the gaslight paper black. And in between t' seconds exposure and 40 t' seconds exposure are 100 appropriate other exposures, which will give rise to 100 different shades of grey. The exposure scale of this bromide paper is 1—40.

Platinum paper has an exposure scale of about 1—100. If t'' seconds exposure give rise upon development to the faintest grey tone then 100 t'' seconds exposure give rise to the deepest black tone. Between these extremes of exposure are 100 other exposures which give the 100 intermediate shades of grey. The 100 intermediate shades of grey are approximately the same in each printing paper.

The exposure scales or ranges of a few representative printing papers are given in Table I. Average figures only are given, because different makes of paper vary considerably.

TABLE I.

Type of Printing Paper.		Approximate Exposure Scale or Range.	
Short Exposure scale.	Vigorous Gaslight Paper	1–10	Relationship between the extreme exposures required to record upon the paper from white to black.
	Soft Gaslight Paper	1–20	
	Average Bromide Paper	1–40	
	P.O.P.	1–60	
Long Exposure Scale.	Carbon	1–80	
	Platinum	1–100	

A negative is a graduated printing device. It is obvious upon inspection that different intensities of light pass through different parts of the negative according to the opacity of the various deposits of silver. Somewhere upon every negative is a portion more transparent than the rest. Somewhere else upon the same negative is a portion more opaque than the rest. There is a definite relationship in every negative between the amount of printing light that passes through the most opaque part compared with the amount passing through the most transparent part. This relationship is called the scale or range of the negative, and the terms have that meaning in the opening paragraph and throughout this paper. If through the most transparent part of the negative there passes 10 times as much printing light as there does through the most opaque portion, then the scale of that negative is 1—10. Such a negative is capable of just bringing out the tones from white to black on a piece of vigorous gaslight paper which has been shown to have an exposure scale of 1—10. Such a negative therefore is said to fit or suit vigorous gaslight paper. On the other hand, such a negative (1—10) would be useless for printing on platinum paper which has an exposure scale of 1—100, for if it were used it could only produce a few grey tones out of the whole scale of tones common to all papers. Similarly, a negative which allows 40 times as much light to pass through the most transparent part compared with the most opaque portion is described as having a range or scale of 1—40. Such a negative would be suitable for printing upon bromide paper of a similar exposure scale. If a 1—10 negative were printed on vigorous gaslight paper (scale 1—10), then obviously many of the dark grey tones would all be rendered as black, and many of the light grey tones would be rendered as white. We call such a print harsh. The scale of the negative is too long for the paper.

In general, the scale of the negative should coincide with the scale of the paper in order to produce a touch of white and a touch of black somewhere upon the finished print. If, however, for perfectly legitimate artistic purposes it is desired to utilise only a portion of the possible tones which any paper will yield it is only necessary to use a negative whose scale is *shorter* than the exposure scale of the paper by *some definite amount*, thereby producing a print exhibiting white and light greys, or greys and darker greys or dark greys and black, but not the full gamut of tones, white, light greys, dark greys, and black.

The subject (any subject) is merely a collection of different light-intensities. From a pictorial point of view the shapes and grouping of these different light-intensities (subject tones) alone are of importance. From a technical point of view, however, the shapes and grouping do not matter in the

slightest degree. Technically, the important characteristic of the subject which is relative to the subject-matter of this paper is the total range of light-intensities that the subject reflects, and which, through the medium of the lens, fall upon the plate in imitation of the subject. An ordinary landscape with the sun shining, presenting sunshine and shadow, exhibits a range of light intensities of about 20 to 1. The sky is probably the brightest part, and a foreground shadow the darkest. Under average conditions 20 times as much light is being reflected from the sky as is being reflected from the foreground shadow. These relative reflection powers are transmitted to the plate by the lens, and upon the plate during exposure is a sky image which is 20 times as bright as the image of the foreground shadow. The range of that subject, imaged upon the plate during the act of exposure, is 20—1. The same subject under different lighting conditions and other subjects can present different ranges. A few average subject ranges are given in Table II. The figures are, of course, rough approximations only.

TABLE II.

Subject.	Approximate range of light intensities.
Flat open landscape without sunshine or shadow	3–1
Landscape with dark object in foreground without sunshine	8–1
Landscape with dark object in foreground with sunshine and shadow	16–1
The most extreme lighting in ordinary outdoor work	32–1
Interiors and indoor portraits with marked highlights and deep shadows	40–1 to 100–1

These ranges of light-intensities in ordinary subjects are very different from the ranges which many photographers think that the average subject presents. It appears to be commonly thought that the sky is several hundred times as bright as the shadow side of a tree, for instance. It is as well for photographers that this is not so, because no photographic plate is capable of recording such a range. I would refer those photographers who still believe that a long range of light-intensities is commonly met with in photographic subjects to the papers on this subject by Hurter and Driffield,* whose conclusions have since been substantiated by other investigators. Hurter and Driffield showed that the photographic range from bright sky to black velvet at close quarters illuminated by diffused light was 32—1. The photographer is seldom called upon to deal with a greater range in an outdoor subject.

Whatever the range of light-intensities in the subject may be, it is that range which illuminates the plate during exposure. The negative which results upon development can imitate, exaggerate or diminish that range according to the length of time that it is developed. The range of the negative has already been defined as the relative transparencies of its lightest and darkest parts. Let us suppose that a subject has a range of 20—1. If the negative is developed for what we may call a medium or normal time (contrast or gamma=1), then we produce a negative whose range is exactly the same, namely, 1—20. If, on the other hand, we shorten the development time (contrast or gamma less than 1), we can reduce the range of the negative to anything we like according to the amount by which the time of development has been reduced. By reducing the development time to quite a little less than normal, a 20—1 subject can be made into a 1—10 negative. There is no loss of truth in the tones caused by this procedure: they are merely differently spaced. Similarly, by prolonging development beyond the medium or normal time (contrast or gamma greater than 1), the range of the negative can be expanded easily to 1—200 or more, far beyond any range required in ordinary photographic practice, again without loss of truth in the tones, for their spacing is merely extended.

We are now in the position to understand the purpose of development as laid down in the opening paragraph, and we can quote some illustrative examples. For the sake of ease in description, development to a contrast of 1 (gamma=1) will be called development to a normal time.

The subject has a range of 40—1. It is proposed to print on bromide paper. The exposure range of bromide paper is 1—40 (Table I.), so that the negative has to be developed for just the time to give a range of 1—40. But a 40—1 subject is reproduced as a negative of 1—40 range by a normal time of development. If the correct normal time of development is known, then the production of a good print on bromide paper of that subject can be accomplished by means of a negative developed for normal time.

Let us take the same subject whose range is 40—1. It is now proposed to print on vigorous gaslight paper. The exposure range of vigorous gaslight paper is 1—10 (Table I.), so that the negative has to be developed for such a time as will give a negative range of 1—10. In order that a 40—1 subject shall give a negative whose range is 1—10, the negative must be developed for some time *less* than normal. If the exact time less than normal is known, then the vigorous gaslight print will represent the subject in exactly the same manner as the bromide print did, but from a negative developed for a shorter time.

Take the same subject again (range 40—1). It is proposed to make a platinum print. The exposure range of platinum is 1—100 (Table I.). A negative has to be produced, therefore, whose range is 1—100. Such a negative can only be produced out of a 40—1 subject by developing for longer than normal time. If the precise longer time of development is known, then the platinum print will represent the subject exactly as did the bromide print and gaslight print. We have in these three examples shown that each printing process requires the negative to be developed for some particular time in order to represent the same subject in the same manner. In a similar manner a variation in the subject alters the time for which the negative must be developed. Instead of upon a subject of a 40—1 range, let us expose a plate upon a subject of a 10—1 range. Let us make a negative to print on bromide paper. Such a negative must have a range of 1—40. To make a negative whose range is 1—40 from a subject whose range is 10—1 requires development for a longer time than normal. So whereas in the first example given we fitted the subject to bromide paper with a normal-time developed negative, now we have to fit another subject to the same bromide paper by giving a long time of development to the negative.

It is abundantly evident, therefore, that the relationship between the range of the subject and the exposure range of the printing paper determines the degree of development of the negative. It is the purpose of any system of negative development to link the subject with the printing paper in the manner described. We can repeat the opening paragraph to emphasise its importance as a complete definition of the condition of successful development. *Success in the development of a photographic plate involves the production of a negative whose printing range or scale either diminishes, imitates, or exaggerates the range or scale of light-intensities in the subject in order to make them coincide with and utilise the whole of or an appropriate portion of the exposure range or scale of the printing paper.*

In the paragraphs that follow an attempt will be made to summarise briefly the reasons that combine to prevent the photographer from being able to carry out development with the precision necessary to fulfil these conditions with invariable certainty when development is carried out by inspection, or factorially or for a calculated time.

Development by Inspection.

The successful accomplishment of development by inspection implies that the photographer shall be able to judge, in the

* "Latitude in Exposure and Speed of Plates," "Photography," July 15, 1893; "The Hurter and Driffield System," "The Photo-Miniature," No. 56, November, 1903. Both these papers have been reprinted in "The Photographic Researches of F. Hurter and V. C. Driffield," published by the Royal Photographic Society.

light of a dark-room, what are the relative transparencies of the lightest and darkest parts of the negative, and thus estimate its range, and at the same time make allowance for the effect of the unchanged silver bromide which at a later stage will be removed in the hypo. If this could be done with reasonable accuracy, development by inspection would be ideal. The subject, the developer, the temperature of development, etc., could all be ignored. The negative would be developed until it was of the correct range to fit a chosen printing paper and announced its correct nature by its appearance, no matter for how long or short a time it required to be developed to give that appearance. But it is an unfortunate fact that the range of a negative is a characteristic beyond the power of the eye to compute. Those photographers who have actually measured the range of a fixed dry negative in a density meter devised for the purpose know well how impossible it is to estimate the range by simple inspection. What is impossible in good light with a fixed and dry negative is not rendered possible in the dim light of a dark-room, with an unfixed negative. There are experienced photographers, however, who do succeed in developing by inspection successive negatives to a predetermined range with a moderate degree of accuracy. To what extent they conceal their failures remains unknown. For the most part, however, these successful photographers confine their work to one class of subject (in which the range does not vary very much), illuminated by artificial light of reasonable constancy, so that successive exposures are approximately of equivalent value, and the negatives are destined for the same printing process. Under these narrow conditions, the *general* appearance of the negative during development becomes a crude measure of its range. Skill in imitating this general appearance from day to day comes to a few photographers with experience, and these narrow conditions account, in my opinion, for the success with which development by inspection can be practised by certain workers. But the nature of the problem of development, already described, is such that it is certain that for mixed work and for the utilisation of any printing process at will, precise development by inspection with certainty is an impossibility. If the nature of the problem of development were more universally understood I do not doubt that many photographers whose work is of a mixed nature would feel less confident of their skill in development by inspection, and they would more readily give credit to the part played by chance.

B. T. J. Glover.

(To be continued.)

SUCCESS IN GLAZING.

Notwithstanding all that has been said and written about glazing, there seem to be many photographers, both professional and amateur, who still find a considerable difficulty in obtaining anything like perfect results. Perhaps it is the very simplicity of the process which to a large extent accounts for this lack of success. When a thing seems easy one is too apt to deal with it in a haphazard sort of way, thinking that it is sure to come right in the end. Habit is habit all the world over, and most people have got a habit of scamping little things that appear to be easy. It is just as necessary to be thorough in work that is easy as in that which we acknowledge to be difficult. Unless we put our energy, and our thoughtful energy at that, into a small matter like glazing we are just as much liable to failure as if we went carelessly to work in a much larger enterprise. In point of fact, most photographers leave the glazing work in the hands of boys or girls at a small salary. Boys and girls just fresh from school and with their minds more set upon play than work consider, or most of them do, that they have been going through a hard time at school, and that they are now entitled to a good time for a little while before settling down to the real business of life; consequently, the work with which they are entrusted is scamped, and what good results are obtained are obtained at a cost far heavier than if more staid and better paid assistants were employed.

You go into a room where three or four or more girl assistants are working (sic) and what do you see? At one end of the bench or sink you will find the first girl with one hand resting on the bench and with the other supposed to be applying the French chalk or glazing solution to a glass in front of her, but upon which her eyes never rest, as her head is turned towards the next assistant with whom she is carrying on an animated conversation with reference to the doings of the previous evening or, at any rate, with reference to something totally unconnected with the work in hand. Is it likely then that the glass will be properly prepared, that the edges will not be missed, or is it likely that Assistant No. 2, who takes the glass from her to lay on and squeegee the prints, will do much better towards her portion of the work? If the prints stick, well it couldn't be their fault. It must have been bad paper or a fault in the drying room.

It should be borne in mind that the process of glazing, though as I have said it is a simple one, is not a single one; it is not for instance like fixing a print, it is a compound process made up of several processes, each simple enough in itself, but each and all requiring the exercise of care and attention; without attention and without care in any one of the minor processes the whole compound process will prove a failure.

In the first place it is necessary to have a *clean* glass, one imperfectly cleaned, one that is greasy or dirty or finger-marked will not do; then it is equally necessary that the glass shall be properly and carefully prepared either with French chalk or glazing solution. Also, that the print or prints are clean when laid on the glass, and that they be properly squeegeed, without air bubbles being left, and so on throughout until the prints are off the glasses and out of the hands of the glazing superintendent, when his responsibility finishes.

To obtain a really clean glass it should be washed and polished, with methylated spirit, water will not do, and to test its actual cleanliness there is no better method than one which all old collodion workers will recall, viz., breathing on the glass; if perfectly clean, the breath will dry off readily and evenly; if any trace of dirt remains it will be seen at once and its position located. The glass being now clean the next part of the process is to prepare it for the reception of the print or prints. The method of preparation differs with different workers; some prefer French chalk, others one or other of the advertised glazing solutions, others, including myself, prefer a home-made solution of ox gall, and some few cling to powdered white starch or petrol. In the case of a small business, such as a studio, there is nothing to be said against the use of French chalk, which should be dabbed well all over the glass with a pad and then polished off with a clean linen rag. The first time of using the glass this part of the process should be repeated at least half-a-dozen times before the prints are laid on. Once the glass is in use a single careful application will be found to be ample. The glass being now ready, the print should be carefully swabbed over the face to remove any trace of dirt or grit, and then laid in its position on the glass. If a number of small prints are to be glazed on the one glass care should be taken not to place them in too close juxtaposition. The glass being filled, a piece of rubber sheeting is laid over all and squeegeed with a flat squeegee, preferably one of soft pine or, at any rate, fairly thick rubber; most of those on the market are too flimsy. In squeegeeing,

be careful not to keep continually crossing the sweeps as that will churn any one air bubble up into twenty or more small ones. The print or prints being squeegeed and examination through the glass showing that the contact is perfect, a piece of linen sheeting or of blotting board should take the place of the rubber sheeting and be squeegeed with a roller squeegee to remove superfluous moisture and facilitate the drying process. The roller squeegee should be a genuine tool, not one of the toy type which jump from their gearings directly any real pressure is applied. The glass is then ready for transfer to the drying rack.

Where one of the glazing mediums is used in preference to the French chalk the only difference in procedure is with the first part of the process: the polished glass is coated on both sides, with the medium by means of a well-soaked rag, or preferably with a small mop such as are used for cleaning lamp glasses; the medium in this case should be made up of at least double strength, and the glass is then placed in the rack and allowed to dry, care being taken to keep it free from dust during the drying. The prepared glass, when dry, should be again treated with the medium, and the prints placed thereon, the process proceeding as with the French chalk. Most of the mediums in the market are good, but the home-made is preferable on many accounts, not the least of which is the difference in cost: at the present price of labour, bottles, printing labels, packing, advertising, and carriage, to say nothing of manufacturers' profits, it stands to reason that a home-made product must be materially less costly. The method of manufacture is as follows:—To the contents of one ox gall, to be obtained of most English butchers at a cost of about sixpence, add one gallon of water, two ounces of glycerine and two drams of formaline. This will keep almost indefinitely in a stoppered bottle, the quantity required for use each time being poured therefrom into a jar or basin in which the rag used for applying is soaked. This is the ordinary strength for general use; for the first application to new glasses only half a gallon, or less, of water should be used. Powdered starch, petrol, etc., are more or less the cause of trouble, and cause markings on the finished prints, and their use is not advisable. It should also be noted the extra thick paper, such as postcards, requires much more care in squeegeeing than the ordinary grade used for portraiture or other work that is to be mounted on card.

Having our prints all on glass, we are not yet through, as great care is still requisite in the drying to ensure perfection, especially in damp weather, where artificial heat has to be used; the best method of warming a drying room is undoubtedly by means of hot water or hot air pipes, the warmed air being kept in motion by electric fans. The next best method is by means of an ordinary coal or coke fire. Only when unavoidable should gas be used as a means of heating, and whatever method is employed, the glasses should never be brought too close to the source of heat. The drying should proceed gradually and evenly, five to six hours is not too long a time for paper of postcard thickness; any attempt to rush the prints off the glass too rapidly is merely courting disaster. A difficulty sometimes arises with regard to the glasses filled up during the evening, as they have, perforce, to be left unattended for from fifteen to sixteen hours, during which they are subject to changes of temperature; and, what is more to the purpose, changes of the amount of moisture or damp in the air. It will therefore be found necessary to see that the fire is made up last thing, so that the temperature may not fall too much before it can be attended to again. The danger in question, is, of course, accentuated in regard to the prints which are put on glass on the Saturday, and have to remain thereon until Monday, i.e., unless they become detached and fall off the glass of their own accord. It will always be found that the greatest percentage of failures in glazing is among these Saturday-to-Monday prints. It would seem that the ox gall after once drying loses its power if it again becomes damp, and consequently there is a considerable chance of the prints becoming difficult to detach from the glass support.

During and since the Great War, there has been considerable complaint of an epidemic of small specks appearing on the finished prints, and many reasons have been given for their appearance, but so far no real preventive or remedy has been adduced. Be the cause what it may, I personally opine to the belief that, it is either imperfect coating with or use of impure baryta or imperfect admixture of two or more gelatines, hard and soft. Soaking the prints, before glazing, in hot water, in cold water, in formaline have all been suggested as remedies, or rather preventives, but have none of them proved an absolute success. Such being the case, I would recommend a real remedy, which is after the prints are glazed, and show the specks or spots in question, to coat them with a very dilute copal varnish to which a small proportion of turpentine has been added.

Before leaving the subject, I would remark that in the dry, warm weather which we hope to see ere long, the drying racks may be placed in the open air with good results.

C. Brangwin Barnes

THE MORDANT DYE PROCESS FOR COLOUR TONING.

[In several communications of late to the "Colour Photography" Supplement of the "British Journal," viz., January 7, 1921, p. 3, November 5, 1920, p. 43, and June 4, 1920, p. 24, Mr. F. E. Ives has published the results of his experiments in dye-toning by a mordanting process for the production of three-colour transparencies. In the following note he describes further details of this process in particular application to single colour toning of transparencies on glass or celluloid.—Eds. "B.J."]

The mordant dye process is not suitable for colouring prints on paper, but for prints on glass or celluloid it offers the advantage that the solutions used are very much cheaper than the chemical toning solutions, and keep good until exhausted by use. There is also the advantage that a practically unlimited variety of colours and tones can be obtained.

My earlier experiments were directed mainly to the production of pure transparent colours for trichromatic and colour cinematograph work, and after mastering this problem attention has been directed to perfecting the application and control of the process to toning and tinting, particularly for cinematograph positives, but also for lantern slides.

For this purpose it suffices to further reduce the strength of the bleaching solution and the time of immersion, so that no bleaching action is evident to the eye, though there has been sufficient action to fix the required amount of colour from the dye bath.

It is even possible with a number of basic dyes to mix a little of the normal bleaching solution with the dye solution without precipitaion, and so to be able to watch the progress of the toning and stop it at the desired point. I do not recommend this procedure because it limits the choice of dyes, and is, after all, no quicker or better than the method by successive operations.

The bleaching bath which I recommend for this purpose is as follows:—

Water	30 ozs.
Potassium ferricyanide	5 grs.
Ammonium bichromate	1 gr.
Glacial acetic acid	¼ oz.

To insure even action I prefer to immerse the positives dry, and the time of immersion may vary from 30 seconds to two minutes, according to the amount of colour desired in the finished result. Five minutes' washing is desirable before immersion in the dye bath. Good dyes to use are malachite green, saffranine, phenosaffranine, rhodamine, auramine. Stock solutions may be made up with one grain of dye to each four ounces of water, and a little acetic acid. These solutions can be mixed to produce a great variety of tones.

The amount of colour mordanted depends not only upon the time of immersion in the bleach, but upon the time of immersion in the dye bath; the best results are obtained with short immersion in the bleach, and long immersion in the dye bath—half an hour or more for some dyes. With a suitable amount of acetic acid in the dye bath (the requisite amount depending upon the dye used) a few minutes' washing in plain water after dyeing clears the whites perfectly. If a tint is desired in addition to the tone, this washing is omitted.

It is an interesting fact that extremely fugitive dyes produce quite permanent colour prints by this process.

I venture to predict that by reason of its unrivalled simplicity and economy, this method will supersede all others for colour-toning on glass and celluloid.

F. E. Ives.

THE MORDANT DYE PROCESS FOR NEGATIVE INTENSIFICATION.

In a separate communication I point out that a diluted bleaching bath without sufficient action to bleach the silver image visibly would prepare it for taking up a large amount of basic dye from solution. This is the procedure recommended for "toning" silver images. It is obvious that if the dye used is of a non-actinic colour it will act as an intensifier, and the process can be employed in negative making for that purpose, giving a greater range of densities and more control of density probably than any other method.

For general use in intensifying, I recommend a mixture of victoria green and saffranine dyes, which in suitable proportions produce a near-black colour by which the degree of photographic density can be closely estimated by the eye. Different makes of dyes vary somewhat, but I am using—

Water	30 ozs.
Victoria green	2-1/2 grs.
Saffranine	5 grs.
Glacial acetic acid	1/4 oz.

The process is very cheap, and the solutions keep indefinitely, but the time which it takes to dye up and subsequently clear the image, particularly on thickly-coated plates and non-curling film, makes it unsuitable for "hurry" work.

For some special purposes, however, it is superior to any other method of negative intensification. Thus, by a single (complete) bleaching operation and a single dyeing, more printing density can be imparted to dry plate line or half-tone process negatives than by any other means. It adds much to the value of the method for that purpose that the dye print can be cleared and reduced as readily as an ordinary negative can be by Farmer's solution. The mordanting substance, silver ferrocyanide, is extremely soluble in hypo, and a solution as weak as one grain to the ounce acts upon the dye image like Farmer's reducer upon an ordinary negative. Knowledge of this fact also shows the importance of washing out all hypo from the film before immersing in the bleaching bath, and avoiding any trace of hypo in the subsequent handling, except as indicated. The presence of chlorides and bromides is also contra-indicated.

F. E. Ives.

PHOTOGRAPHIC DEALERS' CONGRESS.

The Congress, arranged by the Photographic Dealers' Association, will be held during the Photographic Fair at the Horticultural Hall, Vincent Square, S.W., according to the following programme:—

Monday, April 18, 2.30 p.m.—Annual meeting, to be held in the Congress Room, Photographic Fair, Horticultural Hall. Business:—Annual report and balance-sheet, election of officers. 6.30 p.m.—Annual dinner. This will take place at the Holborn Restaurant. Tickets, 10s. 6d. Morning dress. Ladies invited.

Tuesday, April 19.—Visit to the Houghton-Butcher Camera Works, Walthamstow. By the generous invitation of the Houghton-Butcher Manufacturing Co., Ltd., Congress members will be conveyed to Walthamstow by char-à-banc, leaving the Photographic Fair, Horticultural Hall, Vincent Square, at 11.30 a.m. Lunch will be served on arrival at the factory, when parties will be arranged, accompanied by guides, to see the works.

Wednesday, April 20, 2.30 p.m.—Dealers' Congress, open to members of the P.D.A., in the Congress Room, Photographic Fair, Horticultural Hall. Subjects for discussion:—

1. The high price of plates and papers and the effect on amateur photography.
2. Should Co-operative Societies be granted dealers' terms?
3. On what terms should professional photographers be recognised as dealers.
4. Are pre-war trade discounts sufficient to-day?

Thursday, April 21.—Visit to Messrs. Ross' Works, Clapham Common, S.W. By the kind invitation of Messrs. Ross, Ltd., Congress members will meet at the factory at 12 a.m. Luncheon will be served on arrival. Members will afterwards be arranged in parties and conducted through the works. Clapham Common can be reached by L.C.C. trams from the Embankment, or by the City and South London Railway from any tube station to Clapham Common Station.

Friday, April 22, 7 p.m.—In Congress Room, Photographic Fair. Lecture on "Window Dressing as a Selling Force and its Application to the Photographic Trade," by Mr. E. Willson, of Messrs. Kodak, Ltd., President of the British Association of Display Men, and winner of the £100 prize in the National Window Dressing Competition at the Advertising Exhibition, White City, 1921.

The lecture will be illustrated by lantern slides, and by arrangement with Messrs. Kodak, Ltd., will be open to photographic dealers and their assistants, admission on presentation of business card.

Congress meetings can be attended only by individual members of the P.D.A. A special Congress fee of 5s. entitles members to attend the meetings on Tuesday, April 19, Thursday, April 21, and also includes admission to the Photographic Fair. All applications for dinner and Congress tickets must be accompanied by a remittance, and addressed to Mr. J. E. Hodd, 119, Victoria Street, S.W., not later than Monday, April 11.

Photography in the Navy.—Details are published in Admiralty orders of the examinations to be passed by seamen and marines who wish to join the new Photographic Branch, established in November, 1919. Photographers, first class, receive 1s., and second class, 6d., per day as specialist pay. All men at present holding the rating of acting photographer, first or second class, and all volunteers in future, are required to pass an examination, both written and practical. Candidates for the first class rating have also to pass a test in cinema work. In the Atlantic and Mediterranean Fleets an examination will be held every six months, the dates being arranged and promulgated by the respective Commanders-in-Chief. The tests will be conducted by the Fleet Photographic Officer, or, if none is borne, by the Photographic Officer in the target-towing sloop. On stations abroad or in ships at home, where no Fleet or Sloop Photographic Officer is serving, the names of candidates are to be sent to their respective depôts and also to the captain of the gunnery schoolship "Excellent," where a roster will be kept of all men who have qualified, and where men will be nominated to fill vacancies in the branch as they occur.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, March 14 to 19:—

COLOUR PHOTOGRAPHY.—No. 8,333. Relief colour photography. H. E. Dawson.

FILMS.—No. 8,107. Sensitised photographic films. C. V. Drysdale, J. H. Powell, and A. Wood.

ENLARGING EASEL.—No. 8,024.—Photographic enlarging easel. Wallace Heaton, Ltd

COLOUR PHOTOGRAPHY.—No. 8,590.—Method of producing photographic plates for indirect tri-colour photography. E. A. Lage.

CINEMATOGRAPHY.—No. 8,236. Cinematograph apparatus. J. G. Betjemann.

CINEMATOGRAPHY.—No. 8,401. Apparatus for developing, fixing, toning, tinting, and drying cinematograph films. A. Bourdereau.

CINEMATOGRAPHY.—No. 7,953. Day or night screen and film for moving pictures. T. H. B. Gayner.

CINEMATOGRAPHY.—No. 8,545. Moving pictures. M. Hall.

CINEMATOGRAPHY. — No. 8,474. Cinematographic projection. M. A. J. Harper.

CINEMATOGRAPHY.—No. 8,102. Cinematograph machines. H. Hevey.

CINEMATOGRAPHY.—No. 8,312. Cinematograph projection machines. M. H. Morris.

CINEMATOGRAPHY.—No. 8,352. Cinematograph apparatus. K. de Proszynski.

CINEMATOGRAPHY.—No. 8,353. Cinematograph mechanisms and films. K. de Proszynski.

CINEMATOGRAPHY.—No. 8,241. Cinematograph, etc., projecting apparatus. R. Wellesley.

STEREOSCOPIC CINEMATOGRAPHY.—No. 7,956. Apparatus for making and method of projecting stereoscopic cinematograph pictures. F. L. Rose.

CINEMATOGRAPH-PHOTOGRAPH. — No. 8,400. Synchronisation of machines for recording and reproducing sounds and movements. C. H. Verity.

X-RAY APPARATUS.—No. 8,096. Apparatus for production of X-rays. E. E. Greville and F. W. Read.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

MOSAIC COLOUR SCREENS.—No. 158,670 (Nov. 7, 1919). The invention relates to multi-colour screens for natural colour cinematography and still photography, of the kind in which coloured particles are used in conjunction with a tacky substance to form the colour screen upon a suitable transparent base. The coloured grains are mixed into a paste with a liquid tacky material, of a composition which will not impair the colour of the grains, and with this paste a suitable film of glass or other convenient material is coated. The grains or particles may comprise threads or particles of glass or other suitable transparent or translucent material capable of being coloured, but of such a nature as to repel or to resist any dye that may be applied to the liquid tacky material.

When, for example, a two-coloured screen is to be produced the grains or particles will be all of one colour and will be mixed into a paste with a tacky substance such as gelatine, fish-glue, or other like material which will not dissolve the grains, and which is dyed with another colour with a suitable dye solution, preferably warmed to, say, 60 deg. F., in order to soften the gelatine. The paste is then applied to the film or base, and the outer surface of the screen cleaned and dried in order to remve any dye that may be adhering to the surface of the particles, the result being a two-colour screen ready for any desired operation.

In a similar manner a screen or film of three colours, five colours, or other desired number of colours may be produced by employing grains or particles of the requisite plurality of colours.

If desired, the prepared surface of the screen may be protected with a suitable transparent varnish or other medium.

The grains may, if desired, be formed by dissolving a gum or like substance such as gum sandarac in alcohol or other solvent, the solvents being dyed any colour and then driving off the solvent so as to leave the coloured gum, which is then crushed to form particles

For dyeing the grains dyes are used which will be dissolved in the same solvent as that for the gum employed.

In order to facilitate the mixing and spreading of the pasty mixture formed from the tacky substance and coloured grains, glycerine is preferably added to the mixture.—John Camiller, 8, Wykeham Mansions, 20, Rosendale Road, West Dulwich, London, S.E.21, and Adam Hay, of 49, Old Bond Street, London, W.1

New Apparatus.

The Movie Camera Attachment. Made by the Movie Photo Co., 20, Cornhill, Bridgwater, Somerset.

THIS is a piece of apparatus for the making of the so-called "living portraits" which during the last few years have become an attractive photographic novelty in many places. It is an attachment somewhat resembling a repeating-back, which can be used in conjunction with a well-built studio camera, and allows of the necessary three negatives being made with great accuracy through the ruled screen. Perhaps it is necessary to explain to some that the living portrait is made from a negative containing three successive photographs, each of a different expression of the sitter's face, and existing as band images of width about 1-100th of an inch. This negative is made by exposing the plate three times in succession under a ruled screen, in which the opaque bands are twice the width of the clear spaces, the screen, or the plate, being shifted parallel to itself the width of the clear space between each exposure. From this negative a print is made by contact, and is then viewed through a similar ruled screen in close contact with it. A shift of the screen then discloses in turn the sets of bands representing the first, second, and third exposure.

It will be clear that, for successful results, strong and even pressure between the screen and the plate during exposure is necessary, as is also exact and strictly parallel movement of one or the other. In the apparatus before us the plate is moved by a cam, which operates upon a stout brass carrier very accurately guided by a pair of grooves. The successive movement of the screen into the second and third positions is most simply made by pushing across a lever, on the outside of the plate holder, into slots provided for it. The apparatus is most solidly and substantially made, as it requires to be for close contact between the screen and the plate. The plate holder travels on a back frame, which is fitted to the camera as a repeating-back is fitted. This back frame also accommodates a focussing screen, which is quickly drawn away and the plate holder brought into position. The apparatus is made for using the half of a half-plate, on which three negatives, each measuring about 2 inches square, are obtained. The plate holder is provided with a series of stops, by which it is brought accurately into position for the exposure of each successive third of the plate.

We are able to express the highest opinion of the design and construction of the outfit, the price of which is £12 12s.; and the Movie Company also supply a clockwork apparatus to be used as a window display of the "changing" character of the portraits. The price of this latter is £2.

New Books.

THE PHOTOGRAPHIC INSTRUCTOR.—The manual of this title, written by the late Mr. J. I. Pigg, has been brought out in a sixth edition by Messrs. Chapman and Hall at the price of 3s. 6d., which is not dear for a book of 250 pages, even in the paper covers which many publishers of technical works are now adopting, by reason of the abnormal charges for cloth binding. Mr. Pigg's text book, which has been revised and extended by Mr. P. R. Salmon, occupies a place of its own. While it deals with the elements of the technique of everyday negative-making and printing, it contains chapters on special branches of work which, as a rule, are left untreated in the average photographic primer. Such special branches are stereoscopic photography, orthochromatic and colour photography, photo-micrography and telephotography, and even cinematography, and process and X-ray work. The chapter on printing processes likewise deals with methods other than the ordinary ones, and provides sufficiently explicit instruction in carbon and Platinotype, gum bichromate, and oil and Bromoil. Those parts of the book requiring to be brought up to date have evidently benefited by Mr. Salmon's revising hand, and perhaps nowhere so noticeably as in the pages on the factorial and time methods of development, which are presented to the reader in eminently practical form. The manual is one providing accurate guidance in almost every branch of photography, and is well illustrated and printed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, APRIL 4.

Bradford Photographic Society. Annual General Meeting.
South London Photographic Society. Annual General Meeting.
Willesden Photographic Society. "Personal Practice in Pictorial Printing." E. C. Perry.

TUESDAY, APRIL 5.

Royal Photographic Society. Ordinary Meeting. "Chemical Methods in Photography." C. M. Thomas, M.A.
Exeter Camera Club. R.P.S. Affiliation Competition Prints.
Manchester Amateur Phot. Soc. "The Present-Day Importance of Photography." A. Dordan-Pyke.
Portsmouth Camera Club. H. Van Wadenoyen's Portfolio.
Rotherham Photographic Society. Annual Meeting.

WEDNESDAY, APRIL 6.

Croydon Camera Club. "Colour Vision." F. C. Reynolds.
Dennistoun Amateur Phot. Assoc. "Carbro." A. C. Cairns.
Edinburgh Photographic Society. S.P. Federation Portfolio.
Ilford Photographic Society. "Kew in Colour." W. Lambert.

THURSDAY, APRIL 7.

Camera Club, The. "The Stormy Adriatic." W. C. F. Anderson.
Dundee and East of Scotland Phot. Soc. "Tricolour Photography." G. D. Charlton.
Everton and District Photographic Society. "Development by Time and Tank." A. Dordan-Pyke.
Hammersmith (Hampshire House) Photographic Society. "From Alps to Appenines." J. Dudley Johnston.
Kryn and Lahy (Letchworth) Phot., etc., Soc. "A Lesson in London."

FRIDAY, APRIL 8.

Bedford Camera Club. "Colour Slides." Paget Co.

CROYDON CAMERA CLUB

Dr. G. H. Rodman, F.R.P.S., gave an exhaustive lecture on "Spiders: Their Structure and Habits."

A feature of the evening was undoubtedly furnished by the gyrations of a spring-awakened fly, which examined the enlarged spiders on the screen with supreme indifference, if not contempt, and occasionally settled on the canvas to obtain a better view. Ultimately, coming within the sphere of a ventilating fan, it suddenly remembered an engagement elsewhere.

Another feature consisted of a gallant but abortive attempt to secure the usual half-time interval at the end of a solid hour of spidery lore. The lanternist, Mr. George Washington Walker, did his best by proclaiming that only a few minutes' life was left for the arc carbons, demanding an immediate change. On Dr. Rodman placidly disregarding this warning, and proceeding, they nobly rose to the occasion and worked yet another hour without turning a hair. A few present, who had neglected to make spiders a special study, expressed a sincere wish in the direction of compression, though they and all bore witness to the highly interesting and instructive character of the lecture, and admired the doctor for his thoroughness and enthusiasm in a fascinating branch of natural science.

The subject can hardly be said to be photographic, but one analogy may be mentioned. The retina of a spider's eye has ranged behind it crystals, which reflect the light and reinforce vision. The extra "vision," comparable with halation, obtained in somewhat similar way by a dry-plate, has nothing to recommend it, though many years ago a quasi-scientific journalist had the hardihood to start a discussion—"Does Backing Slow a Plate?" A most hearty vote of thanks was accorded the ever-welcome visitor from Richmond.

CLIFFORD CAMERA CLUB.—On 23rd inst. at the Club's Headquarters, Mr. H. H. Featherstone, F.R.P.S., gave a demonstration and lecture on desensitising plates before development. The preparation he used was one he had found as the result of numerous experiments, but it was understood to be similar to "Desensitol." The advantage he claimed was that while equally efficient as a desensitiser the stain left by his preparation disappears more readily during fixing and washing. Mr. Featherstone emphasised the fact that the sensitiveness of plates can only be reduced—not destroyed—by his and similar preparations, and the object of their use is not to abolish dark rooms, but to render them more comfortable by permitting more generous illumination. He said one desensitising bath should not be used for more than three plates, as its action was impaired and finally stopped by bromine absorbed from the emulsions, and development should not be prolonged beyond three minutes. The solution appeared to act by dyeing, and longer immersion in developer, he thought, bleached the deposit of dye, and left the plate once more liable to fog.

After the process had been described and questions answered, a flashlight photograph of the audience was taken. The exposed plate was bathed in desensitiser in darkness, and placed in developer together with an unbathed unexposed plate. A lamp fitted with a yellow, bromide safelight was then switched on close to the developing dish, and development completed. The flashlight negative was quite free from fog while the other plate appeared hopelessly fogged.

Mr. Featherstone then received a hearty vote of thanks, and the meeting concluded.

Commercial & Legal Intelligence.

LEGAL NOTICES.—A first and final dividend of 15s. 1d. in the £ has been declared in the case of Thomas Gillies Gaulen, commission agent, late photographer, Moorhurst, Whitminster, Gloucestershire, lately Hayne, Avenue Road, West Hartlepool, and 47, Church Street, West Hartlepool. The dividend is obtainable at the Official Receiver's Office, 26, Baldwin Street, Bristol.

CITY SALE'S 180-PAGE LIST.—The magnitude of the dealings of the City Sale and Exchange is exemplified in a list just issued by the branch of the firm at 81, Aldersgate St., London, E.C.1, which runs to over 180 pages. A few of these are occupied by a brief history of the firm, but nearly all contain closely-printed particulars of hundreds of pieces of apparatus in each of the various classes of cameras, lenses, enlargers, etc. The list is sent free on application.

News and Notes.

Messrs. John Harrap and Son advise us of the establishment of a special department at 3, Holborn Buildings, London, E.C.1, for picture, photographic, or advertising frames.

Royal Photographic Society.—In connection with the new studio now being fitted up at the house of the Royal Photographic Society, 35, Russell Square, Messrs. Houghtons, Ltd., have generously presented a handsome background with supporting frames and rollers to the Society.

Photography and Advertising.—Mr. Elwin Neame, the well-known West End photographic artist, is to lecture before the Publicity Club of London at the Hotel Cecil on Monday, April 4. Mr. Neame, who is bringing a "live model" with him, is dealing with the influence of photography on advertising. A cordial invitation to attend is issued to all publicity men interested, who should 'phone Mr. Day, Central 11769, for free invitation tickets.

The Professional Photographer for March reflects in equal intensities the artistic and commercial sides of photography. Mr. F. C. Tilney has one of his illuminating chapters on composition in portraiture, and there are examples of the virile work of the Swedish portrait photographer, Ferdinand Flodin, of Stockholm. On the commercial side, the importance of photography to the manufacturer receives an impressive testimony from Mr. S. Grimshaw, official photographer to the Ford Motor Co., of Manchester.

Quiagraph While-You-Wait Camera.—A descriptive circular of this latest camera for the making of direct-positive portraits is sent to us by the Quta Co., 252-254, Haydons Road, Wimbledon, S.W.19. It carries 50 plates ($2\frac{3}{8} \times 1\frac{3}{4}$), which are loaded in daylight, and is provided with direct focussing and with tanks for development and fixing while the customer waits for the necessary minute or two. The camera, which is priced at £8 8s., is evidently deserving of the attention of those in the ferrotype portrait business.

London Camera Exchange.—The issue of a 50-page catalogue of second-hand apparatus definitely marks this firm (Robbins, Manistre and Co.) among the leading establishments which specialise in the purchase and re-sale of cameras, etc. The partners know their business thoroughly well, and we applaud their policy of dealing only in goods which they can offer with confidence. The catalogue specifies a very great variety of camera, lenses, enlargers, etc., and is obtainable free on application to 2, Poultry, Cheapside, London, E.C.2

Nottingham Photographic Society.—The 17th annual exhibition will be held on April 28, 29 and 30, in the Albert Hall Institute, Derby Road, Nottingham. The closing date for entries is April 13, and all pictures and slides must be delivered by Monday, April 18. There will be an open section, as well as a section for the members of the Society only. Further information and entry forms may be obtained from the hon. sec., Mr. A. Beeston, 103, Nottingham Road, Nottingham. Mr. F. W. P. Simpson, of Loughborough, will judge.

Dye-image Negatives.—According to a patent specification, No. 156,691, open to inspection but not yet accepted, of the Ullmann Gesellschaft, Zwickau, Germany, in the production of dyed bichromated colloid negatives from opaque originals, in order to obviate a loss of sharpness when the developed negative is dyed, and to render it waterproof, the negative is dyed and then bathed in a solution which will convert the dye into a water-insoluble compound. As an example, the negative is dyed in a solution of penta-methyl-p-rosaniline and then bathed in a dilute aqueous solution of di-amido-stilben-disulpho-acid-diphenol.

Guilleminot Papers.—M. Jules de Gottal, 17, Cecil Mansions, Marins Road, London, S.W.17, sends us samples of two of the development papers manufactured by MM. R. Guilleminot, Boespflug and Co., of Paris, for whom he is agent in the United Kingdom. These are the "Aero Contraste," a bromide paper giving vigorous prints or enlargements from weak negatives, and the "Sedar," a bromide emulsion, which, by straightforward development with M.Q. yields prints of rich, warm black to brown colour comparable with those on platinum-toned collodion print-out paper. Both papers are evidently of high-class manufacture.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

HALATION: PLATINOTYPE.

To the Editors.

Gentlemen,—May I once more suggest that the best preventive of halation is to use a double-coated plate the lower (the slow) emulsion absorbs whatever halation may get in from the glass; and it is surprising what, in all average cases, a complete absence of halated effect can be expected, and that without any messy backing. Of course there are subjects that a backing, in addition, may be advisable for: such as a strong light coming directly through a window in the subject; but this even will give little trouble, though it should always, if possible, be minimised by waiting till the light comes *on* rather than *through* the window. The virtues of the double-coated plate have been my song for very many years but they are still comparatively unknown. All makers should list them; they would then be tried for at least difficult subjects, and once tried they would never be abandoned by those in search of quality; immunity from over-exposure; the ability to use the full exposure that alone gives the perfect negative of perfect exposure to all parts of the subject; deep shadows and high lights alike being perfectly rendered on a double-coated plate.

Platinotype.—I frequently find as in your last issue, that a thin negative is advised for Platinotype printing. This is directly contrary to my experience. I work for a very fully exposed negative, slightly under-developed and then intensified with mercury and sulphite of soda just sufficiently to separate the planes and give a strength of image that will make judging the degree of printing easy, easier than is at all possible with a thin negative. Perfect timing of the degree of printing is the crux, the real difficulty in Platinotype printing, and only an image rich in gradation and strong in transparent densities will ensure it.—Yours faithfully,

Frederick H Evans

Acton, W.3.

A STUDIO LIGHTED FROM THE SOUTH.

To the Editors.

Gentlemen,—Your leading article on a studio light from the south, west, or east is interesting and valuable, and suggests means of managing an admittedly difficult light. In America I believe it is not at all uncommon to use a sunlit studio, and I remember many years ago calling to see an American photographer who had just opened a studio in the West End of London in an old mansion. He received me most courteously and showed me his two studios, which were originally conservatories on the south side of the house. I suggested that he might find some difficulty in managing to work with a south aspect, but he said that in his studio in San Francisco he used a south light, and with proper arrangements of blinds and curtains his operators found no difficulty, after some experience, in getting any kind of lighting they desired.

It did not occur to me until some time afterwards that a south light could be managed with ease in a climate of comparatively constant sunshine, such as I imagine San Francisco enjoys; but in our land of sunshine and cloud, with those glorious clouds chasing each other across the blue (which give our English landscape one

of its greatest charms, when "waves of shadow went over the wheat"), a south light would be most difficult to manage. Just as the photographer has carefully arranged his blinds to give the lighting he wanted, with the sun shining, one of those lovely white clouds comes sailing along, and his whole scheme is upset, and he has to wait until "the clouds roll by," or else he starts again without the sun, and when he has re-arranged everything and is ready to make his exposure out shines the sun once more, and his work has to be begun over again. In my own studio I have some trouble from the same cause; the pitch of the studio roof is a little too flat, and before eleven o'clock the sun peeps over and shines on the sitter and I have to draw the white curtains; in a few minutes the sun may be obscured, and the light is then reduced too much. But as this is over by eleven o'clock it is not a serious inconvenience, as few sitters come before that hour. Now, however, with daylight saving the difficulty may last till twelve, and that's the only objection I have to summer time.

At the east end of the studio, by drawing a curtain aside I can get rather a nice effect with direct sunshine if I darken the rest of the studio, but it can be secured only when the sun shines, which, of course, it often doesn't do, and it is too far round in the afternoon. So I have given up trying to use it, because if I show any photographs with sunshine sitters want to be taken that way, and I cannot do it because it's a dull day, or perhaps too late in the afternoon. I also have a window on the south side, but I never use it, because the sunshine is so intermittent and uncertain.

Then a studio with a south light would be very difficult for all kinds of other work, besides portraiture, copying pictures, for instance, or photographing objects. The difficulty arises not only from the trouble in diffusing the direct rays of the sun, but chiefly from the frequent variations, as there are very few days in the year when we enjoy uninterrupted sunshine. Occasionally, as in 1911, we do get months of brilliant sunshine, but such years are like angels' visits. After all, we find that everyone who wants a good, even, steady light, the artist, the photographer, the engraver, and even engine fitter, gets a north light if he possibly can. If I were designing another photographer's studio I would sacrifice many things if, by so doing, I could get a north light.—Yours faithfully.

ATELIER.

STEREOSCOPIC RELIEF.

To the Editors.

Gentlemen,—With regard to Mr. R. W. Blakeley's opinion that dissimilar views for each eye are essential to a stereoscopic effect, I should like to tell him a little story.

In that blissful quarter of an hour between the times of being called and getting out of bed, I turned my face to the wall one morning and gazed blankly at the wall-paper, about three feet from my bed. Presently I was conscious that the wall-paper pattern had taken on a third dimension. It looked as though it was solid but made of transparent material. I could see into it for several inches. As usual, when anything apparently unnatural strikes one, I pulled myself together, raised my head from the pillow to see whether things in general were still as they should be. As I did so all the different items of the pattern scurried to other places as though they were ashamed of being caught out of bounds, and lo! everything was normal again. My head fell once more to the pillow, but, as it pressed to its former place the patterns scurried out again, and the stereoscopic effect was insistent until I finally moved.

I thought about this for several mornings, and played about with the effect, trying to find an explanation. Usually the pattern looked about two-thirds of its actual size and very near. Indeed, I put my hand out to touch it, but couldn't reach the wall until I had stretched a good way out of bed. (This proves something, surely, with regard to the relationship between stereoscopic vision and the sense of distance.) But once again the pattern looked enormous and comparatively far away. (This sounds very like D.T., but barring an occasional glass of wine with my lunch I am a teetotaller.) I have not been able to repeat this enormous effect. I expect it is in some way purely subjective. Of course, the actual size of the items of the pattern is a constant factor; so when they look near their size must look small, and vice versa.

The pattern is an old-fashioned textile design of lattice and a sprig-motive in each diamond. It is rather dark, but well marked. I found the explanation of the illusion by noticing that in the apparent solidity or depth of the images there was a vertical line of the diamond shapes that seemed more recessed than any others. It was always so whenever I got the effect in a period extending over some weeks. There was a paperhanger's "joint," only discernible upon close scrutiny, and having discovered this one morning I wondered how it would behave in my phantom-solidity view. I adjusted my head and got the illusion, but couldn't at first find the tiny suggestion of a white streak by which I recognised the joint—it was the thickness of the paper that had risen above the "butt-joint." After a while I found it *in duplicate!* One was each side of the depressed column of diamond-shapes. I knew then that the whole pattern was, in my eyesight, superimposed upon itself. There were two images. I checked this by looking at a chair and a table against the wall, and they had double images. The scurrying of the pattern to and fro (and somewhat up and down) was due to pressure by the pillow upon the eyeball. This I tested with my finger, and found that the slightest pressure on the edge of the bony orbit throws the eyes out of adjustment.

I was then satisfied that if two images precisely alike can be made to coincide a stereoscopic relief may result, and I further had discovered that those two images need not exist actually, so long as they exist in the dual sight. The combination in this case takes place somewhere between the two retinas and the brain. Will somebody please explain?

I should add that where the pillow partly obscured the pattern in one way, the other eye saw it within, or through the first eye's pillow image, and saw it in all the commonplaceness of normality.

Some of Mr. Blakeley's incorrigible friends who persist in saying "very nice," "very good," may be squinting into his stereoscope, and may thus superimpose the two images of the identical slides over which he wastes his "cursory breath."—Yours, etc.,

F. C. TILNEY.

THE P.C.U.K. AND PHOTOGRAPHIC RESEARCH.

To the Editors.

Gentlemen,—As an old "Conventioner," and one of the old school of workers, I am very pleased indeed to learn from your pages of the re-election of Mr. C. H. Bothamley as President of the forthcoming Bristol meeting, he being a true photographic scientist, and one who has done so much for the Convention in the past, more especially at the time when papers of scientific interest were the order of Convention week. As a holiday-making concern the Convention has been a success, and I understand that there was about £30 balance on the right side at the 1920 meeting, but its success and usefulness will be greater if some attention be given to photographic theory and practice, and Mr. Bothamley is the man to bring it about, he always dealing with scientific theories in a way the average worker can understand.

It does not appear to be generally known that the Convention has a fund—and a most jealously guarded one, too—for photographic research, and that the Council have power to make grants of money for the carrying out of special work. I have an idea that the last (and only?) time any of this money was granted was in 1897, Messrs. Haddon and Grundy's paper on "The Strength of Hypo-Solution and Time for Fixing Albumen Paper" being the outcome of it.

I think more publicity might be given to this matter of aid to research, and we might be told how much money is given, and to whom one must apply for particulars. The grant—if of respectable proportions—might be an inducement to some of our young and enthusiastic workers to investigate items of practice within their competency.—Yours faithfully,

GODFREY WILSON.

[The original idea was, we believe, to make a grant of only £5. We understand, however, that the matter was brought before the recent meeting of the Council, that it is to be considered by a sub-committee, and that an announcement concerning the grant may be expected in due course.—EDS. "B.J."]

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

E. H.—"Camera Work" was formerly published by Mr. Alfred Stieglitz, 1,111, Madison Avenue, New York, but its publication ceased some years ago.

H. W.—Ordinary unbleached sheeting is generally used, and this can be had up to 108 inches wide. Scene painters' canvas has been used, but is much more expensive.

S. A.—When using anhydrous sodium sulphite instead of the crystal, use half the quantity. As regards the soda carbonates, 10 parts of the crystal carbonate are equivalent, in alkaline strength, to about 4 parts of the anhydrous.

O. J.—The 4½-inch Wray is worth about £1: the 5 x 4 Wray, *f*/5.6, if of 6 inches focus, is worth about £2: the whole-plate Wray should be worth about £3. We do not know an "Auto" daylight enlarger of Houghton's under this name. If you mean simply a fixed-focus enlarging box it is worth, perhaps, about two-thirds its pre-war price.

F. A.—We remember the bromide paper in which the paper had a metal coating. If we remember rightly it was placed on the market here for a German firm by the Rotary Photographic Company, but it has not been on sale for many years. At the present time, so far as we know, there is nothing of this kind made, such results being very much more easily obtained by the carbon process, or by one of the transfer bromide papers, such as Kerotype, or Kodak Transferotype.

J. L.—(1) A good studio plate of about 400 H. and D. (2) Yes, but not at all easy to arrange the requisite lighting of the sitter and the background. (3) Prints are generally worked up to a fair extent. (4) Nothing better than the pyro-soda recommended by the makers of the plates. (5) If the camera will carry it, about the best lens for half-plate size is a portrait lens of about 10 inches or 12 inches focal length, but it is a big and expensive lens. (6) It would seem that your lens is simply an ordinary R.R. Impossible to say who made it. Many of them came from France.

N. E.—As published in the issue of the "Colour Photography" Supplement of March 5, 1920, where the patent specification is reprinted, "Bakelite" has been protected for the making of colour screen-plates by Max Wieland, 47, Bosestrasse, Tempelhof, Berlin. Of course, there have been scores of processes for making screen-plates of geometrical pattern patented within the last ten years or so. You will find particulars of all of them indexed under "Colour Photography" in the annual indexes to the "British Journal." So far as we know none of them are commercially used.

B. L.—We are afraid there is no satisfactory method of straightening an ebonite shutter which is warped. No doubt very great hot mechanical pressure would flatten the shutter, which could then be re-worked if necessary to fit the slide, but the game is scarcely worth the candle. We have used unblackened sheaths in the N. and G. changing boxes for many years without finding any drawbacks. In fact, unless the blackening is of an exceedingly tenacious kind, such as that used by the makers of oxidised lens mounts, we would much sooner be without it, as it is very liable to chip off and cause marks on the plates.

C. J.—The process is, of course, quite different from using the so-called ferrotype buttons or cards in a cannon camera. You have to make a negative, and then a print from it. There is nothing difficult at all in making the print, but making the negative is a little more difficult than making the direct positive as you have been doing with your cannon camera, and, of course, takes consideraby longer. Generally speaking, we think you could very easily learn to do it, but do not think it is a very good commercial proposition, because the process takes a longer time than people will wait. Cameras of this kind have come on the market every now and again, but never into general use.

S. B.—(1) You ought not to fit the diaphragm right in the front of the lens, since to do so introduces distortion. The cells must be a very close fit indeed if you cannot find room for a Waterhouse stop. If we were you we should send the lens to the Premier Optical Co., 63, Bolton Road, Stratford, E.15, who, if it is at all possible, could fit a Waterhouse stop. We do not know that a diaphragm cap is on the market. (2) So far as immunity from action of the developer is concerned lead is an excellent material for tanks. Though acid may be used in compounding separate stock solutions, it is neutralised in the working developer and has no effect. Even with an acid fixing bath, in which there is free acid, the action is very slight on lead, and lead-lined tanks can be satisfactorily used for this bath.

J. M.—We think it is a waste of money to buy an anastigmat of such a long focus as 14 inches for covering a half-plate. If you were to get a good Dallmeyer R.R. or Ross Symmetrical of this focal length you would pay a good deal less, and have a lens that was capable of just as good results, even when using panchromatics. The aperture would not be larger than *f*/8, but in nine cases out of ten you would have to stop down your anastigmat to that aperture, or smaller, in order to get depth of focus. We recommend you to get one or two lenses of this kind on approval from a firm of dealers in second-hand apparatus. The money you would save would enable you to buy a short-focus anastigmat, which we should think you will really need for jobs where you cannot get much space between the camera and the subject. As regards prices, we have recently published prices for commercial work suggested by the Edinburgh Society of Professional Photographers, which we think ought to be a reasonable guide to you. You might base your charge for taking a negative and supplying one print on these; further prints at, say, Raines's prices.

THE BRITISH

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Contents.

SUMMARY

In the concluding part of his article on a comparison of development methods, Dr. B. T. J. Glover discusses particularly the respective merits and demerits of time and factorial development in relation to the making of negatives (from subjects of different ranges) suitable for different printing papers. He adds a few notes on the correction which could be applied in the way of intensification or reduction without interfering with the "correct" character of the negative resulting from exposure. (P. 195.)

Mr. E. J. Wall, in some notes on the history of certain processes, traces the collodion positive to Scott Archer, and Monckhoven's intensifier, in substantially its present form, to the French experimenter to Ad. Martin. Also, he finds the germ of self-toning paper in an article by Mr. John Spiller, published in the "Photographic News" in 1860. (P. 197.)

Precautions in manipulation, which may well be disregarded when plates of moderate speed are being handled, become important in the case of emulsions of the great sensitiveness now obtainable. We have some notes on the chief respects in which such care needs to be exercised in an article on page 194.

Entries for the forthcoming exhibition of the Professional Photographers' Association may be sent in a day or two later than previously announced, namely, until April 11. Pictorial exhibits are to be selected by Messrs. Angus Basil, Bertram Park, and R. N. Speaight; technical work, by Messrs. Alexander Corbett and H. A. St. George. (P. 206.)

Details of the construction of a folding reflex camera, the first fully finished model of which will be shown at the Photographic Fair, are contained in a recent patent specification. (P. 200.)

Methods of producing tint effects without the use of a tint-laying apparatus in the making of line blocks are described in a contribution to "Photo-Mechanical Notes." (P. 199.)

Strongly restrained development and the subsequent use of the iodine-cyanide reducer is a combination which will do much towards obtaining presentable results from stale plates. (P. 194.)

A caution in respect to the F. numbers on a shutter of the between-lens type may be necessary to those unfamiliar with the varying efficiency of such shutters, according to the size of the diaphragm opening. (P. 194.)

The old method of putting hand work on a sheet of ground glass bound up with the negative is one which has many a useful application at the present day. (P. 193.)

The advantage of thorough screening of the photographers' eyes when judging strong lighting in the studio is the subject of a paragraph on page 193.

EX CATHEDRA.

Judging the Lighting. When working in a brightly-lighted studio the operator is often deceived as to the effect of the lighting by the flood of light which enters his eyes and prevents him from appreciating the true value of the light which is falling upon the sitter. This is particularly the case when working against the light; the effect appears much flatter to the eye than it does to the lens, assuming that the latter is properly shaded. The remedy for this is obvious, although few workers seem to realise it. It is to shade the eyes as well as the lens, and for this purpose nothing is better than the old-fashioned canopy beneath which both the operator and sitter were situated. This fitting is rarely seen now, and the operator must rely upon the simpler plan of shading his eyes with his hands, as he does instinctively when looking at a sunlit view out of doors, all that is necessary being to cut any brightly-illuminated window, or electric lamp, out of the field of view. Where the size of the studio permits, the canopy is a boon to the operator, as not only does it supersede the focussing cloth, but allows of children and nervous sitters being taken without their knowledge. Several well-known American photographers, and on this side Mr. Marcus Adams, have seen the advantage of thus camouflaging the camera.

* *

Simple Local Control. A very simple method of controlling the density of negatives locally consists in the use of a sheet of ground glass of the same size as the negative placed glass to glass against the latter, and the two bound together with lantern-slide binding. The exposed ground side of the glass is then worked upon with pencil or stump where required. This idea may not be new to many, but is of considerable value in pictorial work, such as lightening tones and shadows, etc., in landscape or architectural work; and the use of glass has certain advantages over tissue paper or papier mineral secured to the glass side of the plate. This is especially so if the plate is to be printed by contact, the double thickness of the glasses assisting in making the hand-work less evident in the print. Any errors in manipulation may be rapidly removed from the ground glass with a damp cloth and the work done again immediately, which cannot be said of the former method, which only allows of rectification of mistakes by the application of a fresh sheet of paper. Care must be taken not to put too much work on the glass, and any hard outlines may be gradually softened off by gentle rubbing with a piece of chamois leather strained over one finger. When lightening shadows or controlling high-lights by this method the photographic image must always be visible in the negative when viewed against the light. When a sheet of glass has served its purpose it may be cleaned off and used again for another plate, and so the method is not expensive.

The slight grain in the glass may appear in the print, but not to any extent. In some specimens that we were recently shown it had quite an attractive effect in the picture.

* * *

Shutter Efficiency and Diaphragms. A point which is often overlooked by users of between-lens shutters is the difference of efficieney which arises from varying the aperture of the diaphragm. With shutters which open from and close to the centre, the full aperture of the lens is only available for a small proportion of the exposure. This is most marked in shutters of the Unicum type, where two circles move across each other, but even with those having a star-shaped opening it is considerable. It is thus obvious that the smaller the diaphragm aperture the greater is the efficient exposure. Thus, with such shutters the ordinary practice of doubling the exposure at each step on the iris scale will not give equal exposures, because a diaphragm aperture of *f*/16 is fully exposed for a longer time at any given shutter speed than one of *f*/8 would be at the same setting, therefore it would be safe to give rather less than the quadruple exposure which would be necessary with a focal-plane shutter or a cap. This variation, of course, differs with different types of shutter, but it is always worth considering when the question of the possibility of using a smaller aperture than the full opening arises.

* * *

The Development of Stale Plates. Although no one would willingly use plates which have deteriorated by age or careless storage, it is occasionally necessary to deal with such, either because no others are at hand or because exposed plates have suffered through a long journey in tropical climates. In such contingencies quite serviceable negatives may usually be obtained by disregarding the surface fog which usually appears at an early stage of development, and developing until no further action appears to take place. Fixing should be thorough, so that there is no risk of staining on any after-treatment that may be necessary. It may now be found that the images, although rather foggy, are capable of yielding a good print, but if this is not the case, the fog may be removed by treating with a reducer, the best form of which is the usual iodine and cyanide solution which does not alter the colour of the image, and which appears to have a tendency to dissolve the foggy veil before it attacks the true image. Pyro-soda, with a slight addition of bromide, is a suitable developer, but hydroquinone, either with a caustic alkali or a carbonate, is better, as it appears to give more contrast and at the same time minimises the veiling.

* * *

Panoramic Groups. Although a specially-designed camera, such as the Cirkut or Al Vista, is the most convenient for the production of groups whose width is great in proportion to their height, very satisfactory work can be done with an ordinary camera and a lens of fairly wide angle. For the sake of economy it is advisable to have plates cut to conform to the size of the print: in the case of a 12 x 10 camera a 15 x 12 plate will give two 12 x 7½ plates, and for 15 x 12 slides the plate may be cut lengthwise to give 15 x 6, or if this be too narrow an 18 x 15 would give 15 x 9. If the expense is not a consideration the full size plate may be used, or if more than one exposure be needed half the plate may be covered during each. One objection to wide angle groups is the broadening of the outer figures if the lens is of very short focal length, but such a lens need not be used if there is room, as there is generally, to take up a sufficiently-distant standpoint. In any case, this distortion may be minimised by arranging the group in a curve, as is recommended to users of the Cirkut. There is a tendency for the centre to receive more exposure than the ends, but if a full exposure be given this will not be apparent in the print.

THE HANDLING OF ULTRA-RAPID PLATES.

The speed of present-day plates has reached a point of which the most sanguine of the original experimenters never dreamed. Almost every week advances in this direction are advertised, and we can assert from practical tests that in most cases the makers' claims are well founded. A rapidity of 500 H and D is now looked upon as quite ordinary; some makers have gone far beyond this with isolated batches, but have not ventured to put them upon the market, owing to the difficulty of making such extremely sensitive emulsions upon a commercial scale. It appears, therefore, that we have by no means reached the limit, and that in the future we may be using plates which are as great an advance on those we are using as the latter are on the productions of the last century.

During the transition from wet collodion to gelatine emulsion, great stress was laid upon the necessity for extreme care in the handling of the new plates, which in the hands even of experienced workers often gave flat foggy negatives, and it may be said that the recent advances render a reiteration of such warnings desirable. It seems that in many cases it is overlooked that a plate which is exceedingly sensitive to light transmitted by the lens is equally sensitive to light which reaches it in other ways, and the result is a want of clearness and brilliancy, just the trouble experienced by the past generation.

From a considerable experience of the modern plates we are able to say that this is due in all cases to want of care or knowledge on the part of the operator, for it is as easy to produce dense high-lights, if needed, and clean shadows with a 500 H and D emulsion, as it is with one of ordinary, say, 100 H and D, provided proper precautions are taken. The first point to be observed is naturally the safety of the dark-room illuminant, and this is doubtful in many professional dark rooms. As a general rule, a very rapid plate takes much longer to develop than a moderately slow one, and if dish development be practised this means that the rapid emulsion is exposed to the red light for, say, twice the time that the slow one would be. The extra speed would probably permit of a fogging action, even in the same time, and with double time such fogging becomes pronounced. Added to this, the emulsion may be isochromatic, and this further tends in the same direction. It is extremely difficult, if not impossible, to produce a red light of any useful visibility to which such plates can be safely exposed for any considerable time, so that after installing as safe a light as possible, it is wise to keep its direct rays from falling upon the developing dish a moment longer than is necessary for inspection. This can be done easily by providing some screen behind which the dish can be placed during the greater part of the time. It should be noted that the fogging is more likely to occur before or during the early stage of development, so that plates should not be unnecessarily exposed while filling slides or before placing in the developer. A recent case of partial fog was traced to allowing plates to lie, overlapping each other, upon the bench while filling.

Diffused light in the camera, whether it arises from badly blacked bellows, shiny diaphragms or dusty or depolished lenses, has also a flattening effect upon the negative, which becomes more evident as the sensitive-

ness of the plate is increased. Omission to shade the lens effectively is still another error. Camera fog and dark-room fog can easily be distinguished by observing whether the edge protected by rebate of the slide is clear or not. An often unsuspected cause of fog with rapid plates is the penetration of light through the wood of the slide. We have seen slides left in sunlight in the studio for a quarter of an hour—quite long enough to cause mysterious markings.

Regarding a general weakness of the image, it is usually safe to attribute this to unsufficient development, due either to the use of a solution too weak in alkali or to too short a period of immersion. We cannot sufficiently emphasise the necessity for using the formula issued with any particular brand of plates if easy working is required. We recently found that the thin yellow images complained of by a correspondent were due to the use of a developer containing one-fourth the proportion of soda and one-half the pyro prescribed by the plate makers. This had worked admirably with a slower brand, but even in double the time failed to produce a brilliant image with the rapid emulsion.

The lighting of the sitter must also be considered. With a plate which has a tendency to give clear glass in the shadows, the lighting may be somewhat flat, yet the negatives will appear fairly bright, but with a plate which makes the most of all the light falling upon it, this flatness will be evident in the finished result. We do not, be it understood, advocate harsh lighting for rapid plates. The lighting should appear to the eye as it is desired to appear in the print; the plate can be trusted to do the rest.

Those who practise tank development will escape many of the pitfalls we have enumerated. All that is necessary is to give sufficient time to obtain the desired contrast, and not to expect perfect results from varying brands of plates by a uniform time of development. It is unsafe to judge density by the appearance of the image upon the back of the plate, as variations in the thickness of coating often lead to error.

A COMPARISON OF DEVELOPMENT METHODS.

(*Concluded from page* 183)

Time Development.

The knowledge that is required beforehand to enable the time of development required for some specific purpose to be calculated with precision is classified below:—

(*a*) The range of light-intensities in the subject.
(*b*) The development rate of the plate.
(*c*) The nature and concentration of the developer.
(*d*) The temperature at which development is conducted.
(*e*) The exposure range of the printing paper.

Every one of these factors contributes an effect upon the time of development. The only items which can be readily measured are the temperature of the developer and the exposure range of the printing paper. The measurements of the remainder present difficulties almost insuperable. It is most unfortunately true that the development rate of a plate varies from one make of plate to another, and *varies between different batches of the same plate*. In any one plate it becomes slower with the age of the plate. The concentration of the developer depends upon the degree of purity of the constituents, a matter beyond the photographer's control. With many developing reagents the amount of dissolved air in the water used affects the time of development, and this amount varies with different water supplies, and in the same water supply at different times. The effect of different temperatures does not only depnd upon th developer, but also depends upon the batch of plate in use, so that the temperature co-efficient of a developer is an attribute of both developer *and* plate. The range of light-intensities in any one subject has a visual range measurement and a photographic range measurement. The former measurement is appropriate when fully screened panchromatic plates are in use, and the latter when ordinary (non-colour-sensitive) plates are used. Partially screened panchromatic, orthochromatic and self-screened orthochromatic plates will view a subject range as one which is neither entirely visual nor entirely photographic. The list of disabilities has perhaps been sufficiently extended to show how far from being precise modern time development is.

The time and temperature tables published ignore the subject range, ignore the fact that the development rate of the plate changes from one batch to another, assume that the effect of temperature changes is always the same, give no information as to the printing process appropriate, and assume that the photographer can imitate the strength of the developer upon which the lines in the table were based. A short step in advance is made by the makers of panchromatic plates, who do calculate development times for each batch of plates and differentiate between subjects under the headings "portrait," "architecture," and "landscape," portrait standing for a long-range subject, architecture for a medium-range subject, and landscape for a short-range subject. The subject divisions are vague, and occasionally very misleading, for each of these subject categories can yield both short and long scale examples.

There can be but little doubt that modern time development is a crude approximation, and can only yield a precise result by happy chance. From the very nature of the problem of development, time development as at present practised must yield negatives of very different ranges, whose development errors need to be corrected in some manner subsequently.

Grotesque as negatives may be when developed by inspection by beginners, and advantageous as it may be to teach beginners to develop for an average time obtainable from a time and temperature table in order to keep the errors within reason, there can be but little doubt that a negative developed by an experienced photographer by inspection has as good a chance of turning out what is required as a negative which has been developed for a calculated time in the manner of present practice. Guesswork plays the major part in both methods. Practical photographers may not, and as a rule do not, know very much about the properties of the materials which they use, nor have they very much knowledge of the principles which govern their use, but they have a keen eye for spotting a good negative, which gives them what they want in a definite printing process, and the fact that many eminent photographers stick to development by inspection, and abhor a tank, shows how little there is in it. Of two methods equally bad, neither can be called the better.

Factorial Development.

The Watkins factorial method of development, when applied to the development of plates for the production of negatives, eliminates some of the disabilities of time development, could by elaboration be made to eliminate others, and introduces some which are peculiar to the factorial method.

The disabilities which are very satisfactorily eliminated are:—

(*a*) The variable rate of development of different plates and different batches of the same plate.

(*b*) Uncertainty due to the concentration of the developer.

(*c*) The effect of temperature on the time of development.

The disabilities which are introduced are:—

(*d*) The occasional inconstancy of the Watkins factor in the same developer.

(*e*) The influence of varying exposures upon the time of appearance of the image.

The remaining disabilities of pure time development were the range of the subject and its relationship to the exposure range of the printing paper. An elaboration of the factorial method might overcome this difficulty. The simplest case would be the development of a panchromatic plate factorially which has been *fully* screened during exposure.

The factorial development of panchromatic plates has now been made possible by the introduction of desensitising agents,* in which the plate can be bathed in darkness before development is commenced. To the fully screened panchromatic plate the range of the subject is what the eye can see, namely, the visual range. This can be measured in a simple manner, although so far as I know there is no simple instrument sold for this purpose. The relationship between the range of the subject measured and the exposure range of the printing paper (Table I.) can be expressed as the gamma or contrast to which the plate should be developed in the following simple manner:—

Suppose the subject range is 40 to 1, and the paper range 1—20. The negative gamma required is the logarithm of 20 divided by the logarithm of 40 $= \frac{1\cdot3}{1\cdot6} = \cdot8$. Development to a gamma of .8 gives the negative required. Similarly a 40 to 1 subject is to be depicted on a 1—100 paper such as platinum. The required negative gamma is $\frac{\log 100}{\log 40} = \frac{2\cdot0}{1\cdot6} = 1\cdot25$. In these two cases the same subject can be rendered upon soft gaslight paper and platinum paper in the same manner by printing from two negatives developed for different times to a gamma of .8 and 1.25 respectively. With any developer the factors could be worked out for gamma of different values, so that whatever be the relationship between the subject and the printing paper, the negative gamma required would have an appropriate Watkins factor. Factors for gamma .6, .8, 1.0, 1.2, 1.4. . . . 2.0 would cover the whole ground. The factors so provided should be worked out for an exposure which is the minimum correct exposure. Errors in exposure would upset them in practical use. It is quite likely, however, that so used, with fully screened panchromatic plates, the Watkins factorial method would yield results more nearly accurate than any other practical method of development.

For use with ordinary or partially screened colour sensitive plates this method of calculating the factor required is not a practical one. The visual range of the subject differs from the photographic range by an unknown and variable amount. I know of no simple manner of estimating it. And if with these ordinary and partially screened colour-sensitive plates we develop factorially to a factor which is a mere estimate, guessing the allowance for the subject and the printing paper, and making an approximate allowance from the standard Watkins factor originally published for most developers by Mr. Watkins, then we must recognise once more that development is an approximation based upon guesswork, and that the errors in the result are liable to be extremely large.

It seems to be apparent that, knowing the purpose of development and knowing the causes of inaccuracy of each system of development in vogue to-day, it is a logical deduction that they are about equally inefficient. The fact that the three systems continue to exist side by side, one system favoured by some photographers and another favoured by others, lends considerable support to the view expressed in this paper, namely, that they are more or less equal. There are some photographers who waste a good deal of their time wandering from one developer to another, and from one system of development to another in the hope of improvement. With few exceptions all developers are equal. Purity and price are the only factors which the practical photographer need consider, and he could, with advantage to his pocket, use the cheapest *pure* developing reagent on the market. And so far as choice of a developing system is concerned the main deciding factor is convenience. If the photographer has many negatives to develop, and it is necessary to get them done quickly, then by all means let him develop them in a tank, roughly guided by time and temperature. If, on the other hand, the photographer is experienced in developing plates by inspection, then by all means let him stick to that method. To the beginner I would suggest either the factorial method or the time and temperature method as the readiest way for an inexperienced man to emulate the mistakes of his experienced brother, and not make even greater ones. But as they are at present practised, the particular system of development followed simply does not matter.

The paper will have served its purpose if it succeeds in emphasising what are the characteristics in a negative which enables it to yield a print appropriate to the subject, and if it indicates how imperfect are the present means of obtaining a perfect negative for a specific purpose. It has for the most part been destructive in criticism. The few remaining paragraphs will indicate the means at the disposal of photographers for the remedy of errors which they cannot avoid in the development of negatives by present methods.

Compensation of Errors in the Development of Negatives.

There are two important ways of compensating for the lack of success in producing a negative of some definite range. They are as follows:—

(*a*) The choice of a printing paper whose exposure range *will* fit the negative.

(*b*) An alteration in the range of the negative by intensification or reduction.

Let it be supposed that the negative was designed to yield a print upon bromide paper. When printed, however, the print was flat. That would mean that the range of the negative was too short, through under-development, to enable it to call forth the full range of tones of bromide paper. Obviously a shorter range paper is required. Soft gaslight paper has a shorter exposure range, and vigorous gaslight paper has a still shorter exposure range. To one or other of these two printing papers the photographer must turn if he wants a good print from that negative. On the other hand, if the print on bromide paper were harsh it would indicate that the scale of the negative had been rendered too long by over-development for the exposure scale of bromide paper. Obviously a longer scale paper must be sought for in P.O.P., or carbon or platinum. One method of getting a good print out of every negative is to make use of the different characteristics of different printing papers, and having failed to so develop the negative that it fits a particular paper, make use of another paper that fits the negative. This is the practice of trade printers who are noted for their skill in producing good prints from negatives of widely different ranges. They chose an appropriate paper.

The other method (*b*) seeks to alter the range of the negative in order to make it fit the exposure range of some particular paper. Intensification lengthens the negative range in the manner that longer development would have done. Reduction shortens the negative range in the manner that shorter development of the negative would have done. The two terms intensification and reduction are unfortunate. They are usually thought to mean an increase or decrease in density. It does so happen that there is an increase or decrease in negative density, with intensification or reduction respectively. But the real object of both of them is to increase or decrease density in a differential manner so that the *range* of the negative is altered.

* Sold as "Desentitol" by Messrs. Ilford, Ltd.

An appropriate method of intensification to increase the negative range is the bichromate bleaching method followed by redevelopment with amidol (chromium intensification). An appropriate reduction method to decrease the negative range is the mixed ammonium persulphate and potassium permanganate method of N. C. Deck[1], subsequently modified by K. Huse and A. H. Nietz[2]. Neither process is under good control, and the amount by which the negative range is altered has to be guessed at. The guess becomes more accurate with experience.

By one or other of these methods (*a*) and (*b*), or an appropriate combination of both, it is possible to obtain a print of any nature from any negative, which has been given a normal exposure, and has not been badly fogged during development.

In the course of this paper no reference has been made to the differences which exist between various types of printing paper as to the truth throughout the scale of the tones that they depict. All printing papers are untruthful in their representation of the subject at both ends of the tone scale (white and black), and some are more so than others. The most truthful papers are those which possess a characteristic curve which more nearly approaches to a straight line throughout its course than is the case with the less truthful papers. In practical photography these differences are small, and the small extent to which the eye can appreciate them is shown by the fact that platinum paper, the most favoured of all papers, compares very unfavourably with some brands of vigorous gaslight paper. The chief point of *practical* importance is the one laid down in this paper, namely, that the scale of the negative and the paper must be properly related to one another. It may be stated with confidence that those photographers who obtain prints upon one type of paper which compare unfavourably with prints upon another type, are using a negative of a faulty range upon the paper with which they are dissatisfied. The fault is in the development of the negative, and is not a fault inherent in the printing paper. For all practical purposes, modern printing papers of every type are capable of giving precisely the same results as one another so far as multiplicity of tone and tone values are concerned. It is sound practice in printing to choose any paper whose exposure range will fit the range of the negative, thereby compensating any reasonable mistake in the time of development of the negative.

Modern photographic practice involves:—

(*a*) The production of a negative of uncertain range by one or other method of development.

(*b*) The choice of a printing paper to fit that negative range.

(*c*) The alteration of the negative range by intensification or reduction if necessary.

H. T. J. Glover.

(1) A Combined Permanganate-Persulphate Reducer for Negatives, "B.J.," July 14, 1916.
(2) Proportional Reducers, "B.J.," October 27, 1916.

SOME HISTORICAL NOTES.

The following notes are called forth by those which appeared in the "B.J." of February 4, p. 62, and it would appear that Messrs. Sotheran may be correct in ascribing to Ad. Martin the origin of the collodion positive, as he read a note before the Académie des Sciences[1] which deals with this subject, and there is an interesting corroboration by Delamotte,[2] which confirms this:—

"Conversion of negatives into positives (124). A negative picture, prepared as indicated above, can be converted into a positive in various ways. That suggested by Sir John Herschel consists in smoking the glass on the collodion side Or the proof may be backed with any black substance, such as varnish, paper, velvet, etc. (125.) Dr. Diamond obtains the picture by the usual collodion process, and develops by protonitrate of iron The negative image being developed a mixture of hypo-sulphite of soda, which has undergone partial decomposition, and pyrogallic acid is poured over the plate, which is slightly warmed. Upon this the darkened parts are rendered brilliantly white by the formation of metallic silver. The picture, being backed up with black velvet, assumes the aspect of a fine Daguerreotype, without any of the disadvantages arising from the reflexion of light from the polished silver surface. (126.) Mr. Archer obtains this result by pouring a solution of bi-chloride of mercury over the proof; Mr. Fry, by the combined action of pyrogallic acid and proto-nitrate of iron. (127.) M. Marten's (sic) communication to the Academy of Sciences at Paris details the following method of operations for producing *positives* directly on a glass plate: Make a solution of gun-cotton in ether The gun-cotton is prepared by heating 2 parts of cotton wool with 50 parts of nitrate of potash and 100 parts of sulphuric acid. This, when well washed and dried, is soluble in a mixture of 10 volumes of ether and 1 volume of alcohol to which are added 15 grains of nitrate of silver, converted into the iodide by iodide of ammonium, and dissolved in 300 grains of alcohol. (128.) The plate of glass covered in the usual way with this substance is plunged before it becomes dry into a bath of

Nitrate of silver	..	...	...	8 parts.
Nitric acid	..	...	...	5 ,,
Distilled water	..	...	...	100 ,,

(129.) For developing it is plunged into a bath of sulphate of protoxide of iron, and carefully washed. The picture is now a *negative*, but on plunging it into a bath of the double cyanide of silver and potassium it immediately becomes *positive*. It must next be washed and dried. The cyanuret bath is composed of

Water	...	.	...	2 qts.
Cyanuret of potassium	...	.	...	375 grs.
Nitrate of silver	...	..	...	60 ,,

The pictures produced in this manner possess great brilliancy."

One must not, of course, take Delamotte's notes as chronologically correct, as obviously Archer's method should come first and he says: "The whitening process. The picture being thoroughly washed in plenty of water, after fixing with hypo-sulphite of soda is treated in the following manner. Prepare a saturated solution of bi-chloride of mercury in muriatic acid. Add one part of this solution to six of water. Pour a small quantity of it over the picture at one corner, and allow it to run evenly over the glass. It will be found immediately to deepen the tones of the picture considerably, and the positive image will almost disappear; presently, a peculiar whitening will come over it, and in a short time a beautifully delicate white picture will be brought out. The negative character of the drawing will be entirely destroyed, the white positive alone remaining. This picture, after being well washed and dried, can be varnished and preserved as a positive, but nevertheless, even after bleaching, it can be changed into a deep-toned negative, many shades darker than it was originally, by immersing it, after a thorough washing, into a weak solution of hypo-sulphite of soda, or a weak solution of ammonia. The white picture will vanish, and a

1. "Compt. Rend.," 1852, *35*, 29; "Institut," 1852, 215; "J. prakt. Chem.," 1852, *57*, 249; "Dingl. Poly.," 1852, *125*, 119; "Ann.," 1853, *15*, 176; "Chem. Centr.," 1852, *23*, 713; "Jahr. Chem.," 1852, *5*, 219.
2. "Practice of Photography," London, 1853, pp. 78, 79.
3. "Manual of the Collodion Photographic Process," 1852, pp. 38, 39.

black negative will be the result. It is very singular that the picture can be changed from a white positive to a black negative, many times in succession, and very often with improvement. Thus, by the above process, a most perfect white positive or a deep black negative is produced, quite distinct from each other."

It is clear that Archer fully recognised the collodion positive, even although he did not recommend backing it up with a black surface. Ought not to Archer, therefore, be given the credit of the collodion positive?

R. Hunt[4] says: "(231.) The negative collodion image can be converted into a positive one by several methods, all of them, however, depending upon the conversion of the film of darkened silver into a layer of brilliantly-white metallic silver. The best method of doing this appears to be one of the following:—First, protosulphate of iron, 20 grains; distilled water, 2 fluid ozs.; nitric acid, 4 or 5 drops; or, 2nd, protonitrate of iron, obtained by decomposition of nitrate of barytes, with the protosulphate of iron; or, 3rdly, by the use of a mixture of the protosulphate of iron and pyrogallic acid. Either of these solutions is poured over the plate; and in a short time a clear metallic image is obtained, which, when backed up with a black velvet or a black varnish, is superior to the best effects of the Daguerrotype."

Eder,[5] when dealing with the production of collodion positives—"helle Bilder auf dunklem Grunde"—ascribes treatment of the negative with mercuric chloride to Bertsch,[6] and the backing with black paper to Bertsch and Le Gray,[7] but gives no authority for backing with black or violet velvet or linen, but ascribes to Brebisson[8] the credit of black varnish.

Hardwich[9] deals rather fully with the subject, as one would expect, and one must be content with the following short quotation:—"In a collodion positive the lights are formed by the bright surface of the reduced metal, and the shadows by a black background showing through the transparent portions of the plate." He deals with the various developers that can be used and the use of mercuric chloride for obtaining white images, but nowhere does he specifically mention actually backing the plate.

It should not be overlooked also that Fox Talbot and T. A. Malone obtained an English patent, 12906 of December 19, 1849, in which "a method of converting or changing negative photographic images into positive ones" was claimed.[10] "To produce the negative picture, a clean glass plate is covered with a film of albumen by pouring a solution of albumen over the glass, and drying it; the film is then iodised by exposure to the vapour of iodine, dipped into a nitrate of silver solution, placed in the camera, and treated with an aqueous solution of gallic acid, which develops the latent picture. To convert this picture into a positive picture, a solution of nitrate of silver is allowed to stand some time on the plate; the resulting picture is still negative if viewed by transmitted light, but, if viewed by reflected light, is positive. To view the positive image well, the glass should be placed upon a dark surface." This proves that the idea of backing a negative with a dark background was known in the old albumen days.

J. Urie[11] patented, in 1854, an improvement in photographic pictures, in which to give photographs on glass or other transparent plates, "the effect of standing out in high relief from the apparent surface, the back of the glass or the surface opposite to that on which the image is taken is coated with a black varnish or other pigment."

4. "Researches on Light," London, 1854, 143.
5. "Ausführliches Handbuch der Photographie," Halle, 1896, *2*, 353
6. "Photographie sur verre," 1852.
7. "Photographie," 1854.
8. "Horn's Phot. J.," 1854, *1*, 95.
9. "A Manual of Photographic Chemistry," New York, 1855, pp. 101-110. This is presumably the same as the first English edition.
10. "Abridgements Relating to Photography," London, 1861, 13; "Repertory of Arts," *16*, 97; "Mechanics' Magazine," 52, 518; "Patent Journal," *9*, 143
11. "Eng. Pat.," 407, 1854; "Abridgements," 1861, 26.

Monckhoven's Intensifier.

Probably everyone is familiar with this well-known intensifier in which a mixture of mercuric chloride and potassium bromide is used as the bleach, and a solution of potassio-cyanide of silver as the blackener, and probably it will always be known by the above title. It was recommended by Monckhoven in 1879[12], yet as a matter of history it should be recorded that potassio-cyanide of silver was suggested by Ad. Martin as early as 1854, and probably in the very pamphlet mentioned by Messrs. Sotheran, for Eder says,[13] when speaking of collodion transfers—"dunkle positive Collodionbilder auf hellem Grunde"—that the toning of the primary image may be effected with a neutral gold bath, with palladium chloride, with mercuric chloride followed by hypo and with mercuric chloride followed by a solution of potassium cyanide, or hypo, saturated with silver; and to this last method he appends the following footnote:—"This process was recommended by Ad. Martin, of Paris, for transparent pictures for the purpose of precipitating on the image surface, by double decomposition, powdery metallic silver, so that the drawing would become black: 100 parts water, 2.5 potassium cyanide, and 0.4 silver nitrate. (Ad. Martin, in a pamphlet on direct positives published by him soon after the discovery of the collodion process, Barreswil & Davanne, Phot. Chemie, 1863, p. 245.) This is probably from a German edition of their well-known *Chimie Photographique*, the first edition of which was published in Paris in 1854. Martin's paper was printed in the English journals,[14] and he says:—"The silver reduced by these means is white, and gives only grey shadows. But this white silver must be transformed into black silver, which takes place when we pour upon the image, after being developed and well washed, *but not fixed*, a saturated, but non-acid solution of bi-chloride of mercury: the reduced silver becomes black by precipitation of metallic mercury. The picture is then carefully washed, and a solution of cyanide of silver in cyanide of potassium is poured over the plate. This solution is obtained by dissolving 10 parts of cyanide of potassium in 100 parts of water, and pouring into the resulting liquid a solution of nitrate of silver of the strength of 10 per cent. until the precipitate of cyanide of silver, which is formed, ceases to be re-dissolved upon agitation; upon being filtered the solution is ready for use. We can replace the salt of silver by a copper salt, which gives the same results; the metallic copper thus precipitated is black, and gives to the picture a tone exactly like that given by silver. Hyposulphite of soda may be substituted for cyanide of potassium, and the solution prepared in the same way, either with silver or copper. Hyposulphite of soda, which has served for fixing negatives developed with pyrogallic acid, and whose action has become exhausted, gave very good results upon the addition of a salt of silver or copper."

It is interesting to note that this process of intensification is precisely the same as recommended by Burton,[15] except that the latter recommended the use of ammonium chloride instead of the potassium bromide, and this change is of minor importance.

The Invention of Self-Toning Paper.

In the issue of the "British Journal" for April 20, 1906, p. 319, Mr. D. Bachrach claimed the invention of this particular class of paper, and in the issue for October 9, 1908, p. 781, I pointed out that Ashman & Offord[16] had published in 1885 a series of papers on gelatine-chloride emulsions and the addition of auric chloride "for quickening the toning process considerably." I have since discovered what may, I think, be justly termed the true invention of the self-toning principle. Mr. John Spiller[17] described in an article entitled

12. "Bull. Belge," 1879, *6*, 178; "Phot. Korr.," 1879, *16*, 208; "Eder, Handbuch," 1905, *3*, 542.
13. "Handbuch," 1896, *2*, II., 347.
14. "Brit. J.P.," 1861, *8*, 270; "Photo. News," 1861, *5*, 339.
15. "Yearbook of Photography," 1873, 97.
16. "Photo. News," 1885, *29*, 467
17. "Phot. J.," 1869; "Phot. News," 1869, *13*, 401.

"On the Action of Chloride of Gold upon Certain Salts of Silver," the formation of a gold-silver compound, to which he ascribes the formula (old notation) $AuO_3.4AgCl$; but we are not particularly concerned with this salt, rather with his statement that follows:—"After obtaining the foregoing results with gold, I tried these compounds on paper and in collodion for photographic purposes. For printing, it was necessary to submit the paper to a double treatment in sensitising it, and these operations—floating successively on chloride of gold and silver nitrate solutions—must be performed immediately before use, in order to escape the effects of spontaneous discolouration. Thus employed, I found the consumption of the precious metals was larger for the same ultimate result than by the established process; but there is one aspect of the case which I have repeatedly studied in the hope of eliciting a really practical method; I refer to the circumstances that upon matt paper chloride of silver may be produced with a slight excess of common salt, and in this state preserved for a long time in a perfectly dark place. When required for use in rapid printing, its surface may be "extra-sensitised" by floating upon a highly dilute solution of chloride of gold, and hanging up to dry. *The paper gives from the first very agreeable tints, which remain almost intact whilst in the fixing bath, so that no supplementary toning process seems to be required.*" The italics are mine.

This is such a clear statement of a self-toning paper that to Mr. Spiller must be ascribed the discovery of the same. In a leading article[19] attention is called to a process, described as "Hennah's," in which gold chloride was used with ammonium chloride as a salting agent, the prints being subsequently hot-ironed. This presumably refers to T. H. Hennah, who was the author of some works on the collodion process (see R. P. S. Library catalogue, 1907, 33), but I have been unable to trace this particular method to him in any English journal, through presumably he was an Englishman.

Gold chloride was also used in the Wothlytype process,[20] and presumably to alter the tone of the resultant prints, but this can hardly be called a self-toning paper.

E. J. Wall.

Photo-Mechanical Notes.

Tint Negatives and Positives.

Photo-engravers and lithographers are frequently asked to add a tint or tints to reproductions, but every firm cannot afford to rent or buy a tint-laying apparatus. The process worker, however, has at hand all the appliances for making tint plates; the only addition he will have to make are some special shaped stops, which can be cut out of cardboard. The openings of these stops are shown in figs. 1 to 6.

The negatives are printed on metal, and etched in the usual way, or, in the case of the lithographer, printed on litho metal, from which transfers can be taken. The light required is that reflected from white blotting-paper illuminated by the ordinary arc lamps, the glasses of which should be quite clean and the reflectors freshly whitened, so as to ensure even illumination of the reflecting surface. These tint negatives and positives are made as follows:—Focus the camera for copying same size, and then move back to about the position for copying half size, without altering the camera extension. Place the half-tone screen in the holder, the ruling selected depending upon the fineness or coarseness of the tint required. The following table will give the approximate screen distance and exposure for light reflected from a pair of 10-amp. enclosed arc lamps:—

Screen ruling.	Distance.	Exposure. Wet plate.	Process dry plate.
	mm.	min.	sec.
60	13	3	60
80	10	3	60
100	8	2½	50
120	6.5	2	45
150	5.5	2	40

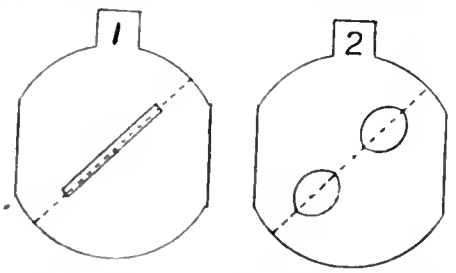
18. "B.J.," 1906, 53, 323.
19. Fr. Pat., 65,851, 1864; abst. "B.J.," 1865, 12, 97; "Phot. News," 1866, 10, 362; Eng. Pat., 2,347, 1864; U.S. Pat. 49,488, 1865; "Chem. Tech. Rep.," 1864, 3, II., 392. The use of gold chloride is not mentioned in the English patent.

Develop the dry plates in the usual hydroquinone-caustic for 1½ min., or if the temperature is below 62 deg. Fah., for 2 min. Stops 2 and 5 may require a shorter exposure than the others. The dotted lines shown in the illustrations represent the position of the screen-ruling in relation to the stop opening to obtain the effects described.

Stop 1 will give a straight-line tint when correctly exposed; if fully exposed, a thick line will be the result, which, when printed on the metal, yields a thin line. By making a positive from the negative and using for printing on the metal, a thick line is the result. Under-exposure is shown by the line being broken and lacking in density.

Stop 2.—A serrated line will be the result from using this stop. The print from the negative gives concave serrations; that from the positive gives convex.

Stop 3 will give a wavy-line tint, the thickness of which is

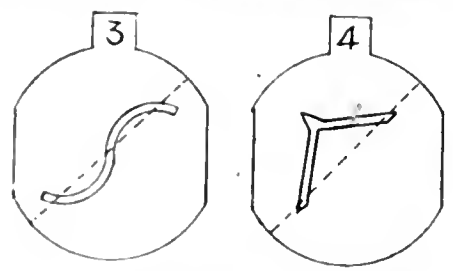


governed by the exposure. If under-exposed, the line will appear broken at the bend.

Stop 4 will reproduce a wavy effect one side and slightly so the other. Full exposure shows a fine joining up; thus the negative and positive will give different tints.

Stop 5 will give a copy of the screen, the print from the negative being a square dot, and from a positive, a screen tint.

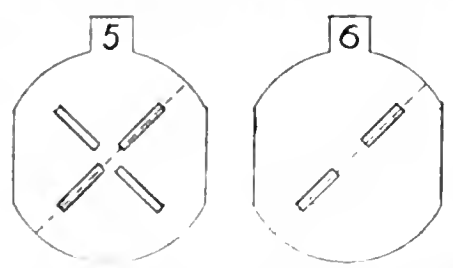
Stop 6.—A broken-line tint is the result of using this stop. A



small round dot tint can be made by racking the screen close to the sensitive plate, and then exposing through a small round stop (f/45 64). The negative will print a thick cross-line, having a small round opening; the positive, a small round dot.

By using a Metzograph screen a grained tint is secured; the screen must be brought up close to the plate, and a small round diaphragm used (f/64 or 90).

There are numerous other purposes for which these stops will prove useful—for instance, to emphasise a distinctive feature in a line advertisement. Make the usual line negative, after which



close and remove the dark-slide. Place the half-tone screen in the carrier, and replace the slide. Pin a sheet of white blotting-paper over the original, and expose through one of the stops already described, or through the Metzograph screen. The resulting line-negative will be broken up into tint, which is printed on the metal in the usual way. The portion or object to be thrown out in relief is then painted in solid with the usual etching ink,

or this can be done by a method of double printing, and then etched. The result is very striking.

Some effective and original half-tone reproductions can be made by using one of these stops for the shadows exposure. For the highlight exposure a stop must be cut of a similar shape, but having an opening double the width. An operator with an eye for originality and novelty, and who has time to experiment in this direction, will be surprised by the results obtained, and be amply rewarded for his trouble.

HALF-TONE SCREENS.—According to a patent specification, No. 156,713, open to inspection but not yet accepted, of Herbst and Illig, a half-tone screen is made by forming depressions in one of the surfaces of a plate and filling the depressions with an opaque material leaving a net of transparent lines crossing each other at uniform angles and flush with the opaque fields. Three methods of making the recesses are described by photographically or mechanically producing lines on a plate which will resist an etching solution, etching the recesses, filling them up with opaque material and finally clearing the surface of the plate.

NEGATIVES FOR OFFSET.—A recent patent specification, No. 156,692, filed by the Ullmann Gesellschaft of Zwickau, Germany, but not yet accepted, describes a process for obtaining negatives or transparencies which can be used either for offset printing methods or for making ordinary litho or rotary zinc printing surfaces A bichromated colloid negative is made on a surface from which it can be stripped and before stripping is coated with a gelatine solution forming an upper film. To produce the bichromated films two glass plates are secured together and coated at the edges with a rubber film margin or border. The combined plates are dipped in a solution of wax in carbon tetrachloride to obtain a thin wax film, and after drying into a 3 per cent. collodion bath containing a few drops of castor oil. The plates are separated, coated very thinly with bichromated colloid, and after exposure and drying the additional gelatine applied. The negatives may be retouched before stripping

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FORTHCOMING EXHIBITIONS.

April 13 to 23.—Portsmouth Camera Club. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Professional Photographers' Association, at the Photographic Fair, Horticultural Hall, Westminster, S.W. Hon. Secretaries (Correspondence), Marcus Adams, 43, Dover Street, Piccadilly, London, W.1; (Exhibits), R. N. Speaight, 157, New Bond Street, London, W.1.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith. Hampshire House, Photographic Society. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Latest date for entries, April 16. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

April 28 to 30.—Nottingham and Notts. Photographic Society. Latest date for entries, April 13. Particulars from the Hon. Secretary, A. Beeston, 103, Nottingham Road, Nottingham

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THE ENSIGN HANDBOOK.—The little catalogue of 320 pages just issued by Messrs. Houghtons, Ltd., is really more than a price list of photographic requisites, for it includes ten chapters, occupying nearly 100 pages, written by Messrs. W. L. F. Wastell and Percy G. R. Wright, which provide an excellent and very readable introduction to the practice of amateur photography. Moreover, these text pages contain a glossary of photographic terms, the very simple explanations of which will stand many a beginner in good stead in the process of first making himself acquainted with the technicalities of photographic apparatus. The "Handbook" is supplied at the price of 6d., post free 9d.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, March 21 to 24:—

LENS.—No. 9,178. Projection lens. W. A. Dorey.

DAYLIGHT DEVELOPMENT.—No. 9,149. Daylight development of roll films. H. G. Chaney.

PHOTOGRAPHIC PROCESSES.—No. 8,969. Photographic processes. A. Hamburger.

COLOUR PROCESS.—No. 8,695. Process for producing opaque photographs in natural colours. M. Obergassner.

CINEMATOGRAPHY.—No. 9,167. Cinematograph, etc., apparatus. E. Coulon.

CINEMATOGRAPHY.—No. 8,813. Cinematograph film. A. E. Evans.

CINEMATOGRAPHY.—No. 8,814. Cinematograph projector. A. E. Evans.

CINEMATOGRAPHY.—No. 9,001. Production of cinematograph film pictures. S. Hyman and J. McKim.

CINEMATOGRAPHY.—No. 9,166. Motion-picture photography. T. C. Martin and W. H. Merrill.

CINEMATOGRAPHY.—No. 9,206. Cinematographic apparatus. H. S. Mills.

STEREOSCOPIC CINEMATOGRAPHY.—No. 9,161. Means for obtaining stereoscopic cinematograph pictures. E. H. Wright.

PHOTO-ELECTRIC PROCESS.—No. 8,943. Process for manufacture of photo-electric cells. T. W. Case.

PHOTO-ELECTRIC CELLS.—No. 8,944 Photo-electric cells. T. W. Case.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

FOLDING REFLEX CAMERAS.—No. 158,601. (September 26, 1919).—The reflex camera is provided with a sliding front which carries a focussing lens tube and is adapted to slide on to and off a hinged tail-board out of and into the camera casing, the sliding front being held rigid in the extended position by the tail-board and by a hinged focussing screen, in conjunction with the usual trellis connection, the sliding front being connected to the camera casing by flexible material surmounted by a flexible hood. The arrangement is such that when the camera is collapsed, the focussing screen and usual hinged mirror are folded behind, and the hood is folded in front of the sliding front, the hood having plates which with the hinged tail-board close the camera casing.

In order to facilitate rapid collapse of the camera the sliding front has a catch for engaging with the focussing screen when the camera is extended and the screen is in the usual horizontal position, the catch being released by a finger piece on the front of the sliding front so as to allow the focussing screen to fall.

A comparatively shallow main body 1 receives a sensitive plate or film, and carries the shutter and its mechanism. It is connected by flexible material 2 to a sliding front 3, so forming the dark chamber 4. The dark chamber 4 opens at the top into a focussing hood 5, which is preferably formed in one with the material 2 of the dark chamber. The side walls 6 and 7 and base 8 of the main body 1 are extended, and a tail-board 9 is hinged at 10 to the extended base 8, to permit inward and outward sliding movement of the sliding front 3, which movement is guided by guides 11 on the tail-board 9. The extended side walls 6, 7, of the main body 1 serve to house the sliding front 3 in the extreme inward position, that is to say, when the camera is folded or collapsed, as shown in fig. 3.

The guides 11 on the tail-board are formed at their inward ends into sector-shaped plates 12, having inturned edges 13.

These edges 13 are adapted to engage with the inturned edges 14 and 15 of the sides 6 and 7 of the main body 1, thus preventing the dropping of the tail-board 9 below a horizontal position.

A frame 17 carrying a mirror 18, and a frame 19 carrying a focussing screen 20, are mounted on spindles 21 and 22, carried

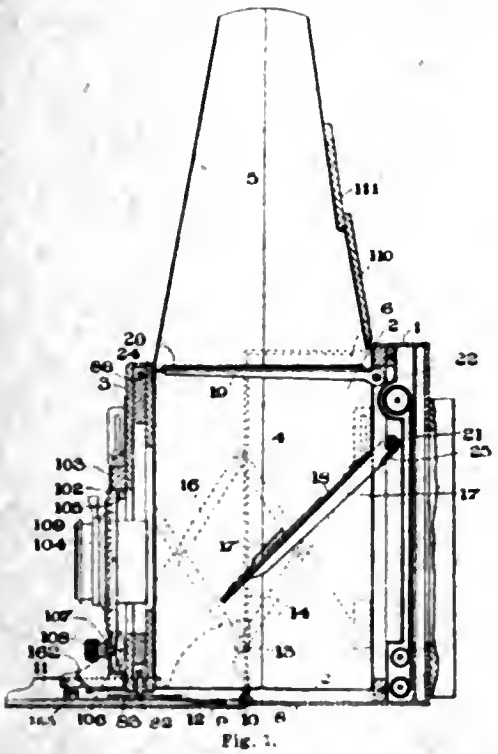


Fig. 1.

in the main camera body 1. The spindle 21 has a knob 90 outside the camera casing. The pivoting axis of the mirror frame is behind and below that of the frame carrying the focussing screen, so that when the mirror and screen are not required for

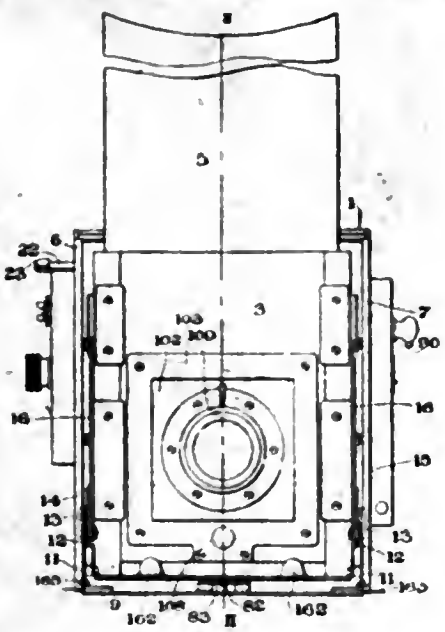


Fig 2.

use, that is in the folded position of the camera, the two frames depend vertically from their pivoting spindles, so that the screen lies over the mirror, as illustrated in fig. 3. Light plate springs 17¹ are provided on the mirror frame 17 to prevent the screen frame 19 damaging the mirror 18 when the camera is being collapsed. Alternatively, these springs may be fitted in the ground glass screen frame 19, and stop pins may be provided on the frame to hold the screen a definite distance from the mirror after the springs have cushioned the blow and have yielded.

When the camera is opened, the frame 19, carrying the screen 20, is moved about its axis by any suitable means, such as an external winged nut 23 secured to the pivoting axle 22, so that it extends over the opening between the dark chamber 4 and focussing hood 5, as shown in fig. 2, and is automatically retained in this position by a suitable catch 24 carried by the sliding front 3. The screen thus forms a tie between the main body 1 of the camera and the front or sliding plate 3, in this way ensuring rigidity of the camera in the extended position.

When the front plate 3 of the camera is brought forward into the extended position, a pin 82, projecting from its under side, comes into engagement with a slot in the spring catch 83, secured to the hinged tail-board 9 as shown in figs. 1 and 2. This engagement of the sliding front with the tail-board assists the focussing screen in holding the front rigid. The pin 82, as shown in fig. 4, is connected to the catch 24 through the medium of the pivoted lever 84, rod 85, and second pivoted lever 86. The rod 85, at the end in contact with the lever 86, is sloped or bevelled as shown in fig. 5, so that when the pin 82 is pulled down by pressure on the spring catch 83, and the rod rises, the bevelled end acts on the end of the lever 86, oscillating it so as to bring the catch 24 within the sliding front 3, thus releasing the frame 19 carrying the focussing screen 20.

When the focussing screen 20 is moved into the horizontal

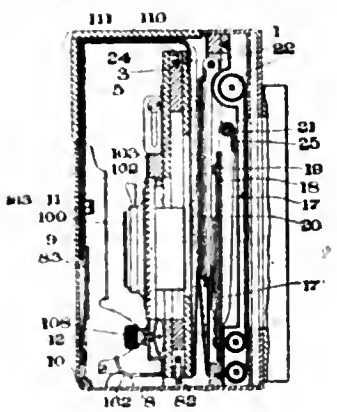


Fig. 3.

position as described, the mirror frame 17, carrying the mirror 18, is moved automatically about its pivotal axis by means of a spring 25 in the same direction as that of the focussing screen, until it reaches a position at which it is at an angle of 45 deg. to the horizontal axis of the lens, whereupon further movement is prevented by suitable means.

The lens plate 102, carrying a lens 109 of known type, is slidably carried by the sliding front 3.

The lens plate 102 is supported by a frame 103, so as to be capable of slight pivotal movement as indicated in fig. 2. The plate 102 is adapted to be moved about its pivotal axis 104, against the action of a spring 105, by means of a cam 106, adapted to bear on the rear of the plate 102 at or near to its base. The cam 106 consists of a disc fixed at an angle on a rotatable rod 107, arranged longitudinally of the camera and provided with a milled head 108 to facilitate operation.

Assuming that the camera be in its folded condition, as shown in fig. 3, and that it is desired to use the camera, it is first extended by pressing in and releasing the catches 163, folding down the tail-board 9, raising the hood 5, and drawing forward the front plate 3 by finger pieces or draw lugs 162 until the catch 82 engages within the spring catch 83. The wing nut 23 is then rotated to bring the focussing screen 20 horizontal. The parts including the mirror 18 then assume the positions indicated in fig. 2, the mirror being held at an angle of 45 deg. by a movable stop. The operator can then focus a view in the screen 20, having previously set and wound the shutter. He

can then make an exposure by releasing the mirror, which rises under the action of the spring 25, the mirror previously to the exposure assuming a horizontal position and effecting a light-tight closure beneath the focussing screen, as well as automatically releasing the roller-blind shutter.

In closing or collapsing the camera the catch 24, retaining the focussing screen 20 in the horizontal position, is released by pressure on the spring finger piece 83 on the tail-board 9. The focussing screen 20 then falls and carries with it the mirror 18 and frame 17 to the vertical position, as shown in fig. 3. The hood 5 is folded down over the lens and is covered in such

Fig. 6.

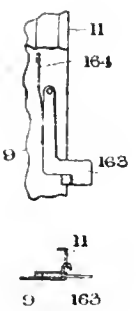


Fig. 7

Fig. 5.

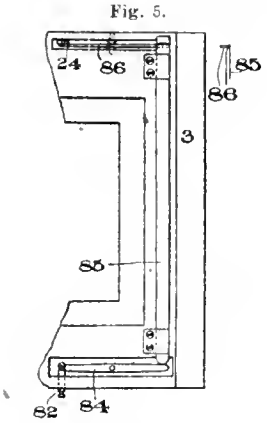


Fig. 4.

position by suitable closing or reinforcing plates 110, 111, so that in the collapsed position one plate, 110, extends along the top of the camera body 1 to the turned-over edge of the hood 5, while the other plate, 111, folds over this edge, a complete closure being effected by moving the tail-board 9 into the vertical position so that its front edge meets the free edge of the plate 111, and the catches 162 engage with the inturned edges of the casing 6.—Percy George Mason and Newman and Guardia, Ltd., both of 17-18, Rathbone Place, London, W.1.

The following complete specifications are open to public inspection before acceptance:—

Dye Process.—No. 160,137. Process for treating and dyeing photographic images and products obtained thereby. W. van D. Kelley.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Universum.—No. 382,665. Sensitised films for photography. Universum-Film Aktiengesellschaft, Unter den Linden, 56, Berlin, Germany, manufacturers. March 25, 1918

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Ossal.—No. 374,868. Irridiating or lighting-up screens for Röntgen-ray work, being for surgical or curative purposes. Chemische Fabrik von Heyden Aktiengesellschaft, 57, Leipziger-strasse, Dresden, Saxony.

Correction.—In the note "Soda Carbonate and the Watkins Factor," in our issue of March 25, there are two literal errors which may lead to undesirable confusion unless corrected. In column 1, p. 168, 7th line from the bottom, the word *with* should begin a new sentence. In column 2, p. 168, in the table of factors, No. (2) should be 6.5 and not 65.

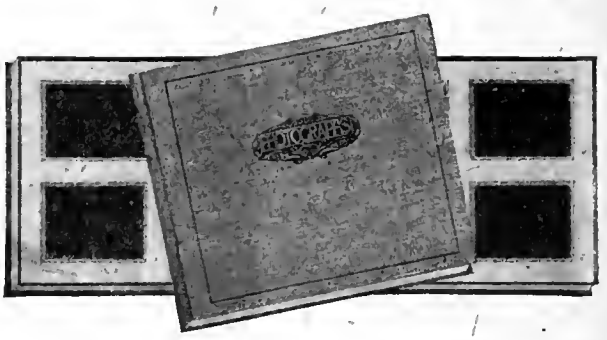
New Materials.

Extra Hard Bromide Paper. Made by Criterion, Ltd., Stechford, Birmingham.

Both for contact printing and enlarging a very considerable demand has sprung up of late years for a development paper which yields results of satisfactory contrast from negatives of poor quality in this respect. This demand no doubt chiefly arises in connection with the printing and enlarging of amateurs' film negatives, in dealing with which the printer must take things as he finds them, and very often has to work from very poor material. While gaslight papers may be readily used for such negatives by increasing the power of the light in the printing box, it is not so commercial an expedient to employ them for the making of enlargements. Therefore, "photo-finishers," and no doubt many others, will welcome this variety of bromide paper yielding the contrast of a gaslight paper, and at the same time permitting of the use of illuminants in the enlarging lantern such as are ordinarily employed for use with bromide paper. The Criterion "Extra Hard" is a bromide paper, we find, which marks the makers' long experience in the manufacture of such material. It works exceedingly cleanly, giving prints of good colour and entire freedom from stain, and, like other Criterion development papers, is specially manufactured for freedom from stress markings. It is made in a whole range of surfaces—glossy, platino-matt, silky (semi-matt), rough matt, canvas and cream crayon, and is obtainable also of postcard thickness.

Albums for Photographs. Made by Bartons (Birmingham), Ltd., Cosway Works, Finch Road, Handsworth, Birmingham.

For artistic excellence the productions of Messrs. Bartons in mounts and albums are second to none. Some specimens of their latest styles in albums of various descriptions, which they send to us, form still another confirmation of the high opinion we have of their goods. A most artistic 28-page list describes and illustrates the many styles. These latter include slip-in, paste-on and loose-leaf albums, made up in every case from mounting papers and boards of extremely pleasing neutral colours and agreeable textures, and enclosed within covers of choice design. The "Astor" is one of the slip-in albums which we illustrate. It is bound in art cloth, stiff boards, with a title and border printed in a colour to match the cloth. It is made in brown and grey, for either 48 or 96 prints, in the one case with two spaces per page; in the other with four on a page. This album is issued in six sizes, for prints from vest-pocket to post-card size, at prices which range from 4s. 9d. to 14s. each. Another style of slip-in album is the "Happy Recollections,"



in which covering leaves with cut-out openings allow of the insertion of prints of various sizes from No. 1 F.P.K. to post-card. Prices from 7s. to 12s. 6d.

The paste-on albums include some very choice examples, most of which are of the loose-leaf pattern, the flexible mounting sheets being held within the covers by a stout silk cord. The "Portman" is an album of this kind, containing 24 leaves, made in five sizes, from 6½ × 5 to 16 × 12 inches, at prices from 4s. 6d. to 20s. each. There are also some cheaper patterns, and a series of very stylish albums of the same loose-leaf pattern, in which the leaves are of black linen-texture flexible board. These are the "Cemiri," "Negro," and "Nocturne." Among the albums in which the mounts are fixed we should refer to the "Reynolds," of 24 linen-grained flexible leaves, with covers of grained calf leather with padded sides. This and others of a similar description make

ideal albums for the reception of prints on a photographer's reception table, or for holding collections of prints brought together for a customer.

BARNET PROCESS AND SUPER-SPEED ORTHO PLATES.—Messrs. Elliott & Sons, Barnet, Herts., have recently added to their series of plates one for line and half-tone negative-making, which we are satisfied will meet with favour from photo-engravers. The plate is of greater speed—about 75 H and D—than the average photo-mechanical plate, yet is of extremely fine grain and density-giving power. Its very sharp rendering of fine lines with the usual hydroquinone-caustic developer convinces us of its ability to yield screen negatives of the fine definition in the dots required by the photo-engraver. The Barnet Super-Speed Ortho plate has been lately improved in speed, with the result of further emphasising its qualities as an ultra-rapid colour-sensitive emulsion plate of the type which has steadily grown in popularity of late for studio portraiture.

MATCHLESS PAPER.—A departure from the existing emulsion methods of coating has been made in the introduction of this paper, which, in the absence of a gelatine or collodion coating, is akin to the plain papers in vogue many years ago.

The new paper, which is supplied by the Imperial Dry-Plate Co., is, of course, of the print-out class, although more sensitive than ordinary P.O.P. It yields a series of excellent warm tones simply by fixing in a hypo. bath, or may be toned with gold, either in a separate or combined bath, for tones ranging from warm sepia to purple. The range of tones is, in fact, very much greater than it is possible to get on any emulsion P.O.P. of the ordinary or self-toning kind. This fact, added to the retention of the natural surface and texture of the paper by the use of a sensitising solution as distinguished from an emulsion coating, renders the paper an altogether distinctive material, and one which will appeal particularly to the pictorial portrait or landscape photographer.

The manipulation of the paper is exceedingly simple. It differs from that of ordinary P.O.P. only in requiring a negative of somewhat strong contrast and a fairly considerable degree of over-printing. For warm tones, the prints are first washed in several changes of water and then fixed in a bath containing 4 ozs. of hypo. to 16 ozs. of water. A bath of about half this strength yields prints of a reddish-brown tone. For gold toning, the ordinary sulphocyanide bath may be used, or the bicarbonate bath familiar to those who used the once-popular albumenised paper. The combined toning and fixing bath is also suitable. By any of these gold-toning methods it is easy to secure exceedingly fine tones with a very small expenditure of gold.

The absence of an emulsion coating likewise makes itself evident in the readiness with which the prints can be blotted off and left to dry between blotters or dried by artificial heat. The paper is made in four grades, that is to say, white and buff, in each case of single and double weight. It is issued in all the regular English and centimetre sizes, and in sheets of 24½ × 17 inches, or 50 × 60 cm. In the cut sizes the price may be judged on the basis of 19 quarter-plate pieces in a packet priced at 1s. 3d. Twelve of the large sheets cost 22s. English size, and 25s centimetre size. These prices are for the single weight paper; double weight, 20 per cent. extra.

Commercial & Legal Intelligence.

NEW COMPANIES.

POMPEY, LTD.—This private company was registered on March 21 with a capital of £100 in 1,000 ordinary shares of 1s. each and 50 preference shares of £1 each. Object: To carry on the business of photographic dealers and picture framers, etc. The permanent directors are: C. H. Sheffield, The Cottage, Langston, near Havant (director Sheffield's Studios, Ltd. and Portsmouth Photo Co. Ltd.); Mrs. Minnie Sheffield, The Cottage, Langston, near Havant (director Portsmouth Photo Co., Ltd.)

New Apparatus.

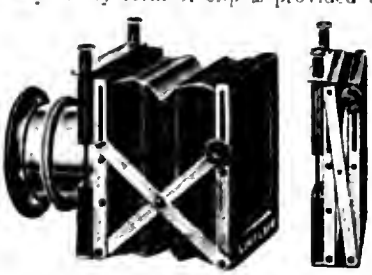
The Goodrick Electric Dry-Mounting Fixing Iron. Made by J. Goodrick and Sons, 52, Hare Street, Halifax.

SINCE the introduction, a few months ago, of a gas-heated fixing iron for dry-mounting, the very practical usefulness of the appliance has been shown by the requests made to the maker for a similar article, but utilising electric current as the source of heat. Mr. Goodrick has therefore now introduced a fixing iron which is even more handy in use than the earlier gas model. It is a hand-piece of 11 inches length, exceedingly well made in brass, and provided with an insulating wooden handle. The electrical heater is brought into operation simply by inserting the plug attached to the cable

into an ordinary lamp holder, and the fixing irons are made so that at any voltage from 100 to 250 the metal head which is applied to the tissue is kept at a temperature from 180 deg. F. to about 210 deg. F. This temperature is reached within about five minutes, after which the iron automatically keeps at the required heat without attention. The consumption of current is very small, about 1-16th of a unit per hour, and certainly the professional dry-mounter could wish for no cleaner or more convenient method of rapidly affixing the tissues to the prints. The fixing iron is supplied complete with a stand at the price of 25s., and may be obtained also from the distributing agents, Messrs. John J. Griffin and Sons, Kingsway, London, W.C.2. The voltage on which it is to be used should be stated when ordering.

Lens Hoods and Screen-Holders. Made by James A. Sinclair and Co., Ltd., 43, Haymarket, London, S.W.1.

IN their latest model of lens hood, that most indispensable accessory for outdoor photography, Messrs. Sinclair have made two improvements which greatly add to the usefulness of the appliance. The hood is fitted to the lens by means of a pair of adjustable grips controlled by the two milled heads shown to the left of the drawing. This allows of one hood being employed with lenses of various sizes. Also, a very handy form of clip is provided within the hood

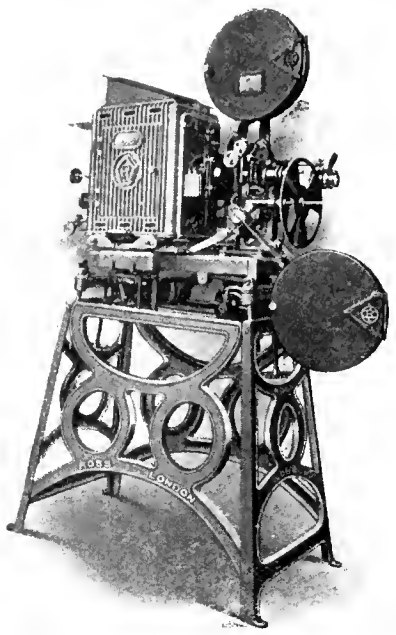


for holding a circular light filter in position. A light-filter can thus again serve several lenses. A pair of crossed struts, shown in the drawing, allows of the hood being adjusted to the most efficient extension, according to the angle of view of the lens. The hoods are supplied in three sizes for lenses from 1 to 1½ inches diameter, 1½ to 2 inches, and 2 to 2½ inches, at the respective prices of 25s., 30s., and 35s. K1, K2, or K3 screen to fit costs 5s. 9d., 7s. 6d., or 9s. 6d.

The Ross Cinematograph Projector. Made by Ross, Ltd., 3, North Side, Clapham Common, London, S.W.4.

LENS-MAKING being more than half precision mechanical work, it is not surprising that Messrs. Ross should turn to the manufacture of a cinematograph projector as a fitting sphere for the application of their many years' experience in the production of optical instruments of the highest class for the Admiralty and other services. In doing so, they have created a machine worthy of their name, which is saying a good deal, and embodying important and valuable improvements in mechanism for the showing of cinema films. Several columns of this journal might be filled in an adequate description of the features, chiefly mechanical, which are the outcome of the expert engineering knowledge applied to the design of the projector. It must suffice to say that this has been directed

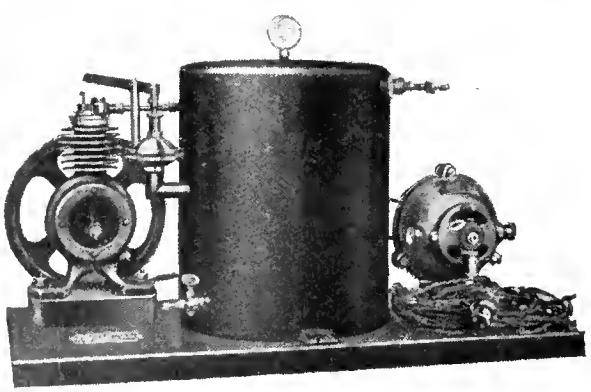
to obtaining (1) a better result—that is to say, greater steadiness, absence of flicker, reduced current consumption, and elimination of fire risks; and (2) the means of making good within a few minutes



any accidental derangement of mechanism which, under current cinema conditions, is subjected to incessant hard wear. The first of these aims has been realised in the highest degree by the choice of special types of gear, hardened metals, and most accurate machine surfacing, regardless of cost. The optical system, condenser and objective, has been computed for the single purpose of perfect projection, and to this end also the cover and flicker blades of the shutter consist of a coloured gelatine film, which eliminates intervals of total darkness in the projection cycle, thus reducing one physiological cause of flicker, and at the same time increasing the brightness of the projected image. The safeguard against breakdown is provided by interchangeability of parts of the mechanism exposed to the severest wear. Each of these latter is a complete unit, which can be taken out whole and replaced by a spare in a minute or two, for any readjustment of the removed part. The whole machine has been made as good as money and optical and mechanical skill can make it, and the remarkably perfect steadiness and regularity of the projections testify to the success which has attended its design. The price is £150.

Aerograph Studio Air Compressor. Made by the Aerograph Co., Ltd., 43, Holborn Viaduct, London, E.C.1.

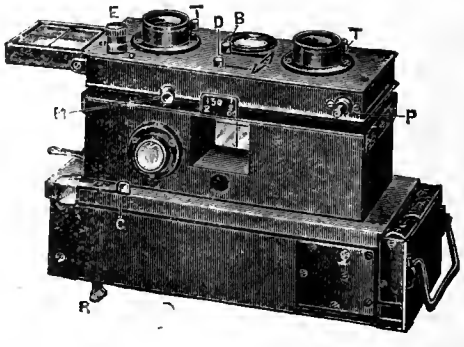
In this new piece of apparatus the makers have designed an air compressor specially for the use of an Aerograph hand-piece of their A pattern. The air compression is obtained from a small pump



operated by an electric motor of one-tenth horse-power, which can be run from an ordinary electric lamp fitting, and is extremely silent in working. The consumption of current is less than that of a 16 c.p. lamp, and the compressor is fitted with an automatic valve-release, which eliminates excessive consumption of electric current, and, at the same time, maintains uniform pressure of any required degree up to 40 lbs. per square inch. The whole apparatus is exceedingly compact, measuring 24 by 12 by 16 inches, and weighs only 50 lbs. It is a most excellent accessory for the regular use of the air-brush.

The Ontoscope All-Metal Stereoscopic Camera. Sold by the London Camera Exchange, 2, Poultry, Cheapside, London, E.C.2.

This is a French camera for the 45 × 107 mm. plates which have achieved such popularity of late years. In taking it up as a specialty of theirs, Messrs. Robbins, Manistre & Co. (The London Camera Exchange) draw special attention to several distinctive features of it. One of these is its rising front of 1 cm. movement, often a valuable aid in dealing with architectural subjects. Another is the lever focussing movement providing for the focussing of objects up to 3 ft. from the camera. A third feature is the shutter, which is provided with a range of speeds from 1 sec up to a marked 1-250th, which is found by tests to be a real 1-200th, quite fast enough for all ordinary work. Another feature is that the magazine, holding 12 plates, is fitted with a curtain metal shutter worked from behind and undetachable so that there is no loose sheath which may be mislaid. In other respects the camera is well equipped, *e.g.*, with a sunk finder and a direct-vision finder and spirit level, and is of fine mechanical workmanship. Fitted with a pair of *f*/4.5 "Stellor" anastigmats the price is £41; with two *f*/4.5 Krauss "Tessars," £45. The camera is also made in a model without the rising front and the focussing adjustment, the



respective prices being £37 and £43. It is also supplied with *f*/6.3 "Saphyr" lenses, price £30 15s., without rising front or focussing movement. These prices include leather sling case.

The Kershaw Soft-Focus Lens. Sold by Marion and Co.' Soho Square, London, W.

This is a quite new British objective for portrait photographers, and one which we think will speedily find favour among those able to see the business value of the soft-focus portrait. At its full aperture of *f*/5.6 it gives a most pleasing and distinctive kind of diffused definition, somewhat greater in degree than that given by, say, a Petzval adjusted for soft focus, but nevertheless agreeable in its softening of outlines and general modelling. As the lens is stopped down the definition is sharpened so that the degree of soft-focus is very readily controlled. At the expense of speed, certainly; but with plates of present-day sensitiveness, the portrait photographer can work with apertures such as *f*/8 and *f*/11, which a few years ago he would have considered impracticable. Apparently the softness of focus is obtained by a mixture of spherical and chromatic aberration, as was the case with the "anachromats," with which Captain Puyn years ago produced the delightful results which first drew attention to the merits of the soft-focus lens in portraiture. The work of the Kershaw lens is of the same kind, and those who remember the French portraits will accept the comparison as a very real commendation. It follows that the lens has a chemical focus, but we find that very little allowance requires to be made for it; if focus is taken on the part of the subject nearer to the lens, the distinctive quality is obtained in the planes situated immediately behind. The "single" construction of the lens is no doubt one reason for the brilliance of the soft image produced by it. The lens with which these trials have been made had a focal length of 12½ inches, and is supplied at the price of £9 9s.

Cinematograph Studio Spot-light Arc Lamps.— The Westminster Engineering Co., Victoria Road, Willesden Junction, London, N.W.10, whose enclosed arc lamps have been the stand-by of hosts of portrait photographers for many years past, have recently added to their series of these lamps for cinematograph studio use a model specially designed and mounted for spot-light effects. The lamp is of the long burning, semi-enclosed type, giving a soft actinic light. It is supplied in a lantern fitted with a 6-inch condenser, and may be obtained on one or other of two stands, one a lofty ladder erection, accommodating both the operator and the lamp at heights ranging from 9 to 15 ft., and the other of telescope tube pattern, extending to 8 ft. in height. Comparative tests have shown the very great efficiency of the enclosed and semi-enclosed arc lamps in the making of cinematograph negatives. Those interested should obtain from the Westminster Engineering Company a report by Mr. H. M. Lomas of tests carried out by him.

Half-Watt Fittings.—The General Electric Co., 67, Queen Victoria Street, London, E.C.4. have recently introduced two new studio fittings for the high-power half-watt lamp. These are counterbalanced holders for the lamp (within an angled reflector), adapted in one case for attachment to the ceiling or beam of a studio, and in the other, which is a movable standard, for use anywhere in the studio. The former model consists of a pendant, which allows of the lamp being raised or lowered, and also of the reflector being rotated on a vertical axis, so that the light is fully under control. If required, a small brass cradle can be fitted so that the whole pendant may be moved on a rail erected across the studio. In the standard pattern, the lamp and reflector are attached to a balanced arm, and can be raised or lowered at a touch between the limits of 3 ft. and 8 ft. from the floor. The arm itself also revolves on the head of the standard, and thus provides a wide range of movement without shifting the standard as a whole. The two fittings are evidently designed with expert knowledge of the practical employment of half-watt lamps in the studio.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, April 11.

Bowes Park and Dis. Phot. Soc. "Improving the Print." W. Bullock.
Cripplegate Photographic Society. "The Choice of a Hand Camera." N. F. Horne.
Leith Amateur Photographic Association. Federation Portfolio.
South London Photographic Society. Platinotype Demonstration.
Willesden Photographic Society. Members' Exhibition.

Tuesday, April 12.

Royal Photographic Society. "Problems of Cinematography." H. M. Lomas, F.R.P.S. "A Shutterless Continuous-feed Cinematograph." R. J. Trump, B.A., B.Sc., A.Inst.P.
Exeter Camera Club. Auction Jumble Sale.
Walthamstow and District Phot. Soc. "Titling the Print." E. W. Brooks.

Wednesday, April 13.

Borough Polytechnic Phot. Soc. Outings Print Competition.
Croydon Camera Club. "The Mounting of Photographic Prints." V. Jobling.
Dennistoun Amateur Photographic Association. "Flashlight Photography." A. Dordan-Pyke.
Ilford Photographic Society. Affiliation Folio.
Photo-micrographic Soc. "The Structure of Lichens." R. Paulson.
Woodford Phot. Soc. "Versatility." R. H. Lawton.

Thursday, April 14.

Camera Club, The. "The Civilisation of Ancient Egypt." A. F. R. Platt.
Everton and District Photographic Society. "Amateur Photographer" Prize Slides.
Gateshead and District C.C. "Gum Bichromate." J. T. Carnaby.
Hammersmith (Hampshire House) Photographic Society. "A Chat on Ortho-chromatic Photography." A. J. Bull.
Hull Photographic Society. Annual General Meeting.
Kryn and Lahy (Letchworth) Phot., etc., Soc. "Pictorial Work in Great Cities."

Friday, April 15.

R.P.S. Pictorial Group. "The Trimming of the Picture." M. O. Dell.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, April 5, the president, Dr. G. H. Rodman, in the chair.

Mr. C. M. Thomas, M.A., delivered a lecture, "Chemical Methods in Photography: Weights and Measures; Solutions and the Sulphites." He addressed himself to the amateur whose work was on a small scale, who developed a quarter-plate every now and then. Therefore, in what he had to say on weighing chemicals and measuring solutions, he confined himself to small quantities. Mr. Thomas gave an interesting historical survey of the British measures of weight and volume, and pointed out how their very names denoted their origin in Eastern countries. He demonstrated the confusion which is caused by lbs. having different numbers of grams, and their corresponding sub-division into different ounces and drams. Perhaps the more one knows about the British weights and measures, the more easily one can be confused by them. At any rate, the formidable series of measures which Mr. Thomas exhibited in the form of a table provided a useful foil for the simplicity of the French so-called metric measures. He showed the very few simple measures of weight and volume which are necessary in making up formulæ in gms. and c.c.s.

From weighing and measuring, Mr. Thomas passed to developing formulæ, and explained the easy way in which stock solutions could be made up so that the same quantity of each was required in compounding, say, a three solution developer from the stock solutions. He then proceeded to demonstrate by an interesting series of experiments the properties of the commonly used chemicals, sulphite, bisulphite, metabisulphite, and hypo, and, in conclusion, showed a few examples of removal of pyro stain by means of the combined bleach of the silver image and decolouriser of stain, introduced some few years ago by the Ilford laboratories. Alternatively, he showed a negative of quite respectable density formed by the pyro stain alone after the silver image had been bleached out. Some discussion followed, in which Messrs. W. B. Ferguson, O. Bloch, K. Hickman, G. E. Brown, and Dr. Slater Price took part, and a very cordial vote of thanks was accorded to Mr. Thomas for a lecture the interest of which owed not a little to its many passages of dry humour.

CROYDON CAMERA CLUB.

Mr. S. W. Rose in delightfully humorous and interesting style narrated his experiences in the R.A.F., illustrating his discourse with lantern slides.

His first job towards winning the war consisted in washing down corridors. His next was connected with a riding school, presided over by a retired gentleman jockey—retired in both capacities. Considering that Mr. Rose previously had never been bestride even a donkey, the riding school came as a complete and surprising novelty, and from what he said even now an armchair, nicely furnished with cushions, is desirable when recalling this phase of the past. Retiring from the "on and off" business he turned cook, and acquired (so he said) a great reputation for his plum-duff, but lost his job owing to a mistaken idea that sergeants were only entitled to the same rations as their subordinates. It is understood he will give an informal demonstration on plum duff in the summer. The next rôle was that of carpenter, and a little gang had quite a pleasant holiday behind the lines, the sergeant in charge being amiability itself, as he had borrowed from all.

Finally, Mr. Rose drifted into the photographic section of the R.A.F., a description of which formed the main theme of the lecture. The various cameras used and their construction and manipulation were clearly described, also a number of very interesting aero-photographs were shown. The department had to account for all plates delivered to them, and on one occasion a batch developed to a uniform black fog. Inquiry eventually elucidated that the airman, finding the magazine jammed, had, with the best of intentions, removed the plates in broad daylight and re-inserted them. The laws of the Medes and Persians relating to

procedure were, he said, to a large extent abrogated; for instance, all the washing plates and prints received was three quick changes, the first bath soon being capable of being used as an emergency fixer. Nevertheless the prints in his possession had lasted well; they were dried by the well-known expedient of "flashing off."

Perhaps the most striking slides shown were those from panchromatic plates, with and without filters. The way in which a deep filter penetrated haze, which without it entirely obliterated the landscape below, was really wonderful. In reply to a question why 5 × 3⅞ came to be adopted as a standard size instead of 5 × 4, Mr. Rose said some thought this was done to prevent jamming in the magazine. Others held the view that the special size was selected to prevent the plates being utilised in privately-owned cameras. A most hearty vote of thanks was accorded him for a really excellent lecture.

On the preceding Monday the club's Easter outing was held. The weather report prophesied "bright intervals." These were struck at the "Hoskings Arms" at Oxted and the "Bull Inn" at Limpsfield, where some fine old ale was discovered by Mr. Harpur. Despite the wretched weather all enjoyed themselves immensely.

News and Notes.

PHOTOGRAPHERS IN GUILDFORD are making a move towards forming an amateur photographic Society. Those interested are asked to communicate with Mr. E. D. Brown, Trevelyan, Cranley Road, Guildford.

MR. PERCY J. SLATER, Sawtry, Peterborough, for many years a specialist in enlarging and postcard printing, sends us his latest price list for these and other forms of trade work. A postcard addressed to him will bring a copy of the list.

CAMERA REPAIRS.—Messrs. O. Sichel and Samuelson, of 52, Bunhill Row, London, E.C.1, advise us that they have opened a department for the repair of cameras and shutters, and also are in a position to supply plate-holders made to customers' orders.

A NEW WELLINGTON LIST contains descriptive particulars of the firm's many grades of plates and papers, and includes the reduced prices now ruling. Messrs. Wellington and Ward will be glad to send a copy of this booklet to anyone applying to them at Elstree, Herts.

THE OPTICAL SOCIETY.—At the meeting to be held at the Imperial College of Science and Technology, at 7.30 p.m., on Thursday, April 14, Mr. F. Twyman, of Messrs. Adam Hilger, is announced to read a paper on "An Interferometer for the Testing of Camera Lenses."

P.P.A. EXHIBITION.—The following is the list of the jury which have been nominated to judge the pictures for the P.P.A. Congress exhibition:—Pictorial section: Angus Basil, Bertram Park, and Richard N. Speaight. Technical section: Alexander Corbett and H. A. St. George. Owing to the many requests that have been received from country photographers, the judging committee of the P.P.A. Congress have decided to defer the date of entry until Monday, April 11, after which date no pictures can be accepted.

SHEFFIELD AND DISTRICT PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.—A meeting was held on Wednesday, March 23, at Miss Ethel M. Eadon's studio, when Mr. H. J. Leslie Cawood gave a short lecture on photographic cost accounts. Mr. Cawood pointed out the advantages of cost accounts when prepared on a proper basis, and the disadvantage of approximate costs. Photographs must be sold at such a price as will attract the public; the selling price was therefore limited, and any additional profits must be earned by reducing costs, *i.e.*, by obtaining additional business, which reduced the percentage of overhead costs. At the close of the lecture several questions were asked, which Mr. Cawood answered. A hearty vote of thanks was accorded Mr. Cawood for his kindness in giving a paper on this interesting and important subject.

Correspondence.

***Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

PROCESS PLATES—AND A PROCESS PAPER?

To the Editors.

Gentlemen,—With reference to the recent "Assistant's Note" on the use of process plates, I have found one make of process plate to be of very great service for yet another branch of work.

A few days ago I had to copy some water-colour paintings—marine subjects—done entirely in blue pigments; they had to be reproduced in blue carbon to give an exact facsimile of the originals. After failing, for some reason, to get the kind of negative wanted with panchromatic plates and screens, I tried—more as an experiment than anything else—a Barnet process plate (without a screen), and the result was a most agreeable surprise.

I was under the impression that any shade of blue would be rendered as white on a process plate, but the plate named rendered every shade of blue and gave a brilliant negative, with splendid, if slightly increased, contrasts. In other words, the gradation in the negatives was a little steeper than in the originals. In one painting a steamer at sea was pictured, the port-holes of the vessel being in the original only a slightly deeper blue than the hull; one, in fact, found a difficulty in distinguishing the port-holes. In the negative, however, the port-holes showed quite clearly. Details in the waves were also picked out in a really remarkable manner, and I was able to secure better carbon facsimiles than I had hoped. Full development of such plates to "process stage" was not, of course, possible, because by so doing the lightest of the blues—a sky with fleecy clouds—suffered. For copying flat originals (photographs) process plates are undoubtedly the thing, because of the increased contrasts one can so easily obtain.

Why not a process paper, say a paper coated with the process plate emulsion? It may be thought that gaslight paper would serve, but it will not. One cannot get sufficient opacity (when viewed by transmitted light), and one cannot "wangle" the development of gaslight paper so easily as one may dodge development of process plates. A process paper of bromide rather than gaslight quality is wanted, especially by architects and engineers who make plans. A suitable contrasty bromide paper would permit of the enlargement of plans and the use of them as paper negatives; the paper at present available, however, cannot be developed sufficiently opaque.—Yours faithfully,

COPYIST.

A NEW USE FOR COLOUR-SENSITIVE PLATES.

To the Editors.

Gentlemen,—An enterprising contributor to the illustrated magazines has, I believe, discovered a novel use for colour-sensitive plates and light-filters. But should I, by chance, be wrong in my idea, the pictures of his I have before me give me an idea, and I think it well worth attention.

Quite recently the decorated ceiling of a famous London church was cleaned, and the paintings upon it, which had been for generations covered with dirt, and unnoticed by many people, were made clear and bright, the renovators exposing to view a masterpiece of ceiling work by a famous painter of long ago.

The reproduced pictures in question form a pair, one showing the appearance of the ceiling—nearly black and images but faintly visible—before cleaning, and the other a view of the ceiling after cleaning, with the figures very clear and brilliant.

A very careful measurement of these two pictures of the paintings and their surroundings—windows, arches, etc.—and a careful study of the lighting of the same, lead me to believe that both pictures were taken "at one sitting," an ordinary and filterless

plate being used for one exposure and a panchromatic plate with a screen for the companion one.

The great similarity of the ceiling's surroundings struck me as being rather peculiar, and I wondered how the photographer could have managed, after an interval of some weeks occupied by cleaning, to again place his camera within practically a fraction of an inch of the same spot. Then I noticed the titles and particulars below each picture. The very honest editor—or was it the photographer?—did not say that the "dark" picture was taken before the ceiling was cleaned, but that the picture "represented the appearance of the ceiling before cleaning." This rather clever wording confirmed my suspicions, and suggested to me a new use for ex-our-sensitive plates—and "ordinaries" as well, namely, for the picturing of "before and after" effects.—Yours truly,

L. T. W.

HALATION AND DEVELOPMENT.

To the Editors.

Gentlemen,—I was very interested in reading the article in your recent issue relating to development and halation, particularly your statement that in all probability short development is more likely to minimise halation than long development.

Now, my experience is just the opposite, and I would even go so far as to say that prolonged development *with suitable developer* will not only minimise halation, but will do away with it completely.

In support of this statement I enclose for your inspection a P.O.P. print of a photograph which I took on March 26 last on an *unbacked* plate—exposure 6 minutes at *f*/11. Neither the negative nor the print have had any touching-up.

The time occupied in developing this plate was 27 minutes, about 22 minutes in developer and about 5 minutes in plain water, and I think you will admit that there is no trace of halation.

The whole secret is in the constitution of the developer, and the one used in the above case was:—

10 per cent. pyro solution	40 minims.
20 per cent. soda solution	30 minims.
Water up to	1 oz.

This was poured on to the plate, and at the end of 18 minutes the high-lights were just beginning to come through. At the end of 20 minutes the half-tones began to appear, and the plate was then taken out of the developer and placed in a dish of clear water for about 5 minutes; it was then replaced in the developer for one minute, rinsed and fixed.

At the moment this is the only print I have taken from the negative, or I would let you have a better one, but I am sending it, not as a specimen of high-class work, for its faults are many (the two spots at the base of the column are on this print only, and do not appear on the negative), but purely to show that halation can be got rid of by prolonged development provided the developer be rightly constituted, i.e., it should contain a large excess of pyro.—Yours faithfully,

C. H. Mayes.

Arabin Road, Brockley, S.E.

NON-HALATION PLATES.

To the Editors.

Gentlemen,—Referring to the correspondence in the "British Journal" on halation, I beg to inform you that MM. R. Guilleminot, Boespflug et Cie, Paris, have just put on the market a new non-halation plate, which simply consists of a coloured film between the glass and the emulsion. The film underlying the emulsion is formed of manganese peroxide suspended in gelatine. The brown colour of this coating disappears without any difficulty in the acid fixing bath, and has no bad effect on the emulsion like some double-coated plates may have, and for which sometimes special baths must be used.

With these new Radio-Lux Guilleminot, 400 H & D, the high lights and the deepest shadows alike are rendered perfectly.

As advertised, I will be pleased to send samples to any of your readers who are interested in this new production.—Yours faithfully,

Jules de Gottal.

17, Cecil Mansions, Marius Road, London, S.W.17.

STEREOSCOPIC RELIEF.

To the Editors.

Gentlemen,—With reference to Mr. F. C. Tilney's letter on stereoscopic relief, in Sir David Brewster's interesting book on the Stereoscope (1856), the question of the union of similar pictures is fully discussed, with particular reference to the illusion obtained when wall-paper is viewed with the eyes converging on a near point, and also a more distant point than the plane of the wall. After describing his various experiments, he says, "A friend to whom I had occasion to show the experiments, and who is short-sighted, mentioned to me that he had on two occasions been greatly perplexed by the vision of these suspended images. Having taken too much wine he saw the wall of a papered room suspended near him in the air."

Brewster further suggests this as "an accurate method of discovering defects in the workmanship of paper-hangers, carpet makers, painters, and all artists whose profession it is to combine a series of patterns to form an uniformly ornamented surface."

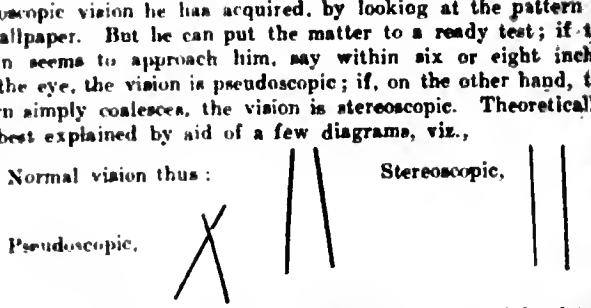
It is an easy matter to converge the eyes on some near point and so get different portions of the pattern overlapping, but then the eyes automatically accommodate for this near point, and the difficulty is to relax the accommodation sufficiently to focus the pattern while keeping the eyes converging on this near point. This may, however, be done with a little practice, when the illusion described by Mr. Tilney will be seen, and it is possible to place the hand apparently behind the transparent wallpaper. It would seem from these experiments that the sense of distance is very largely dependent on convergence, the object always appearing in the plane to which the two eyes converge. Thus with objects in various planes having their images in a stereoscopic slide separated by different amounts, varying amounts of convergence are required to combine the dissimilar images, and the sense of relief is therefore obtained. Although the plane of the whole pattern may be apparently changed, no difference of plane in the various parts will be seen unless there are dissimilarities of the images seen with the two eyes.—Yours faithfully,

W. H. A. Fincham.

Hillfield Avenue, Hornsey, N.8.

To the Editors.

Gentlemen,—I am interested in Mr. Tilney's letter on stereoscopic vision, but if I read his letter right, it is not stereoscopic, but pseudoscopic vision he has acquired, by looking at the pattern of the wallpaper. But he can put the matter to a ready test; if the pattern seems to approach him, say within six or eight inches from the eye, the vision is pseudoscopic; if, on the other hand, the pattern simply coalesces, the vision is stereoscopic. Theoretically, it is best explained by aid of a few diagrams, viz.,



That is, in pseudoscopic vision the right eye sees the left picture and the left eye the right one.

As I am concerned, I can exercise both. Stereoscopic, which I acquired about 30 years ago, when I did a lot of stereoscopic work, and it is very handy when mounting the slides, as it enables one at a glance to see whether the prints are mounted correctly, as it will happen sometimes, in spite of prints being marked L. and R. Thus they will get transposed, and if discovered at once can easily be pulled off and remounted in the right way. The faculty of seeing pseudoscopic I only acquired about ten years ago, and it came about in a peculiar way. I have some floorcloth of a diamond pattern, black and white, and when looking at this, and while I was smoking a pipe, I was looking at the pipe and the pattern simultaneously, and lo! the pattern came up to me within about eight inches of my eyes. I have repeated it hundreds of times, and it is so realistic that I can determine within half an inch where it appears to be, a sort of "fata Morgana," but it does not increase in size, remaining the same size as seen in the distance. Another way of doing this is to put, say, seven

identical photographs on the floor and by looking at them pseudoscopically the three in the centre will rise up to within six or eight inches of the eye.

This subject of seeing stereoscopically and pseudoscopically was fully thresned out in "Photography," and if Mr. Tilney will turn to the issue of April 13, 1909, he will find there, and in some preceding numbers, the subject fully dealt with by Chadwick, Dorman, Adnams and others.—Yours truly, E. FENSKE.

46, Osborne Road, Thornton Heath.
April 4, 1921.

P.S.—Anyone possessing the faculty of seeing pseudoscopically can also see an uncut stereoscopic negative or untransposed point stand out stereoscopically; at least, I can do so quite easily, and there does not seem the slightest strain on my eyes.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

E. M. F.—(1) We have never heard of it. (2) A fine abrasive of this kind is supplied as Frictol by the Vanguard Manufacturing Co., Maidenhead. (3) Hydroquinone as a developer was introduced by Abney, who thereby no doubt led to the origination of the other organic developers.

P. S. M.—There is no simple chemical rule for the equivalence of soda carbonate and caustic soda or potash in a developer. The relative quantities of these alkalies required to neutralise the same weight of alkali are not measures of the activity of the respective alkalies in this respect.

PELMONT.—Certainly it can be done, but at present there is no advantage in the process, because several times the normal exposure has to be given. Slow plates do not require such a proportionately great increase of exposure but then, of course, their initial lesser speed is just as great a handicap for your purpose.

C. E. T.—Intensification with mercury and ammonia will make the negatives worse than they are at present. The best intensifier for such ghosts of under-exposed negatives is uranium. Another plan is to bleach the negative with bichloride of mercury solution, back it up with black velvet, and copy it as though it were a print.

G. SHELL.—The original papers of Hurter and Driffield are now available in the volume forming part of the memorial to these two investigators. It is edited by W. B. Ferguson, K.C.M.A., who contributes an introduction tracing Hurter and Driffield's work up to the publication of their first paper in 1890. It is published by the Royal Photographic Society, price 25s. net.

N. E.—The idea has been embodied in at least one hand-camera which we remember, viz., one introduced by Messrs. Perken, Son & Rayment, about twenty years ago, but optically it is wrong to move the lens up and down on the arc of a circle instead of at right angles to the lens-axis. Though there are no doubt occasions in which this simultaneous rise and tilt may be useful, the effect on the negative is difficult to predict, and there is liability to the same kind of foreshortening which results from swinging the lens.

S. E. H.—The focal-plane shutter has not necessarily 100 per cent. efficiency, equivalent to a shutter which takes no time at all to open and close, and thus causes the plate to receive the full action of the rays from the lens during the whole period of exposure. But if the blind is close to the plate and not very narrow, the shutter approaches this efficiency. The efficiency becomes less as the distance of the blind from the sensitive surface is increased; also as the width of the slit is decreased; also as the *f* No. of the lens is greater. If all these factors are adverse the efficiency may fall to 40 per cent. or 50 per cent., *i.e.*, much below that of a good diaphragm shutter.

T. F. F.—Impossible to say from the meagre particulars if the method is novel. So many processes of making mosaic colour screen-plates have been patented that it is a reasonable assumption that practically every possible method has been thought of. A year or two in the "Colour Photography" Supplement we collected abridgments of most of the methods published during the previous ten years. The latter was the most prolific period, these methods having been inspired by the success of the Autochrome plate on its introduction in 1907. However, if you think it is worth it, it will only cost you £1 to file a provisional specification. Circular of instructions from the Comptroller of Patents, 25, Southampton Buildings, London, W.C.

B. B.—If, as you say, you have found no ill effects as regards the permanence of the prints, it is not possible for us to condemn the formula—at any rate as you use it. But we are strongly against any acid-fixing bath which does not contain a considerable proportion of sulphite in some form or other. We think the best, and also the simplest form of such bath is made by adding some bisulphite or metal-sulphite to the hypo solution. Either of these salts supplies both the acid (sulphurous acid) to the sulphite which takes up and renders non-injurious any sulphuric produced by oxidation. (2) The best means of obtaining strong acid in a "dry" preparation is acid sulphate of soda, otherwise called sodium hydrogen sulphate. But it is a substance which absorbs moisture very readily, and any mixture containing it requires to be well sealed.

L. G. M.—As we have pointed out scores of times in answers in this column, it is not necessary to do anything at all in order to obtain copyright. Copyright automatically comes into existence by the making of the work—a painting, a book or a photographic negative. Registration as a formality necessary for establishing a legal right is abolished. Therefore if the photographs were taken "on your own," the copyright in them is yours. If, on the other hand, you took them to the order of some other person, the copyright in them belongs to that other person, the fact that you have not been able to obtain payment for them does not transfer the copyright to you. The law provides separate machinery for the recovery of the debt. You could, as you seem to suggest, accept the copyright as payment of the debt, in which case the copyright should be the subject of a written assignment to you.

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Contents.

SUMMARY

The Photographic Fair, which opens to-day (Friday) at the Horticultural Hall, Westminster, contains a very representative display of the manufactures of firms in the photographic trade. We publish a series of advance notices indicating particularly the new introductions which will be found at the various stands (P. 211.)

The full programme of the Congress of the Professional Photographers' Association, which is to open on Monday next at the Photographic Fair, will be found on page 220, where also is published a first list of P.P.A. members who have signified their intention of taking part in the proceedings. (P. 220

At its annual general meeting to be held during Congress week the question of incorporation of the P.P.A. under the Companies Acts is down for consideration. (P. 224.)

Mr Elwin Neame's lecture at the Publicity Club last week gave him the opportunity of saying much of interest to the photographer who is a maker of advertisements. A report of his discourse will be found on page 219

In a leading article we endeavour to put forward the view of enlarging as a process which shall be as much a commonplace in photographic manipulation as contact printing now is. On the grounds of efficiency and economy there is much to be said for the universal use of enlarging; and the vertical pattern of enlarger goes a very great way towards simplifying practice. (P. 210.)

M. L. P. Clerc, in the current instalment of his "Paris Notes," contributes a brief sketch of present-day photographic journalism in France, and writes also on the share taken by women assistants in French professional photography, on a new portable studio arc lamp, and on a recent demonstration of the use of a large portrait lens for naturalistic effects. ((P. 217.)

A point requiring attention in the use of the heavy-weight printing papers now much in favour is adequate strength of the springs of printing frame or machine. (P. 210.)

We endorse a recently expressed opinion of Mr. W. B. Ferguson's on the service which plate makers would render to photographic experimenters by stating the composition of recommended working developers in a form, such as grains per ounce or grammes per litre, permitting ready comparison. (P. 209.)

A somewhat greater degree of exposure coupled with a restrained developer will often serve to get presentable results on stale papers or plates. A touch of the iodine-cyanide reducer subsequently will further help matters. (P. 210.)

EX CATHEDRA.

The Congress. In the midst of strikes and rumours of strikes, one thing is certain, and that is, that the Congress of the Professional Photographers' Association will be held. A general railway strike would, of course, reduce its size, but in the worst event a Congress might still be held among those within the London area, although its character would naturally undergo great modification. It is, however, surely inconceivable that the sanity of the British nation has become such a vanishing quantity that the stoppage of the national life for even a few days is a credible conception. Mr. Lang Sims, the secretary of the P.P.A., moving with herculean persistence in these strenuous days, has completed all the final arrangements. He asks us to say that any members of the P.P.A. who have applied for membership of the Congress, but may not have received their badges before their departure for London, should apply to the Commissionaire at the entrance to the Fair, arrangements having been made for their delivery there in the event of uncertainty of postal transmission.

* * *

Developing Formulæ. At the Royal Photographic Society's meeting last week, in the discussion following the lecture by Mr. C. M. Thomas, Mr. W. B. Ferguson, K.C., urged upon manufacturers of plates the desirability of stating in their circulars of instructions the composition of the developing solution as applied to the plate, so that anyone anxious to try the makers' formula could do so without the necessity of making up certain stock solutions, or, alternatively, going to the labour of tedious arithmetical calculations. Mr. Ferguson asked, and it is a request which will be echoed by many plate users, that the composition of the working developer should be stated either in grains per ounce or grammes per litre; preferably in both measures. We recollect that a good many years ago, in the early days of dry-plates, one or two makers did adopt this practice, and the good example which they set no doubt prompted several writers in the Press to take the very great trouble of working out (in grs. per oz.) the composition of all the working developers issued in the various plate makers' instructions. Tables of this kind were published for a few years in the "Year Book of Photography," and about the year 1912 we carried out a similar series of calculations for the developers of both plates and papers and published the results in the "B. J. Almanac." But owing to the complexity of many of the developing formulæ which, no doubt for good reasons, are adopted by plate makers, the calculation of the composition of the working developer is a very tedious business, and in some cases a formula is of such diabolical ingenuity that it is impossible to represent it with certainty in a simple form. For this reason, if for no other, it is certainly worth makers' while to give this recommendation their attention. If makers would all agree to show in a comparable

form the developers which they recommend, it is pretty safe to predict that a number of them would display quite inconsiderable differences, and thus the practice, in addition to facilitating the work of experimenters, would undoubtedly result in a commendable reduction of the number of formulæ.

* * *

A Useful Tool. A most useful and remunerative addition to the kit of the average professional is a quarter-plate reflex camera of a reliable type, fitted with as rapid a lens as possible. With its aid one can easily negotiate many awkward jobs which would be almost impossible with a stand camera, for example, pet animals, certain types of child portraiture, and any moving subjects one may be called upon to take. The ordinary collapsible or Anschütz type is very efficient in its way, but requires more skill in judging distance than most portrait photographers possess; moreover, it does not readily lend itself to a change of lenses. With a reflex a small portrait lens, say of 8 inches focal length, working at *f*/3, can be often used and results obtained which would be procurable in no other way. We counsel the selection of this small size because a half-plate, or even a postcard reflex, with reversing back, is rather an unwieldy instrument and is often relegated to the shelf after a few trials. The quarter-plate size is handy to use and permits of the use of lenses which will give good perspective and extreme rapidity, while the power of accurate focussing gives negatives suitable for enlargement.

* * *

Contact in Printing. Carbon printers have long known that it is unsafe to trust to the ordinary light pattern of printing frame if sharp definition is required, as the flat brass springs which provide the pressure are rarely strong enough, even when new, and rapidly become weaker with use. The tissue which is usually cut from a roll has sufficient spring in itself to prevent uniform contact, and the remedy has to be sought by using the "box" form of frame in which more powerful springs, usually made of steel, are fastened to transverse bars which are pressed down and secured with buttons. Inspection of a number of prints on double weight bromide paper suggests that a similar course might be followed with advantage by those who use this material, for many of the prints showed mysterious fuzzy patches, although the negatives were uniformly sharp. When box frames are used it is almost a necessity to have them fitted with plate-glass fronts, as the very thin glass now used for plates, even of a fairly large size, involves a considerable risk of breakage if adequate pressure be applied. Printing boxes are also often open to criticism on this point, since with these there is often a tendency for the pressure to be uneven.

* * *

Stale Plates and Papers. In these times it goes against the grain to waste plates and papers which have been kept on hand longer than they should have been, and which have consequently developed a tendency to give a slight fog or stain if treated in the ordinary way. When such stale material has to be used a great help towards obtaining clean results will be found in a somewhat liberal but judicious use of bromide of potassium. Protracted development must, however, be avoided, and therefore a rather stronger developer should be used with the necessary bromide added to it. We recently tried an old package of bromide paper which gave deeply-stained prints with normal treatment, but which was quite satisfactory when a more liberal exposure and a restrained developer was used. We have also saved negatives on old plates by using a double-strength developer to which one or two grains of bromide to the ounce had been added. It is worth remembering that the yellow or metallic fog which often appears on stale plates or paper is much more soluble in the iodine and cyanide reducer than the image is, and that it will often disappear before any perceptible reduction of the silver image takes place.

SYSTEMATIC ENLARGING.

THERE is an evergrowing tendency among many of our most skilled photographers to produce a large proportion of their work with the aid of some form of enlarging apparatus, and to issue the prints without any notification of the fact. Only recently one of our best known portraitists told us that all his prints above whole-plate size were enlarged, and that for orders for panels and larger sizes half-plate negatives only were made. Add to this that a highly-skilful trade printer gives it as his opinion that better quality bromide prints can be made through a lens than can be obtained by contact printing, even when the print has to be the same size as the negative, and we have a strong case for the systematic use of the enlarger. Assuming that the question of quality is thus disposed of, we will deal with that of convenience; with a well-designed apparatus there should be little, if any, more labour in using it than there is with the ordinary printing box, if like the latter the enlarger is kept ready for immediate use.

Daylight, on account of its variability and the fact that it is only available for a limited time, especially in the winter, cannot be regarded as a satisfactory source of illumination, so that some constant artificial light must be employed, and in most cases the gas-filled or half-watt electric lamp will be found satisfactory, for, while the light is inferior in intensity to the arc, it is powerful enough for all ordinary work and, being uniform in its light, prevents the waste caused by the fluctuations of the latter. Moreover, its form lends itself admirably to use in the vertical form of enlarger, which we are convinced is the most suitable for everyday work.

In towns where no electric current is available the inverted incandescent gas burner may be adopted and will prove an efficient substitute, although, of course, the exposures will have to be longer.

The design of such an enlarger having been repeatedly published and the fact that more than one model is on the market renders it unnecessary to go into details of construction, our object being to point out to what a slight degree enlarging differs from contact printing. When enlarging is carried out in the way we advocate, the majority of prints will be made in a fixed ratio of size, let us say two diameters, and for these what is practically a fixed focus enlarger may be used. The procedure is then nearly identical with contact printing, that is to say, the negative is laid upon a glass shelf above the lens and the bromide paper laid or held upon a shelf below, exposure being made by means of the usual treadle arrangement. Sometimes, however, it will be found that a much more acceptable result can be obtained by using only a portion of the negative, and, for this reason, a focussing adjustment should be fitted, so that from a full-length negative a three-quarter or even a bust picture may be made to the standard size.

The degree of enlargement should be moderate; that is to say, that from two to three times linear will be the limit, which should not be passed if the prints are to be

issued with only ordinary spotting. A ground glass diffuser between the light and the negative is absolutely necessary, otherwise the grain of the image and the marks of the retouching medium will be unpleasantly obvious. The negative should be brilliant, but not too vigorous, a degree of vigour which would barely give a good contact print being just right for enlarging. The retouching should be fine in texture, and if the focus be slightly softened it will be even less apparent than upon a contact print from the same negative. This may be effected by using a flat field lens and putting the image *very* slightly out of focus, or by using a lens which has a soft focus adjustment, and by focussing as sharply as possible after determining the desired degree of softening.

The system we have outlined should appeal strongly to the professional worker, not only upon the score of economy, which is considerable, but upon the control which can be exercised over the printing; shading, vignetting and any other dodging can be done much more readily than in contact printing. Again, there is the advantage from an optical point of view of being able to work at a greater distance from the sitter, thus securing not only better perspective but also greater depth of definition when using large apertures. We have found the advantage in child portraiture of making small negatives, say, three by two inches, and enlarging to cabinet, instead of working full size in the ordinary way. When taking the small negative a slight movement backward or forward, which would have been fatal on a larger plate, had practically no effect.

For "at home" portraiture, and even some classes of commercial work, small negatives have many advantages. Interiors which would call for an aperture of *f*/64 on a 15 x 12 plate are better rendered with *f*/32, or an even larger aperture, upon a 5 x 4 or half-plate. The only objection that can be raised is the trouble of enlarging, and this we have shown can be reduced to a minimum, the balance being greatly in favour of the small size, when we consider not only the cost of large plates, but of large apparatus and the ever-recurring cost of transport.

The appeal will not be so strong to that minority who print in platinum or carbon, but even they will find a well-arranged enlarger a much better tool for making enlarged negatives than the usual daylight camera. All that is needed is to substitute a plate or flat film for the bromide paper to obtain an enlarged transparency, or to place a small transparency on the negative shelf, if that method be preferred.

Although we advocate the vertical enlarger for ease in working, equally good results can be obtained with lanterns of the ordinary form, the only difference being that the negative has to be fixed in a holder, and the paper has to be pinned upon a board or fixed under glass in a printing frame easel. When working to one standard size it is not difficult to overcome the latter difficulty, as witness the excellent balanced easel which was used by the Royal Air Force at the front.

In conclusion, we suggest that as a rule the best results in portrait work are to be obtained upon a rather slow, soft-working paper. Some of the so-called "soft gaslight" brands are quick enough for enlarging and give better results than the ordinary bromide, but this is a point for the individual worker to decide for himself. If a man does not know when he has got a good picture there is no hope for him. If he does know a good thing let him experiment till he finds it.

THE PHOTOGRAPHIC FAIR.

Again the stand capacity of the Horticultural Hall, Westminster, has been taxed to the utmost by the requirements of the firms wishing to exhibit at the Photographic Fair, which opens to the public to-day. We learn from the organising secretary, Mr. Arthur C. Brookes, that a number of firms have been unable to exhibit, or have had to content themselves with a smaller space than they desired, on account of the impossibility of providing further room. Since the Fair remains open only until to-morrow week, April 23, it would have been impossible for us to have reviewed the exhibits earlier than our issue of the 22nd had we deferred matters until the actual stands could be visited. By courtesy of the exhibitors, however, we are able to give what we believe is a fairly complete and accurate account of the displays by the various firms.

Although the past year of "peace" has provided all kinds of obstacles to the development of the photographic industry, and particularly as regards that part of it concerned in the manufacture of apparatus, it will be found that the stands at the Fair contain quite a considerable number of new introductions, many of which are introduced at the Fair for the first time to the photographic public. Among these, as our notes will show, are the following:—

Distinctive development papers.
Collodion self-toning paper.
Dye-impression printing process.
Daylight film developing tank.
All-metal film cameras.
Folding reflex cameras
Telephoto lenses.
Cameras for aerial photography.
Print drying machines.
Lens hoods and view meters.
A soft focus lens
A new developing preparation
Hand cameras for stereoscopic photography.
A walking-stick tripod, the large head of which completely folds into the handle.

In connection with the Fair the Congresses of the Professional Photographers' Association and of the Photographic Dealers' Association, which will be held during next week, were assured up to a few days ago of a record attendance. The preliminary list of members of the P.P.A. who have already signified their intention of taking part in the Congress of this body is larger than it was at the corresponding period last year. At the time of writing the uncertainty which still prevails in reference to the disastrous dispute between the miners and mineowners and the strike of railway men threatened in connection with it is unfortunately almost certain to act as a deterrent upon many of those at a great distance from London, who, but for this, would certainly have been present at the Congress. It is to be hoped that the spirits of the new age in which we are will at least soon manage to find some method of remedying their grievances other than holding up the whole community to ransom, while, at the same instant, they label themselves communists.

The exhibition of professional and technical photography, organised by the Professional Photographers' Association, will also be open to all visitors to the Fair. As was the case last year, its hanging is in the competent hands of Messrs. Marcus Adams and Angus Basil, but since the exhibition will not be open to view until the time that these pages are published, we cannot say anything about it until our issue of next week.

Stand No. 1—Kodak, Ltd.

Eastman Portrait Film will receive special emphasis in the Kodak exhibit in the shape of a fine collection of prints made from negatives on it and representing the work of leading professional photographers. These exhibits are not only portraits, but also commercial work made with the "commercial" and "commercial ortho" grades of the Eastman flat film. Appliances for the handling of the film, tanks, sheaths and carriers, will also be on view. Visitors will further have the opportunity of seeing in working the Eastman projection printer, which will be installed in a dark-room for this purpose. This self-focussing enlarger is perhaps the most perfect machine ever introduced for the use of photographers. A special feature of it is the employment of transparent specially surfaced screens for the purpose of introducing various definite degrees of diffused definition into the enlargements.

On the dealer side the exhibit of the Kodak Co. will include a display of Kodak cameras, accessories and Velox pictures, arranged in two windows, the dressing of which, by the company's expert, will be changed each day. The aim here is to show what effective window displays can be produced at very little cost. Professional photographers, as well as dealers, can hardly fail to pick up valuable hints from these displays, and, moreover, will have the opportunity of personally getting the advice from the company's expert, by whom also a lecture on the subject is to be delivered at the Dealers' Congress on Friday, April 22.

Stand No. 2—Wratten Division of Kodak, Ltd.

The Eastman aero cameras will be included in the exhibit of the Wratten Division, and the automatic model of these new introductions will be shown in operation. As regards the Wratten specialties themselves, these will include examples of the latest filters and specimens of the work which can be done in the reproduction of coloured objects by means of the Wratten panchromatic plate and the process panchromatic—an object-lesson in a large proportion of the work which falls to the lot of the commercial photographer.

Stand No. 3—C. S. Baynton.

It is announced that the exhibit of Mr. Baynton will consist, as it has done on recent occasions, of a full range of his "Turbine" print washers, including an illuminated working model.

Stand No. 4—Johnson, Matthey and Co., Ltd.

The salts of the precious metals, the manufacture of which constitutes a branch of Messrs. Johnson, Matthey's business, make an attractive and enviable exhibit. Silver nitrate, and even gold chloride and potassium chloroplatinite, are much more seldom handled by the photographer than in former years, but it is good to see the crystalline purity in which these substances are prepared for the manufacturer of sensitive materials. Messrs. Johnson, Matthey's name has long been the hall mark in this respect, and their exhibit usefully serves to remind photographers of their unique relation to the manufacture of plates and papers.

Stand No. 5—Sanger-Shepherd and Co., Ltd.

The student of orthochromatic photography, or of sensitometric experiments on negatives or prints, will always find a good deal to interest him among the instruments made by Mr. Sanger-Shepherd's firm. Graduated light-filters and filters for three-colour photography enter into the former field, whilst Messrs. Sanger-Shepherd are the only people who provide the photographer with instruments (some of them quite simple and inexpensive) for the measurement of the speed of plates and properties of negatives. These include the even and step wedges of various kinds by the use of which investigations of exposure and development, and particularly of the ubiquitous gamma, are greatly simplified.

Stand No. 6—R. and J. Beck, Ltd.

Messrs. Beck's latest introduction is a new telephoto lens, providing within itself focal lengths of 6 ins. and 15 ins., yet of back focus that it can be used at a camera extension such as that available in the ordinary half-plate reflex. The provision of two definite focal lengths appears to be a new feature in telephoto lenses, and one which probably satisfies the needs of the many photographers who have little use for very long foci. Another new exhibit is a new camera for photomicrography, and, of course, Messrs. Beck will show their Isostigmar, Neostigmar and Bystigmar lenses, the latter an $f/6$ objective which is separable into two single lenses of $f/11$ aperture.

Stand No. 7—The Platinotype Company.

Demonstrations of the extreme simplicity of the manipulation in Platinotype printing are always an attraction, and they will be of frequent occurrence at the stand of the Platinotype Co. The name of the firm, however, no longer fully represents its manufactures, for the abnormal price of platinum metal has brought into existence the two other printing processes, Satista and Palladiotype, the manipulation, and also the results, of which are closely akin to those of Platinotype, whilst the prices of the materials bring the processes within the means of those who, from motives of economy, have been compelled regretfully to choose a less costly medium than platinum for the printing of their negatives. The supremely beautiful qualities of the three printing processes will be illustrated by specimen prints.

Stand No. 8—The Autotype Company.

A twofold address to photographers, both professional and amateur, is now made by the Autotype Co. If you can print by daylight, there is the carbon process; but for manipulation entirely by artificial light, there is Carbro, in which the halfway house is a print on bromide or gaslight paper. In either case you get a carbon print with its distinctive quality of texture and with its range of colour and its facility of being produced on any surface. Demonstrations of both processes are to be given, and the Autotype Co. will also show a few specimens of their excellent service to the professional photographer in the making of carbon and bromide enlargements, finished in various distinctive and most artistic styles in monochrome, water colours or oils. Miniatures, on ivory or ivorine, with or without a photographic basis, and finished in water colours, are also a specialty of theirs to which prominence will be deservedly given.

Stand No. 9—Marion and Co.

A leading feature of this stand is examples of the remarkable results, as regards quality and shortness of exposure, obtained on the recently introduced Iso Record plate. Half-tone reproductions, such as have been used in Press advertisements, while effectively drawing attention to this new power in negative making, cannot adequately represent the standard of quality which goes with it. A soft-focus lens is a further new introduction at this stand, where also professional photographers in particular should note two rapid print-drying machines. The machine print-drier as a time-saving and labour-saving appliance has come slowly into use in this country in comparison with its wide adoption in the United States, and the professional portrait maker will be interested in examining these two commercial driers, which are priced respectively at £73 and £35.

Stand No. 10—Adams and Co.

Messrs. Adams are showing for the first time an improved and perfected design of the folding "Minex" reflex camera, an instrument of beautiful design and workmanship, in which every facility of the box pattern of reflex is obtained, including extension ample for the use of the single component of the lens with which the camera is fitted. The speed with which the camera is brought into the working position for exposure, and alternatively is folded again after use, must be witnessed by those who are disposed to disparage the folding type of reflex on the ground of the time required in making ready for an exposure. The camera, as we have said, embodies all the movements, including great rise of front,

swinging front and others which have long been familiar in the earlier box models of the renowned "Minex" camera, with the single exception of the automatic masking device geared to the rotating back. Another new introduction at Messrs. Adams' stall is a walking stick tripod, the 5½-inch triangular head of which folds within the tripod itself, and when the latter is erected provides a solid support even for a half-plate reflex. The stand, as we have had an opportunity of observing, is exceedingly rigid. Other exhibits by Messrs. Adams are de luxe models, both plate and roll-film, of the "Vesta" folding camera, and also a less expensive model fitted with an f/6.8 lens. Another specialty is a stop-watch exposure meter, in which a first-class stop-watch has a simple exposure meter arranged in the back. The watch may be had with the complete ordinary movement or as a timer, recording seconds up to 1 minute and minutes up to half an hour. Messrs. Adams will also show their watch pattern of exposure meter of extraordinary slimness and very beautifully made in nickel.

Stand No. 11—Taylor, Taylor and Hobson, Ltd.

Messrs. Taylor, Taylor and Hobson will exhibit a series of specimens illustrating the processes of manufacture of both the glass and metal work of lenses, and will have a machine in operation showing lens grinding. Moreover, it is a machine of their own design and manufacture, and represents an advance in the machine surfacing of lenses with an enormous degree of accuracy. The exhibit will, of course, include examples of the new Cooke "Aviar" lenses, originally designed for aerial war work. There will also be shown a new Cooke telephoto lens, providing new facilities in telephotography, and a cinematograph taking lens of recent introduction. Autochromes and enlargements made with Cooke lenses will draw attention to these optical manufactures.

Stand No. 12—Leto Photo Materials Co., Ltd.

The renowned self-toning "Seltona" paper is always the staple exhibit of the Leto Co., of attraction not only to amateur workers, but to many professionals, who find in this printing medium a solution of many printing difficulties. We are advised this year of a novelty relating to the paper in the shape of "Seltona Transfer," the nature of which we have still to definitely learn. A new edition of the Seltona "Perfect Prints" will be issued at the Fair, and the exhibit will also display the many attractive styles for both amateur and professional prints which are provided by the double-weight "Boardoid" papers and by the plate-markers and border negatives which are Leto specialties.

Stand No. 13—O. Sichel and Samuelson.

As suppliers of professional photographic requisites of all descriptions, Messrs. Sichel and Samuelson will devote their exhibit largely to appliances for the business of photographic portraiture. These include a Simplex drying machine, a new pattern of printing machine, cutting and bevelling machines and backgrounds and a background stand. Mounts and frames are requisites in which the firm has long specialised, and the present exhibit will include a collection of the latest styles in oval frames.

Stand No. 14—Ross, Ltd.

These many lenses and cameras will form the exhibit of Messrs. Ross, Ltd., and will provide both the professional and amateur photographer with a great deal to interest them. The qualities of Ross lenses in portraiture will be demonstrated by a striking life-size portrait of Mr. Lloyd George, taken by Messrs. Wakefield, of Chiswick, with a "Homocentric." Messrs. Ross will also advertise their advertising by bringing together a display of the very striking showcards and other advertising publications by which they are assisting dealers in the distribution of their goods. The Ross cinematograph projector, to which we referred a week or so ago, will also be on exhibition, and if not quite within the sphere of interest of most visitors to the Fair, will serve usefully to demonstrate the very great perfection of the mechanical work done in Messrs. Ross's workshops.

Stand No. 15—Kosmos Photographics, Ltd.

The Kosmos Co. has a nice sense of showing its wares, and the stand in the classical Greek style, which was a notable feature of last year's Fair, will this year contain a collection of examples of portraiture by the well-known Paris firm of Reutlinger and by many leading English workers. These, with other prints and enlargements, will serve to demonstrate the remarkably fine and varied results obtained on the Kosmos "Vitegas" paper, particularly in reference to professional work. The many amateurs who took part in the recent Kosmos contest and secured prizes therein will welcome the opportunity of seeing enlarged reproductions of many of the winning pictures and of obtaining prospectuses and entry forms for the forthcoming Kosmos competition, in which £1,000 is to be distributed in prizes. Attention will also be directed to the firm's "Novex" gaslight paper, very popular with amateurs, as well as with photographers and dealers who undertake the developing and printing of amateurs' films. The Bromoil process is also one of the fields of Kosmos activity, on account of the special suitability of "Vitegas" paper for the preparation of the print, and the company's technical literature on this subject will be obtainable at the stand.

Stands Nos. 16 and 17—Houghtons, Ltd.

The dealers in amateur photographic requisites obtain the chief consideration at these stands, for Messrs. Houghtons are bringing together their appliances for professional photography in a special exhibit which will be accommodated in a room on the first floor of the hall adjoining the meeting place of the P.P.A. Congress. Here will be shown the firm's latest appliances for the studio, dark-rooms and printing rooms, including apparatus for strip printing, washing and drying.

At the above stands in the body of the hall the exhibit will represent the firm's resources as manufacturers of plate and roll-film cameras in a large range of types, from the waistcoat pocket "Ensignette," which appears as an aluminium model, to the folding focal-plane camera and the series of Sanderson cameras, both hand and stand. Messrs. Houghtons also have their reflex cameras, including a folding model, and their range of other accessories extends over the whole field of amateur photography and includes the scores of appliances and accessories, the possession of which is the ambition of the amateur worker.

Stand No. 18—Thornton-Pickard Manufacturing Co., Ltd.

A new model of T.P. reflex camera, namely, one for horizontal pictures, will be shown at the Fair, and the exhibit will also include the company's All-Weather press camera. Naturally enough, the old-time specialties of roller-blind shutters and stand cameras will take a leading place alongside the later developments in the shape of folding cameras of various types for film and plates, as well as the series of Thornton-Pickard enlargers.

Stand No. 19—Newman and Guardia, Ltd.

Without question, the latest thing in apparatus at the Fair will be the new folding N. & G. reflex camera, the first of which that has been completed we have had an opportunity of seeing. It is for 3¼ × 2½ pictures, and by most speedy movements is opened into the working position in which, by a lazy-tongs pattern of side support, the lens front and baseboard are held with extraordinary rigidity. We are not yet familiar with the mechanical movement by which Messrs. Newman & Guardia have achieved this simplicity, but the quickness with which the camera is got ready for use from the closed position and folded again is almost uncanny. A new focal-plane shutter gives a wide range of instantaneous speeds, with quick and positive adjustment for "time" and "bulb." There is a rotating back and a swing front, as well as very ample rise of front. In short, all the movements of a box-form reflex with the single exception of double extension, and in these days of large-aperture fixed-focus telephoto lenses the occasion for double extension in a hand camera has largely disappeared.

The beautiful "Sibyl" folding cameras will compete in interest with the new reflex, and will include the additional facility of taking, from the Baby "Sibyl" upwards, a telephoto lens, such as the Ross "Telecentric" or Dallmeyer "Dallon," interchangeably with the normal *f*/4.5 objective.

Stand No. 20—W. Butcher and Sons, Ltd.

The Carbine film tank for the daylight development of roll-film, a notice of which appears in another column, will be shown and demonstrated by Messrs. Butcher, and should not be overlooked by amateur visitors to the Fair, since it is a notable addition to the equipment for easy photography. And, of course, Messrs. Butcher will have a large exhibit representing their series of plate and film cameras, including the popular "Cameo's" and "Klimax's (for plates) and "Carbine's" and "Maxim's" for roll film. There is also the "Pressman" reflex camera, one of the lightest and most compact of reflector instruments. Enlarging lanterns are also apparatus of which Messrs. Butcher are leading manufacturers, and the intending purchaser of an enlarger will be well advised to take the opportunity of examining the merits of the "Abbeydale" and "Record" enlarging lanterns and the "Clincher" daylight enlarger.

To the professional photographer the part of the Butcher exhibit of chief interest is that of mounts and mounting papers, and, particularly, the altogether excellent series of ready-made passe-partout frames which during the last year or two Messrs. Butcher have brought into existence in a whole series of most artistic styles. Cinematograph apparatus, cameras and equipment for developing and printing of film, as well as cinematograph projectors, will also be shown.

Stand No. 21—White Band Manufacturing Co., Ltd.

By way of emphasising their early entrance into the field of developer manufacture during the war, the White Band Co. are showing an advertisement, published a few weeks after the outbreak of hostilities, in which reference is made to the fact. Naturally, they are giving prominence to their products Monomet, metol and amidol, and will exhibit specimens showing the different stages of manufacture from the raw material. But a large branch of the company's business is in the supply of ready-made developing and other preparations, as compressed tablets ("Pakoids"), and in packet and carton form. They have also a special preparation of their own in the shape of a photographic mountant.

Stand No. 22—Acme Art Association.

This old established firm of colourists and portrait painters for professional photographers will show the artistic merits of its productions in the shape of oil paintings and water colour and pastel drawings. Its technique includes work in these media both with and without a photographic basis. Miniatures are also a specialty of the Acme Art, in which branch it is able to offer its customers the service of Royal Academy exhibitors.

Stand No. 23—F. Brodrick, Ltd.

Dark-room apparatus for the professional or trade worker will form an exhibit in which printing machines for films or plates, tanks for their development and fixing, and washers for negatives and prints will be shown. Among the latter is the cascade pattern of washer, the most efficient type for quantity work, solidly constructed in teak. The professional photographer or dealer undertaking the development of amateur's film negatives cannot afford to neglect Messrs. Brodrick's exhibit.

Stand No. 24—City Sale and Exchange.

As British agents for the renowned Paris firm of Jules Richard, the City Sale and Exchange are devoting their entire exhibit to the cameras and other apparatus, such as the "Verascope," "Taxiphote," and others of world-wide repute. The "Verascope" stereoscopic hand camera will be shown in nine different models, including one fitted with a shutter made to give, at its highest speed, an exposure of 1-400th of a second. These cameras employ plates of the standard "Verascope" size of 45×107 mm., and the realistic stereoscopic effects obtainable from the positive transparencies made from them will be demonstrated by means of the several different patterns of stereoscope, both hand and magazine, which have been designed for their use. There are also larger models of "Verascope" for plates 6×13 cm. or 7×13 cm., and we must not omit to mention the exceedingly ingenious "Homeos" camera, which we described in these columns a month or two ago, by which 26 pairs of stereoscopic pictures are taken on a length of cinematograph film and are printed on positive film for viewing in the stereoscope. The camera itself, no less than the printer and stereoscope, which are supplied for use with it, is a triumph of fine workmanship and most ingenious design.

Stand No. 25—Criterion, Ltd.

The distinctive qualities of the various Criterion printing papers will be demonstrated by an exhibit which makes a specific appeal to widely separated classes of professional or commercial photographers. For example, the utility of the "hard" and "extra hard" grades of bromide paper for the making of press photographs will be illustrated by specimens of news photography made on these papers. The artistic merits of rough cream, cream and white canvas, and platino-matt Criterion bromide papers for professional portraits will be demonstrated by examples by leading photographers, and the special qualities of the Criterion portrait gaslight paper will be brought to notice by means of a series of prints from negatives by Miss Compton Collier. The striking effects obtained on red-toned bromide prints will be shown in the shape of theatrical photography by the Stage Photo Co. And the amateur worker will be able to see the results in Bromoil and Carbro which are yielded by Criterion bromide, as well as the lantern transparencies made on Criterion special lantern plates.

Stand No. 26—James A. Sinclair and Co., Ltd.

We are glad to hear that Messrs. Sinclair are resumning the manufacture of their N.S. "Perfect" shutter after a long war interval. It was a pioneer step of theirs to guarantee the accuracy of the speeds by a National Physical Laboratory certificate, and one which, in view of the prevailing mendacity of speeds engraved on shutters, is to be encouraged. Messrs. Sinclair are also showing the new model of their lens-hood which we reviewed a week ago, and also a new form of combined direct-vision finder and view-meter, so arranged that it can be kept on the camera or removed, as desired. Those altogether excellent "Una" cameras will also enter into the exhibit, and the intending Bromoil worker, who seems to be the care of exhibitors this year more largely than ever before, is here encouraged to embark upon the process by the offer of a complete set of apparatus and materials at the cost of a few shillings.

Cinematography represents the highest achievement of the manufacturing side of Messrs. Sinclair's business in the shape of the Newman-Sinclair camera and accessories. We need not refer further to the camera, since a brief outline of its remarkable mechanical features appears on another page.

Stand No. 27—Reginald E. Carter, Ltd.

Another of the many exhibits at the Fair which will be almost exclusively professional. Photograph frames in wood, metal and leather, and also cases and rims for miniatures, are specialties of this firm, which are offered in many exclusive and beautiful styles Another important item among professional requisites is dry-mounting tissue, the "Mayfair" brand of which will be specially brought to the notice of visiters. And Messrs. Carter, as agents for Messrs. Bartons, of Birmingham, will be able to make an exceedingly fine display of mounts and mounting papers, folders and albums, and the very artistic and strong metal binding for framing in the passe-partout style. The unerring good taste of Messrs. Bartons in the art of mount design is, we think, generally acknowledged among photographers. Those who have not had the opportunity of studying these mounts ought certainly not to neglect the opportunity which the Fair provides.

Stand No. 28—J. H. Dallmeyer, Ltd.

Since the last Fair Messrs. Dallmeyer have brought out their new series of "Dallon" fixed-focus telephoto anastigmats of such large apertures as f/5.6, f/6.5 and f/6.8 in focal lengths from 5½ to 17 ins. These lenses, the fine optical performance of which will be shown in photographs, require on the average a camera extension of about half the focal length. Thus, they have a great interest for the amateur worker desirous of obtaining the more pleasing drawing which results from a narrow angle of view and at the same time of reducing the weight and cost of his camera. Messrs. Dallmeyer will show these lenses fitted to N. & G. "Sibyl" cameras. Another new series of anastigmats is the "Perfac," Series V., whilst no Dallmeyer lens exhibit would be complete without the Patent Portrait lenses, the Stigmatics and the Dallmeyer-Bergheim soft-focus lens. A reflex camera for nature photography will also be shown fitted with a Grandac telephoto, giving 25 ins. focal length at 6 ins. camera extension at an aperture of f/10.

Stand No. 29—John J. Griffin and Sons, Ltd.

As specialists in the supply of professional requisites of all descriptions, Messrs. Griffin will exhibit a variety of recent introductions. Among these will be the "Goodrick" dry-mounting fixing irons, gas and electric, which we recently noticed; also the Charles series of flash lamps; "Howellite" gaslight outfit for studio portraiture; "Barkay" studio reflectors for use with artificial light, and Griffin card bevellers and cutters. These will be only a few of the many items of equipment of a portrait establishment which will find a place on Messrs. Griffin's stand.

As manufacturers of photographic papers and chemical preparations, Messrs. Griffin will also draw attention to their gaslight, self-toning, P.O.P. and bromide papers, and to their chemical specialties, such as "Mequin" developer, acid fixers and chemical preparations for the Bromoil process.

Stand No. 30—Elliott and Sons, Ltd.

As a rule in the past no firm brings together a more artistically pleasing and photographically excellent display of prints and enlargements than Messrs. Elliott, who have a sure instinct in making, mounting and framing prints for exhibition. Among those to be shown this year are a number illustrating the new Barnet bromide paper, "Bartona," yielding prints of warm black colour by direct development. But tints and surface textures are specialties of Messrs. Elliott, in the incorporation of which with their sensitive emulsions they have outdistanced many other firms. We conclude from the list of the exhibits which they have sent to us that their display this year at the Fair will be no less effective than that on previous occasions in demonstrating the very refined results which are obtainable on their many grades of bromide and gaslight paper.

Stand No. 31.—Johnson and Sons.

Messrs. Johnson will introduce a new developer in tablet form at the Fair, namely, "Vedol," for the use of which time and temperature development tables have been worked out for the assistance of those developing by rule. Vedol is a universal developer, suitable for bromide and gaslight papers, as well as for plates and film, and lends itself also to the making of lantern slides in a range of warm colours. As in former years, Messrs. Johnson will prepare their exhibit from specimens of the chemicals of their manufacture required in every branch of photography and supplied by them in the forms most convenient to every class of worker—in tablets, packets and solutions for the amateur, and bottled in bulk for the professional. Their "Scales Brand" of tablet preparations will receive prominent notice, and so also will the developing substances metol, amidol, glycin, pyro, hydroquinone and Azol, manufactured by them and guaranteed by the distinctive trade mark of the name of their firm.

Stands Nos. 32 and 33—Gevaert, Ltd.

Among the many Gevaert plates and papers will be shown for the first time results on a new rapid gaslight paper for direct warm black prints by simple metol-hydroquinone development. The Gevaert manufactures cover the whole field of negative making and printing. Plates for the former range from the extreme speed "Sensimm" to less rapid emulsions, and include an orthochromatic, a non-filter ortho and an anti-halation plate. Among printing papers, there is P.O.P., self-toning (collodion), bromide and gaslight to choose from, and the special de luxe "Partox" gaslight paper for direct brown tones by special development. Pictorialism of their specimens employed to represent adequately the technical merits of materials is usually a strong point with Messrs. Gevaert, and no doubt this year's exhibit will be no exception to that rule.

Stand No. 34—Bean and Halliday.

As makers of mounts and mounting materials from first to last, Messrs. Bean & Halliday will be able to bring together a most comprehensive exhibit of mounts, folders, albums and wallets, and will devote a good deal of care to shewing their manufactures with suitable photographs mounted thereon. Their specialties include also all descriptions of mounts, slip-in, etc., for amateur requirements, and a special line is calendars for photographers who do commercial work. They will also show specimens illustrating their department for the supply of photographers' stationery.

Stand No. 35—Adhesive Dry Mounting Co., Ltd.

Dry-mounting, from its facility of demonstration, always makes an attractive exhibit, and the Adhesive Dry Mounting Co., as the originators and pioneers of the process, can be depended upon to show the latest developments in it, and the most recent appliances in the way of mounts and albums, trimming boards and hot presses. Their manufactures cover both the professional and the amateur range of these goods, so that a photographer of whatever class should be able to satisfy his dry-mounting needs at this stand.

Stand No. 36—J. Lizars.

Messrs. Lizars will show their new model Challenge all-metal folding film-plate camera, one notable feature of which is that the plate in its holder registers in focus with the roll film, obviating the adjustment of the focussing scale and thus facilitating the alternate use of these two different forms of sensitive material. The camera is made both of single and of double extension, the former having a novel type of lever focussing. The exhibit will also include other patterns of the "Challenge" hand and hand-stand cameras, among which are models with the excellent feature of being built to take views the landscape way of the plate, and possessing a full range of movements as regards rise and fall and swing of front, drop of baseboard and bellows extension.

Stand No. 37—Robinson and Co.

Messrs. Robinson's exhibit is one of those which ought to be seen, and must be seen, for their work as water-colourists in the making of enlarged portraits for photographers is very fine, and no amount of written description can convey an adequate idea of it. They are the originators of quite a series of distinctive styles in portraits to which they have applied names of their selection, so that a customer who has ordered work in a given style can be reasonably certain that further orders of portraits similarly named will be executed in accordance with his anticipations. In these styles a distinctive background plays a large part. For example, the "Regal Panel" is done with a grey ground, and with drapery sketched in with chalk. In the "Court" series a very striking effect is obtained by means of a perfectly black ground and black mount. The "Pastel" is a buff panel masked on larger cream paper, whilst in the "Gainsborough," for head and shoulders portraits, a background in the style of those of the Old Masters is sketched in. There is a freshness about Messrs. Robinson's work due to the skill with which they use their

chosen medium, namely, water colours, and we should draw particular attention to the very artistic frames which they supply, of wood moulding with a metal surface, which may be had in imitation of pewter, silver, bronze or gilt, and is guaranteed to keep its colour for 10 years. Messrs. Robinson are also themselves miniature painters on ivory, ivorine and paper, and make a special point of guaranteeing the likeness, failure to do which is often a disappointing incident in commissioning portraits of this kind.

Stand No. 38—Thomas Illingworth and Co., Ltd.

Messrs. Illingworth are making the Fair the occasion for bringing prominently to the notice of professional photographers their new developing paper "Zona," yielding prints of warm black tone and exceedingly fine gradation by straightforward development. A large selection of prints in this new medium will be shown. We need not refer at greater length to the paper in these notes, since we have something to say about it on another page of this issue. The portrait photographer must certainly not omit to see these prints in Messrs. Illingworth's exhibit, which is happily situated *immediately opposite the refreshment bar*. By arrangement at the stand, demonstrations of the development of "Zona" and other papers may be witnessed in a dark-room, which will be fitted up in the basement of the hall.

Messrs. Illingworth's large resources in the manufacture of development papers will also be displayed in reference to their grades of portrait bromide, including "Bromide de Luxe," bromide paper for commercial and press photography, and the special paper for X-ray work. For amateurs and for dealers who work for them there are the papers, such as "Slogas" gaslight, "Enitone" self-toning and P.O.P. The exhibit will include a selection of prints on "Slogas" from amateurs' films. Finally, dominating the refreshment bar itself is an enlargement, measuring 12 ft. × by 54 ins., printed upon a single piece of Illingworth bromide paper.

Stand No. 39—Wellington and Ward.

A new Wellington paper—collodion self-toning—will make its bow to the photographic public at the Fair. It is to be obtainable in three grades of surface, matt, glossy and cream chamois, in each case of both thin and thick substance. The paper will be demonstrated at frequent intervals, as also will be the use of Wellington S.C.P. (gaslight paper) and the toning of bromides. This year Messrs. Wellington, who always are very artistic exhibitors, will arrange their stand as a panelled interior covered with wall paper of refined design, and will show their pictures masked and plate-sunk on large sheets of paper, a form of print which, in the style of its production and framing, will provide useful object-lessons for the professional arranger of a reception room, as well as for the amateur who applies his photography to home decoration.

Messrs. Wellington & Ward are one of the few firms who exhibit negatives, always of interest to the amateur worker when they are of the fine quality of these on Wellington plates, and can be compared with prints or enlargements on various papers. This year S.C.P., the distinctive Wellington gaslight paper, will be given special prominence in respect to its usefulness to dealers and photographers undertaking the development and printing of amateurs' films. It is significant that many of the exhibiting firms are laying special emphasis upon this growing business. But the Wellington exhibit will be a comprehensive one of the results on plates and papers and with chemical preparations, the names of which are household words among photographers.

Stand No 40—Witt and Westley.

Mounts and mounting materials for the professional photographer are to form this exhibit by a firm which for many years has shown its keen sense of what is desirable in photographic mounts. Inasmuch as these goods are among the most difficult to describe in words or illustrations, makers of portraits have good reason for appreciating the opportunity of examining at their leisure the many styles of folders, covers, sketch boards, etc. Metal, inlaid and passe-partout frames are also among the firm's specialties, and Messrs. Witt & Westley are agents for the Akron dry-mounting machines and for the dry-plates of the Mawson Co.

Stand No. 41—The Paget Prize Plate Co.

For the supremely fine effects obtainable on self-toning paper the visitor will examine with interest the display of the Paget Co., for many years in the forefront in the manufacture of this description of sensitive material. There are also the several varieties of Paget gaslight paper, including Gravura, with its range of colours by modification of exposure and development. Paget bromide papers receive emphasis of their merits in the shape of enlargements from negatives, many of which are made on Paget plates, and the amateur interested in colour photography will not fail to see for himself the simplicity of the Paget process and the excellence of the results by it.

Stand No. 42—Colin Campbell.

Mr. Campbell will personally demonstrate his process of cold dry-mounting by means of a special adhesive preparation which is applied with a brush and does not require the use of a press. Every photographer will be interested in seeing the actual manipulation in this distinctive process of mounting.

Stand No. 43—Burroughs Wellcome and Co.

Although their products have reached a pitch of perfection and a range of variety which admit of little difference being made in exhibits of them from year to year, Messrs. Burroughs, Wellcome always contrive to show something out of the ordinary for the interest of their customers. This year it consists of 250 quarter-plate and 5×4 prints, all developed with the contents of a single 2s. carton of "Rytol." They illustrate the keeping qualities of "Tabloid" chemicals by enlargements from negatives developed with them on Sir Ernest Shackleton's expedition in the "Endeavour." Tabloid toning preparations likewise are illustrated, and there is, of course, the ever useful compact and comprehensive Exposure Diary.

Stand No. 44—Ilford, Ltd.

While the merits of their many manufactures will be shown in the shape of prints, enlargements and transparencies, Messrs. Ilford, Ltd., will arrange some very interesting technical displays by way of demonstration of the quality of both new introductions and goods which have long possessed an enviable reputation. For example, the visitor will have the opportunity of testing for himself the superiority of a newly introduced light-filter, the "Aviol," for the absorption of ultra-violet light, over that prepared with the German dye Filter Yellow K. Ultra-violet light emitted by a fluorescent screen of barium platino-cyanide will be available for viewing alternately by the two filters, and the advantage of the new dye thus seen at a glance.

Another exhibit consists of a series of eight prints from as many negatives made on Ilford "Special Rapid" plates with exposures ranging from 1 to 8. The plates were exposed in rapid succession, and were all developed together in the same pyro-soda developer for the same length of time. Inasmuch as the subject itself possessed a considerable range of light-intensities, it will be understood that the remarkable uniformity of the prints is an eloquent testimony to the great latitude of the plate. As a comparison, results obtained on plates of another make under the same conditions will be shown.

The advantages of panchromatic plates in the photography of polished woods and in process work will also be shown by means of exhibits, and Messrs. Ilford are including a series of colour prints from negatives made on their "Rapid Process Panchromatic" along with the original subject—a case of butterflies. Negatives made on "Zenith" plates of H. & D. 525, and lantern slides showing the magnificent range of tones on "Alpha" lantern plates will also form part of the exhibit.

Stand No. 45—E. B. Fry, Ltd

Inasmuch as Messrs. E. B. Fry supply their manufactures only through dealers, their name is perhaps less familiar to actual users than that of many other firms in the photographic trade. But they are very large makers, and in some cases the sole makers, of requisites which are in daily employment by both professional and amateur workers. Materials for passe-partout framing are a specialty of theirs, and include binding strips in a range of 32 colours and surfaces, together with hangers of several perfected types evolved by themselves and protected by patent. They issue a 16-page manual on passe-partout framing, in which every detail of the process is described and illustrated, and a number of attractive varieties of passe-partout framing indicated. The business of supplying these requisites has grown from Messrs. Fry's world-wide trade in lantern-slide binders and masks, which have achieved their success largely through the unique qualities of the adhesive applied to the strips, a virtue which is still more appreciated in the case of passe-partout binders. As makers of masks, Messrs. Fry have very thoroughly supplied the needs both of amateur workers and of those doing printing and development for amateurs by issuing a whole series of masks both in transparent light-tight celluloid and in paper. One series of particular interest to the trade printer is a set of transparent masks for making white-margin prints, all of half-plate size (outside dimensions), but provided with printing apertures down to the No. 1 "Ensignette" size. Such a series obviously provides great facility in the making of masked prints by means of a printing box. In short, for a great many of such requisites as these, which enter into the making of prints and transparencies, Messrs. Fry's exhibit is one specially to be studied.

Stand No. 46—Dye Impression Photos, Ltd.

The method of making prints from a dye negative by contact simply, without exposure to light, will be shown at this stand, where the visitor will be able to see the facile way in which prints are made, and, moreover, will have the opportunity of seeing exactly the kind of negative, on paper, which it is necessary to get for the best results in the prints. Examples of the results of the process will be shown, and the complete manipulation in the shape of the dyeing of the negative and the taking of prints from it will be shown in actual working.

Stand No. 47—Iliffe and Sons, Ltd.

Messrs. Iliffe occupy a stand which provides bold advertisement for the "Amateur Photographer," and for the many books on photographic subjects published from the offices of our contemporary.

Stand No. 48—Raines and Co.

Owing to the large demand for space at the Fair Messrs. Raines have not been able to make a very large display representing the many branches of their service for professional photographers, but their wall exhibit will demonstrate in an admirable manner the very high quality of their work as artists, colourists and enlargers. One feature of the exhibit will be a collection of miniatures on ivory, painted in their own studios, and representing a department of their business in which they are able to give close and personal attention to the commissions received from portrait photographers. Other work, which we have had an opportunity of seeing at their Ealing studios before its departure for the Horticultural Hall, is a small selection of the styles in enlarged portraits in which they are regularly working. These include pencil sketches, crayon drawings, and several portraits in water colours on a grey base, the artistic technique of all of which is of a very high order. As compared with the more delicate gradations of a photographic print or enlargement, such portraits of moderate size possess a strength, the quality of which is, perhaps, not sufficiently appreciated by photographers. It is shown by the striking way in which the work retains its character when viewed from a distance, say from the other side of a room, whereas a photographic print in like circumstances loses a good deal of its quality. Nevertheless, Messrs. Raines very rightly give prominence to the excellent results of straight photographic enlargements if made so as to secure the very best results from the negatives. In illustration of this they show a number of enlargements made by them from photographers' negatives without any retouching whatever beyond the spotting out of mechanical defects. The enlargements very forcibly emphasise their contention that in this work the best is the cheapest, since a photographer who makes or obtains an inferior enlargement can easily double its cost through the necessity of afterwards making good its defects by working up. The fine photographic quality of these enlargements is certainly an object lesson.

Stand No. 49—Peerless Photo Paper Co.

The qualities of a new make of portrait developing paper will be shown at this stand in the shape of a large collection of specimen prints. The Peerless Co. manufactures a wide range of development papers, and will also show the results on its gaslight paper for amateurs and on bromide paper of dead matt surface. Prints on P.O.P. and on other papers will also be shown.

PARIS NOTES.

Photographic Journalism in France.

As in my previous letter ("B.J.," March 11) I gave an account of the French Photographic Society, which is the headquarters of photographic activity in France, I may perhaps say a few words on the French photographic Press as it exists at the present time.

Technical journalism in France is in a less favourable position than in England. On the one hand, French is spoken by a much smaller number of people than is English, so that the field which is open to the publisher of a technical journal is smaller; circulation is therefore smaller, and the cost per copy correspondingly greater. On the other hand, manufacturers and dealing firms in France make use of advertisement to a smaller extent than is the case with English or American firms, which again operates adversely upon technical publications. Also the present cost of production is at a very much higher level, whilst circumstances do not allow of the sale price being correspondingly increased

The several periodicals de luxe, which formerly were devoted to photography, such as the "Bulletin of the Photo-Club of Paris" (and the "Revue de Photographie" which followed it), "La Photographie Française," and "Photo-Gazette," were compelled successively to suspend publication during the years 1905 to 1912. The attempts which have been made to issue annual publications, somewhat resembling the "British Journal Photographic Almanac," have not met with success. "La Revue des Sciences Photographiques," a first series of which appeared from 1904 to 1906, and which was revived in 1911, had its career stopped by the war and has ceased to exist, a fate which it shared with a number of minor journals appealing to amateur photographers.

The number of photographic periodicals which now have a life of their own, that is to say, do not exist by lifting matter which has been published elsewhere, is very small at the present time. The first of them which should be mentioned is the "Bulletin of the French Photographic Society," the

oldest French photographic publication. It appears monthly, but, unfortunately, for several years past has been about three months late in publication, so that the communications to the Society are made public with considerable delay. Next comes a group of three journals, managed with great energy by a newcomer in photographic journalism, M. P. Montel. These are "Le Photographe," established in 1910, published twice monthly, and appealing to professional photographers; "La Revue Française de Photographie," established in 1920, also published twice in the month, and catering for amateur photographers. Since the beginning of the present year each issue of the "Revue Française" contains a supplement of not less than four pages, entitled "Science, Technique et Industrie Photographiques," in which are published, without loss of time, abstracts of articles, etc., appearing in all the scientific or technical journals relating to photography and its applications, as well as brief summaries of inventions patented in France, England, United States and Germany. [M. Clerc omits to say that the excellent review of the current periodical literature of photography to which he is here referring is done by himself.—Eds. "B.J."] The third journal of the group is "L'Informateur de la Photographie," a monthly publication for dealers in photographic goods, distributed gratuitously to all retailers. The first issue appeared in March of the present year. In addition to the foregoing trinity of publications, which between them represent a circulation much greater than that of all the other journals put together, must be mentioned "Photo-Revue," the oldest of the amateur journals in France, which formerly was issued weekly, and the only one which maintained regular publication (but monthly) during the war. This journal now appears twice in the month. There are also a monthly review, "Le Procédé," of photo-mechanical processes, and some other publications of minor importance.

It is to be regretted that art criticism, which is such a feature of some of the English and American photographic journals, finds no place in the French publications. No doubt, as a result, the artistic level of the work of most amateurs is exceedingly low, as was shown in the competition organised last year by the Chambre Syndicale des Fabricants de la Photographie, which nevertheless was an important competition, since numerous prizes were offered, including one of 10,000 francs.

Shadow Detail and Short Exposures.

I read with interest, in the recent paper by Mr. G. I. Higson on "The Action of Light on the Photographic Plate" ("Photographic Journal," March, 1921), the following conclusion (p. 149):—"From this result it might be expected that the rendering of shadow detail by short exposures with lenses of great aperture and a rapid shutter would be better than with slower lenses and a slower shutter for the same value of exposure, *but the author is not aware if this effect has been noticed.*" The italics are mine.

This observation of Mr. Higson provides the long-sought explanation of the very remarkable results obtained by means of the camera which about 20 years ago was constructed, to the number of a few instruments, by the late M. Guido Sigriste. M. Sigriste, who was a painter of repute of historical scenes, required for some of his battle pictures accurate records of the positions taken by horses in movement. Being dissatisfied with the cameras obtainable, he himself made one of the focal-plane type permitting of exposures as short as 1-5000th of a second, and having a shutter efficiency of 100 per cent. The metal-edged slit travelled at a distance of less than 1-250th of an inch from the sensitive plate. This camera, fitted with a "Planar" lens, which at that time had the largest relative aperture obtainable, gave results of which M. E. Wallon, after having described the mechanism of the shutter ("Bull. Soc. Fr. Phot.," February 1, 1900, pp. 73-84), wrote as follows:—"These prints exhibit excellent gradation; the values are rendered in a manner which certainly is more correct (in many cases the difference is very great) than that which obtains in ordinary instantaneous photographs, or even from negatives which have received time exposures. I state this as an experimental fact, without endeavouring to explain it. . . . . ."

M. Sigriste established, in conjunction with his painter's studio, a workshop in which a small number of these remarkable cameras were made, but their price, which was relatively high for that time, proved an obstacle to the commercial success of his enterprise. Occasionally one of the cameras is met with second-hand, and it is noteworthy that, despite the apparent fragility of the mechanism, these instruments are invariably in as perfect condition as when they were made. It should be added that M. Sigriste, who was of Swiss nationality, but for many years had made his home in Paris, whilst over age for mobilisation by the Swiss authorities, entered the French army on the declaration of war and lost his life in the service of France.

Women's Work in Photography.

A question asked by a reader of the "British Journal" respecting the opportunities for the photographic employment of women in France has led me to make inquiries among the heads of the trade associations as to the opportunities for women in French studio establishments. Whilst, among amateurs, one can call to mind numerous women whose works have obtained distinction at the various exhibitions, it is scarcely possible to name half a dozen professional studios for portrait photography which are, or were, managed in Paris by women, and of this number barely half of them are run by Frenchwomen. Yet it would be a great mistake to conclude from this that there is no place for women in French professional portrait photography. In many studios the woman takes an active share in the management of the business with her husband, and it should be added that during the war the women entirely replaced men who were serving with the armies, not only on the commercial side, but also in the studios and other branches. In many cases they did so with the help of men disqualified from age or other causes for military service. Woman labour is, however, fairly largely employed in French studios, but not for such different kinds of work as in England. Women are employed chiefly for mounting and finishing prints; occasionally for retouching (the best women retouchers are foreigners), and, to a much smaller extent, in bromide printing.

Portrait Lenses.

One of the most skilful Parisian photographers, M. G. Cromer, has recently brought to the notice of the French Photographic Society the views which he holds as regards the properties of a lens yielding portraits in correspondence with the effect which is seen by the eye. As a result of our binocular vision, we see a little more to the left with the left eye and a little more to the right with the right eye than would be the case if we saw things from a single view-point in accordance with geometrical perspective. This seeing-round effect is further enhanced by the unconscious movements of a person to one side or the other from a midway position of equilibrium. For the purpose of obtaining an equivalent effect by photographic means, M. Cromer considers that the portrait lens should have a diameter of about 5 inches, or as near that size as possible. In order to avoid the excessive sharpness which a Petzval lens tends to give in a single plane of the sitter, he places at some distance at the back of the lens a sheet of "papier glace" (transparent gelatine, as used for tracing) of about 1-100th of an inch in thickness, which yields a slight degree of diffusion and renders the image more homogeneous, the outlines being softened to a greater extent as the gelatine film is placed nearer to the lens. This arrangement was very successfully demonstrated at a meeting of the Society by M. Benjamin, a well-known Parisian photographer, on the occasion of the establishment of a new studio portrait section of the Society.

Desensitising Plates.

As in England a preparation, Desensitol, has been made available by Messrs. Ilford, Ltd., for the desensitising process

of Dr. Lüppo-Cramer for the development of plates (even panchromatics) in full light, a similar product is being supplied in France by the firm of Calmels, and has given every satisfaction to those who have tried it. One of the most skilful Autochrome workers, M. Ch. Adrien, has used the desensitiser in this process so as to allow of development being done in ample yellow light, and has obtained perfect results. The dye is destroyed by the acid permanganate reversing bath, but the desensitising effect appears to persist, and therefore it is necessary to carry out the second development in a sufficiently strong actinic light.

Relief on the Screen!

The inventor of the concave screen mentioned in the previous instalment of these notes has had to abandon, so it is stated, the claim that the screen gives the effect of relief to pictures which are projected on it and to confine himself to the claim that a better visibility of the picture is obtained from all points of a projection theatre. In reply to the letter of Mr. R. W. Blakeley, which appeared in the "B.J." of March 25, p. 178, I must be allowed to say that the word "stereoscopic" was not used in the paragraph in which I mentioned this screen.

A New Studio Arc Lamp.

A new arc lamp, named the "Pistolet Studio," in reference to the resemblance of its shape to that of a pistol, and intended for use in the hand or on a light stand, has been introduced by the firm of Sautter-Harlé, specialists in the construction of searchlights and projection lamps. It is for use with continuous current as an auxiliary source of light in cinematograph and photographic studios, particularly for obtaining a concentrated lighting on parts of the subject. The lamp weighs less than 7 ozs. and has long carbons, the light from the crater being controlled by a spherical metal reflector which is polished or matt according to circumstances. For lighting, the negative carbon, which projects behind the reflector, is pushed by the finger until it touches the positive carbon, and is then let go. A spring, which is the only mechanism of the lamp, brings it to the required separation for normal working during three or four minutes, after which all that is necessary is to adjust the carbons by contact. The lamp is of such small size that after the handle has been detached it can be fitted on the burner of an ordinary oil lamp and used for the ordinary reading lamp effects of home portraiture. Owing to the special carbons which are employed, this lamp yields a light of from 5,000 to 6,000 candles for a consumption of 8 ampères at about 65 volts.

More Taxes.

Two branches of the photographic industry are particularly hardly hit by increases in taxation or creation of fresh taxes necessitated by the failure of the Germans to carry out the obligations which they accepted under the Treaty of Versailles. The cinema theatres have been subjected to progressive taxation, the total of which at the present time in the case of the large theatres may amount to 40 per cent. of the gross receipts. The view postcard trade, on the other hand, has received a severe blow by the raising of the postal rate on picture postcards from 5 to 20 centimes. The disastrous effects of these heavy advances in taxation have not been long in making themselves evident, and an active campaign is being undertaken by the respective trades with the object of obtaining some measure of relief. The cinematograph industry has cleverly applied its experience in stagecraft to enlisting public sympathy. On the occasion of the Mi-carême festivals it arranged for a number of vehicles to traverse the leading Parisian thoroughfares. On them were arranged stage settings representing in a most effective way the heavy imposts of which this important industry is the victim.

L. P. Clerc.

PHOTOGRAPHIC ADVERTISING.

At a meeting of the members of the Publicity Club of London, held at the Hôtel Cecil on Monday, April 4, Mr. Elwin Neame (Elwin Neame, Ltd.) gave an interesting lecture on "Photographic Advertising." For the purpose of demonstration he brought with him one of his famous models for showing the methods of securing unusual effects when photographing millinery, costumes, etc.

In the course of his lecture he said that in America advertisers used photography to a very much greater extent than in this country. Photography was not only on a level with line or wash drawings, but it could be of even better advertising value. The reason photographic advertising was not used to such a large extent in this country as in the States was because, generally speaking, our half-tones were of the cheaper variety, *i.e.*, of the coarser screen, and the quality of the paper generally used was not equal to that used in the States. There were certain colours which were very difficult to photograph, such as light blue on a white background; and yellow and purple also required careful handling, because yellow photographed dark and purple came out very light. Black and white was the ideal combination for photographing, and that was the reason why the American cinema producers almost invariably dressed the leading lady in black-and-white check. Fur coats were excellent to photograph, though black sealskin was rather difficult in goods of that class. Mr. Neame pointed out that most manufactured articles, in the shape of shirts, costumes, etc., were usually made in a variety of colours, and it was up to the advertising agent to see that the photographer was supplied with the most suitable colour scheme for his catalogue illustrations. In the manufacture of men's shirts, if they were made with a light blue stripe on white, it was fairly certain they were also manufacturing the same model with a black or dark grey stripe on a white ground, the dark stripe naturally solving the photographer's difficulty.

With regard to millinery, he said in this country at the present moment nearly every manufacturer of hats was using photographs to illustrate his productions. No doubt there were still a few not yet alive to the possibilities of photography, but he felt sure they would all fall into line in the near future. If a reader of a paper saw a very nice drawing of a hat in an advertisement, there was no guarantee that the hat actually existed other than in the imagination of the artist who had drawn it. When, however, one saw a real photograph of a hat on a model, surely that had a bigger pull and was more likely to create a sale.

Referring to the boot and shoe trade, he mentioned that a few years ago a boot manufacturer would purchase a photograph or painting of a pretty girl's head, and place underneath it the wording, "So-and-So's Boots are the Best," and retire to rest for a few months, feeling that he had coped with all the advertising possibilities of his goods. To-day the boot manufacturer is much more particular. He desires the picture of someone immaculately shod and stockinged, with the general garb in keeping with the particular style of boot or shoe. He further requires that the model shall be doing something interesting, to make a direct appeal to the users of goods of the type illustrated. His letterpress is persuasive, and points out why his boots and shoes are better than those of other manufacturers. "I predict in the future," said the lecturer, "that he will resort to X-ray photography, and, if possible, X-ray and colour photography combined, to show exactly how the placing of the heels and soles takes away the strain on spine, and, naturally, brain." [Mr. Neame tells us that on the day following the lecture he received a 'phone communication from the editor of the "Footwear Organiser," in which he stated that in the current number they were showing X-ray photographs of shoes and boots in reference to the American idea of limiting the height of the heel of women's shoes, and he informed the lecturer that in the States they were using X-rays to ensure perfect fitting.—Eds. "B.J."]

The lecturer pointed out, as one of the big difficulties of catalogue illustration, that often the garments sent did not fit the model. This, however, was easily overcome by having several models of known measurements to fit any reasonable stock size, and, where possible, by a model being properly fitted by the manufacturer of the garment before any attempt is made to take the photograph. This is now being done in many cases, and the

results are equal, if not better, and certainly of more selling value, than any wash or line drawing produced. Referring again to the boot and shoe industry, the lecturer mentioned that he was told, on good authority, that nowadays people will not buy from line or wash drawings, as in so many cases the sample differs to such a great extent from the illustration submitted.

Mr. Neame finished his lecture by demonstrating his methods of tackling various propositions to obtain the necessary effects to produce telling illustrations. The lecture was followed by an hour's questioning, in which the lecturer scored all the time.

BADGE NUMBERS OF CONGRESSMEN.

Provisional List.

The following are the badge numbers of members of the Professional Photographers' Association who will be attending the Congress. The list is, of course, not complete, since it represents only applications received up to almost a week before the opening of the Congress. Even so, it may usefully serve in enabling Congressmen from different parts of the country to become known to one another :—

Members of Congress.

1. Frank Brown, Leicester (President).
2. A. Swan-Watson, Edinburgh.
3. Richard N. Speaight, London.
4. Alfred Ellis, London.
5. H. A. St. George, London.
6. Marcus Adams, London.
7. Angus Basil, London.
8. Alexander Corbett, London.
9. C. F. Dickinson, Dulwich.
10. S. H. Fry, Ripley.
11. W. E. Gray, London.
12. Reginald Haines, London.
13. George Hana, London.
14. F. G. Wakefield, Chiswick.
15. W. B. Chaplin, Windsor.
16. H. A. L. Chapman, Swansea.
17. Gordon Chase, Bromley.
18. T. Chidley, Chester.
19. W. Illingworth, Northampton.
20. Herbert Lambert, Bath.
21. F. Read, Southport.
22. H. C. Spink, Brighton.
23. T. C. Turner, Hull.
24. W. H. Wedlake, Forest Gate.
25. Halksworth Wheeler, Folkestone.
26. R. Lang Sims (Secretary).
27. B. Matthews, Bradford.
28. A. H. Anderson, Bradford.
29. E. E. Balley, Kingsbridge.
30. J. P. Clarke, Cambridge.
31. F. H. Sanderson, Cambridge.
32. Douglas Wayland, Streatham.
33. J. W. Carrick, Upton Park.
34. J. S. Simnett, Burton-on-Trent.
35. J. Speight, Sutton Coldfield.
36. W. Davey, Harrogate.
37. F. W. Clark, Forest Gate.
38. W. T. Cook, Caterham.
39. W. H. Cox, Luton.
40. C. Speight, Kettering.
41. A. W. Dron, Brondesbury.
42. D. Osborne, Treharris.
43. A. Barratt, London.
44. Miss A. Cooper, Birmingham.
45. R. Dowty, Douglas.
46. R. W. Brown, Weston-super-Mare.
47. W. H. Brown, Weston-superMare.
48. W. T. Carter, Rochdale.
49. E. Carter, Rochdale.
50. Miss V Blacklock, South Hampstead.
51. Mrs. Carrick, Upton Park.
52. M. Sander, Stoke Newington.
53. J. G. Vesey, Eltham.
54. G. Shotter, London.
55. Mrs. Shotter, London.
56. G. N. Futcher, Southsea.
57. A. B. Fry, Highbury.
58. F. Flemming, Nottingham.
59. W. Coles, Watford.
60. A. C. Watts, Catford.
61. Miss Ivy Weston, Folkestone.
62. A. Hester, Upper Clapton.
63. J. Short, Nottingham.
64. A. R. Pickett, Bexley Heath.
65. F. Notcutt, Plymouth.
66. G. W. Jones, Kingston-on-Thames.
67. E. A. Wakefield, Ealing.
68. Mrs. Frank Brown, Leicester.
69. Mrs. Angus Basil, London.
70. Miss E. M. Eadon, Sheffield.
71. T. A. Scotton, Derby.
72. Mrs Gordon Chase, Bromley.
73. T. Lee Syms, Tyldesley.
74. T. A. Cornall, Harrogate.
75. S. H. Greenway, Northampton.
76. E. Noble, Grimsby.
77. H. J. Kempsell, Wallington.
78. W. S Hiscox, Middlesbrough.
79. Miss Daisy Day, Bishops Stortford.
80. Miss Clara Osborne, Birmingham.
81. J. Charlton, Canterbury.
82. A. Handford, Croydon.
83. Miss Aieleen Sherlock, Caterham Valley.
84. Miss Judith Farrants, Chorlton-cum-Hardy.
85. E. E. Carter, Romford.
86. Miss L. A. Grinyer, Birmingham.
87. F. Gegg, Evesham.
88. J. Cecil Gould, Weybridge
89. G. W. Cooper, London.
90. Miss A. Jameson, London.
91. A. Bennett, London.
92. Oscar Owers, Southsea.
93. H. Wayland, Blackheath.
94. A. E. Elsy, Hampstead.
95. T. Richards, Newark.
96. H. Abrahamson, Hackney.
97. Guy Hughes, Pwllheli.
98. Miss B. Belton, St. John's Wood.
99. H. O. Thompson, Newcastle.
100. D. B. Seaman, Liscard.
101 S. A. Chandler, Exeter.
102. L. Wood, Brighton.
103. S. Hedgeland, Maidstone.
104. F. G. Paget, Ilford.
105. R. H. Gresewell, Southport.
106. H. Bentley, Barrow-in-Furness.
107. G. Morton, Carlisle.
108. Major W. Wade, Middlesbrough.
109. J. Edwards, Oldham.
110. C. E. Willis, Bolton.
111. G. W. Herbert, Lancaster.
112. S. Darby, West Bromwich.
113. Mrs. Darby, West Bromwich.
114. B. Williams, Bristol.
115. A. W. H. Weston, Northwood.
116 G. A. Wilkinson, Bradford.
117. S. Bibbs, Muswell Hill.
118. F. Hodge, Bowes Park.
119. W. J. W. Stocks, Uppingham.
120. G. Couper, Watford.
121. H. P. Hider, Ealing.
122. A. G. Tooth, Porth, Rhondda.
123. Mrs. T. C. Turner, Hull.
124. Eric C. Turner, Hull.
125. Neville Turner, Hull.
126. G. J. Heaton, Lavender Hill.
127. C. Borup, Streatham.
128. W. Emery, Willesden Green.
129. Miss Chapman, Swansea.
130. W. H. Hawkings, Plymouth.
131. H. G. Dorrett, Tooting.
132. P. A. Martin, Tooting.
133. E. Sweetland, High Wycombe.
134. E. Hadley, Nottingham.
135. H. P. Robinson, Red Hill.
136. A. Hands, Wanstead.
137. J. H. Coath, Liskeard.
138. F. Scrimshaw, Leeds.
139. F. S. Scrimshaw, Leeds.
140. E. Albone, St. Neots.
141. Miss Elsie Ames, Blackburn.
142. Arthur Winter, Preston.
143. J. P. Bamber, Blackpool.
144. Mrs. Bamber, Blackpool.
145. Miss Fanny Weston, Northwood.
146. Miss Lena Connell, London.
147. E. H. Skillman, London.
148. H. Shrubb, Bow.
149. H. Harrison, Bow.
150. Mrs. Harrison, Bow.
151. F. W. Payne, Drogheda, Ireland.
152. E. Payne, Drogheda, Ireland.
153. A. P. Cook, Luton.
154. Norman Grut, Guernsey
155. P. Blackbeard, New Cross.
156. F. Robinson, Camberley.
157. F. Thurston, Luton.
158. F. W. Thurston, Luton.
159. Miss Thurston, Luton.
160. A. Jepson, Leeds.
161. T. R. Hammond, Conway.
162. Rudolf Eriksson, Swedish P.P.A.
163. Mrs. Hester, Clapton.
164. J. Cowley, London.
165. W. W. Dowty, Worcester.
166. B. W. Fisk-Moore, Canterbury.
167. R. H. Pickard, Leeds.
168 W. E. Bull, Witham.
169. Mrs. Dickinson, Dulwich.
170. Madame Estelle, Mill Hill.
171. W. Jenkins, London.
172. H. Snook, Reigate.
173. Mrs. W. E. Gray, London.
174. W. E. Blacker, Sutton.
175. G. Hall, Wakefield.
176. Walter Scott, Bradford.
177. E. Virgo, Sydenham.
178. S. H. Wood, Darlington.
179. J. Brunton, Sevenoaks.
180. J. Hughes, London.
181. G. A. Hale, Farnham.
182. E. W. Trangmar, Brighton.
183. Fred. Spalding, Chelmsford.
184. W. White, Goole.
185. M. W. Medcalf, Mexborough.
186. Argent Archer, London.
187. P. P. Crowe, Reading.
188. Herbert Vandyk, London.
189. F. A. Smith, London.
190. Archer Clarke, London.
191. J. Keogh, Dublin.
192. T. Moxon, Folkestone C.C.
193. R. H. Rice, Waltham Cross

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

Full Congress Programme.

Monday, April 18.—The members will assemble at 7 p.m., and will be received by the President, Officers, and members of Council. General Conversazione. The President will deliver an address.

Tuesday, April 19.—Morning left vacant to enable members of Congress to inspect exhibits in the Photographic Fair.

Afternoon, 2.15, demonstration by Mr. A. C. Braham (Autotype Co.) of the Carbro Process. Meeting for the discussion of business matters relating to the profession. Ten-minute papers :—

(1) "Salesmanship in the Photographic Business," A. C. Watts, Catford.

(2) "Reasons Why You Should Insure through the Medium of the P.P.A.," by a representative of the Eagle & British Dominions Insurance Co.

(3) "Canvassing Frauds, and How to Deal with Them," by S. H. Greenway, Northampton.

(4) "Dark Room Illumination," by a representative of Kodak, Ltd. Evening, 7 p.m., Mr. S. H. Fry in the chair. "Architectural and Technical Photography," by H. W. Bennett.

Wednesday, April 20.—Morning, 11 o'clock, by kind permission of the Rt. Hon. the Lord Mayor of London (Alderman James Roll), the Congress members, under the guidance of Alderman Sir Louis Newton, will be conducted through the historic and interesting Guildhall and Courts. The Congress members will assemble in the Guildhall Yard, Cheapside, at 10.45 a.m.

Afternoon, 3.30.—Sir William Jury extends to 80 Congress members an invitation to a demonstration of "Prizma" motion colour photography at Jury's Imperial Pictures, Ltd., 19, Tower Street, Upper St. Martin's Lane, W.C. Tickets may be obtained upon application to Mr. Lang Sims.

Evening, 7.—Mr. Richard N. Speaight in the chair. "Photographic Portraiture from a Woman's Point of View," Madame Yevonde.

THURSDAY, APRIL 21.—Visit to the works of Messrs. Kodak, Ltd., at Harrow. A special train will leave Euston at ten minutes past one. No railway tickets will be required. The number of the platform from which the train will start will be notified on the station "departure" board. Upon arrival the official group will be taken and refreshments will then be served. The programme of the tour of inspection has been timed to enable the members to reach Euston at 6.30 p.m.

Evening, 7.—Mr. Swan Watson (Edinburgh) in the chair. "A Talk about Continental Studios and Methods," N. E. Luboshez.

FRIDAY, APRIL 22.—Morning, 11.—A second invitation to 80 Congress members to Jury's Imperial Pictures, Ltd. Tickets may be obtained upon application to Mr. Lang Sims.

Afternoon, 3.—Mr. Marcus Adams in the chair. "Psychology in the Studio," C. P. Crowther.

Evening, 7.—Annual dinner at Gatti's Restaurant, 436, Strand. Evening dress optional. Installation of Mr. Swan Watson, of Edinburgh, as President of the Association, 1921-22.

This programme is subject to alteration.

New Apparatus.

The "Carbine" Daylight Film Developing Tank. Made by W. Butcher & Sons, Ltd., Camera House, Farringdon Avenue, London, E.C.4.

A new pattern of roll film developing tank is an introduction of theirs which Messrs. Butcher will show at the Photographic Fair, and where, we are sure, it will attract the favourable notice of the amateur worker. The tank is made for six exposure spools, and is obtainable in three sizes, the smallest for films taking a picture about 1¾ x 2½, the second size for the number 2 E "Ensignette," and the largest for Nos. 1 and 2 "Brownie" cameras and 2¼ A and B "Ensigns." An outstanding feature of the tank is the remarkably small number of its parts. These are simply the tank itself, a lid, and a long framework, or plunger, which passes through the lid, the appearance of the tank with the plunger nearly in the lowest position being shown in Fig. 1. For the insertion of the band of film into the tank in full daylight, the wrapping paper is unrolled as far as the caution mark and the loose end of the film securely fixed with a gummed label. The spool is then placed in a holder and the holder in turn placed in the enlarged mouth of the tank. Having drawn the plunger up through the lid to its full height the lid is put on, the loose end of film projecting outside and being nipped between the lid and the tank. The latter, it should be said, is previously charged with the developer. On now thrusting down the plunger, whilst the loose end of paper is firmly held, the film is pushed downwards by the lower part of the plunger frame and is thereby exposed as a long loop to the action of the developer. The operation of thus loading the film into the tank is very quickly done and without any opportunity, so long as reasonable care is taken, of going wrong. As a means of agitating the developing solution at intervals during the progress of development the tank is provided with a tube entering the tank at the bottom and having a rubber bulb on its upper end. The bulb has only to be squeezed once or twice in order to cause a current of air bubbles to pass up through the developer, and thus to prevent it from becoming stagnant. After development the film may be washed whilst still in the tank by running a stream of water through from top to bottom, or may be taken out of the tank, quickly rinsed under the tap, and put in the fixing bath. Messrs. Butcher supply powders for use in compounding the developer at the price of 1s. 6d. per packet of six, each sufficient for one tank full. Or a solution may be had, at the price of 2s. 3d., ready for dilution with water and sufficing to fill the tank ten times. The price of the tank itself is 35s.

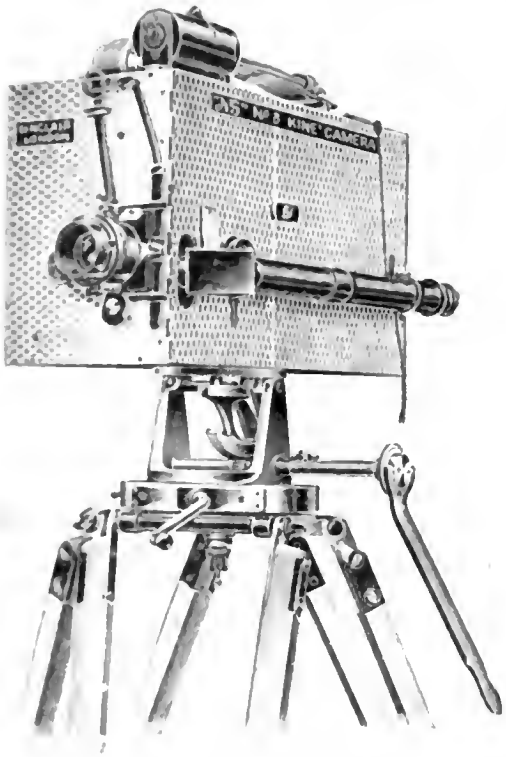
Fig. 1.

Fig. 2.

Fig. 3.

The N. S. Cinematograph Camera. Made by James A. Sinclair and Co., Ltd., 54, Haymarket, London, S.W.1.

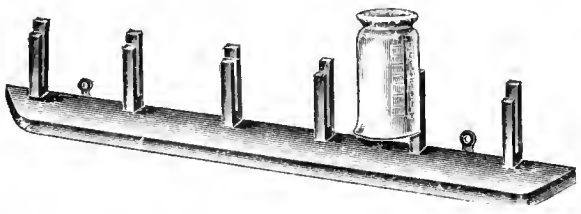
This camera for all descriptions of cinematograph negative making has been further improved by its designer, Mr. Arthur S. Newman, and now embodies a range of movements and conveniences beyond which it seems inconceivable that the cinematograph camera man can wish to go. We are afraid that no written description can do ample justice to the excellence of its design, but special emphasis may be laid upon some of its outstanding features. A chief one of these is the extreme ease of threading the film into the mechanism. The film boxes are placed side by side to the rear of the camera. The film is simply inserted from the full spool box and travels along a channel from which it is most expeditiously threaded through the gate. By means of the winding handle it is then conducted along a guiding channel to the take-up spool box, the whole operation occupying only a few seconds. Another feature is the very light running of the mechanism, making it possible to use the camera on a comparatively light tripod, so that the whole outfit (camera and tripod) comes within the weight of



32 lbs. By means of a special gearing the film can be moved in either direction by means of the winding handle without the shifting of any bands or pulleys. Moreover, the winding mechanism is provided with positive indicators at the rear of the camera whereby every single picture is denoted; that is to say, for trick effects the film can be turned on and exposed backwards over any given length, and exposure then resumed exactly at the section of the film at which the reverse exposure started. Similarly, the indicator allows of accurate track being kept in making "fading-out" and "fading-in" effects.

The arrangements for viewing the picture are most complete and efficient. The picture can be seen and focussed through an eye-piece mounted in one of the side doors of the camera; or this eye-piece may be fitted with a prism and tube by which the actual picture can be sighted from the operating position at the back of the camera. There is also direct-vision finder mounted on the camera top, and adjustable for lenses of different focus. The instrument also provides for the accurate insertion of masks without opening the camera. Both focussing and adjustment of the iris diaphragm are controlled by scales at the back; and a word should be said for the exceedingly reliable method of moving the lens in its mount, not by the helicoidal device of the ordinary focussing mount, which is subject to derangement by wear, but by a simple to-and-fro movement operated by a lever. The lens mounting likewise allows of objectives of any focal length being fitted, and being almost instantaneously interchangeable. Yet with all these movements the camera is small, measuring 14 × 5⅝ × 8 inches. Fitted with 2-inch *f*/3.5 Ross Xpres lens, its price is £250. The tripod designed for it and embodying a most perfect revolving and tilting top is sold at £31 10s.

A Graduate Drainer.—Messrs. Rycott & Dixon, 115, Balham Hill, London, S.W.12, send us one of the draining racks made by them for holding the photographer's glass graduates when the latter are not in use. As shown in the drawing, the rack consists of a series of pegs on which the graduate is loosely fixed in the inverted



position so that it does not become dirty from settlement of dust and cannot pick up chemicals from the work bench. Also the rack is made so that it can be screwed as a shelf to the wall, thus saving space on the work bench and at the same time providing a safe and accessible support for the glass measures. At present it is made to take six measures up to 20-oz. size, price 2s.

New Materials.

Zona Developing Paper. Made by Thomas Illingworth and Co., Ltd., Park Royal, Willesden Junction, London, N.W.10.

A quite new introduction of Messrs. Illingworth is a development paper of speed about a third that of the average gaslight paper, and similar, in its steady progress to full depth in the developer, to bromide paper. The new paper is made primarily for the purposes of portrait photographers, who usually have ample power of artificial light at their disposal, and to whom, therefore, the slower speed of the paper is a matter of small moment. A further notable feature, again of special interest to the maker of portraits, is the surface, or rather surfaces, of the paper. Two grades are made, one of so fine a matt that it can be fairly said that the effect is that of a plain paper uncoated with emulsion—in other words, the natural surface of the paper. The other grade has a slight sheen, but so slight that Messrs. Illingworth cannot bring themselves to call it "sheen," but only lustre; and we agree with them that the delicate touch of brilliance imparted to the prints made on this grade of the paper requires the less positive designation for its description. Actually the difference in the two surfaces is a very subtle one. We cannot recollect having had two distinct grades of paper between which the distinction was so fine; which goes to show the remarkable point of perfection to which the manufacture of printing papers has been brought in this matter of surface alone. At any rate, the photographer who must make beautiful prints will find a pleasure in either the matt or the lustre grade of Zona.

So far as the printing qualities of the papers are concerned, the results exhibit a very wide range of gradation, and the prints made with the M.Q. developer, which is recommended, are of excellent slightly warm black colour. It is a distinguishing mark of some of these slow papers that they respond to all the quality which is present in the negative, and at the same time possess a latitude with regard to exposure much greater than bromide paper or than the ordinary gaslight paper. Moreover, the comparatively leisurely manner in which the prints develop is more in accordance with the practice which professional photographers prefer than is the rapid, almost instantaneous, progress to full depth, such as is shown by many emulsions. We should add a word also on the admirable warm tones which are obtainable by toning either with liver of sulphur or with hypo-alum. Zona paper is made (in each surface) in white and cream. While perhaps the latter is most suitable for the warm-toned effects, some tones on the white paper are particularly striking. Also, Messrs. Illingworth manufacture the new product both in single and double weight, so that with these three variable factors—surface, tint and weight—there is a large range of papers to choose from, ample for the purposes of the professional photographer making, say, both large unmounted sketch portraits and quite small prints. The full list of grades is as follows:—5a, white "Lustre" matt single-weight; 5b, white "Lustre" matt double-weight; 6a, cream "Lustre" matt single-weight; 6b, cream "Lustre" matt double-weight; 7a, white plat matt single-weight; 7b, white plat matt double-weight; 8a, cream plat matt single-weight; 8b, cream plat matt double-weight.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, April 18.

Cripplegate Phot. Soc. "One Man Show." H. E. Wood.
South London Phot. Soc. "Gum Printing." H. E. Gorfin.
Willesden Photographic Society. Discussion Evening Summer Outing Arrangements, etc.

Tuesday, April 19.

Royal Photographic Society. "From Camera to Cinema." A. Pereira.
Exeter Camera Club. "Dye Impression Printing." C. H. Stokes.
Manchester Amateur Phot. Soc. "The Illustrative Art of Gustave Doré." E. D. Rodway.
Rotherham Photographic Society. "An Art Process with Simple Control." H. A. Hill.
Scottish C.W.S.C.C. (Glasgow). Plate Development.
Sheffield Photographic Society. President's Evening.

Wednesday, April 20.

Croydon Camera Club. Display of Prints from Plates Exposed on the Easter Monday Outing.
Dennistoun Amateur Photographic Association. Jumble Sale. Photographic Apparatus.
Edinburgh Photographic Society. Lantern Slide Making.
Ilford Photographic Society. "Maldon." N. K. Jackson.
Partick Camera Club. "The After Treatment of Negatives." A. Dordan-Pyke.
Woodford Phot. Soc. Annual General Meeting.

Thursday, April 21.

Everton and District Phot. Soc. "Bromoil." The President.
Hammersmith (Hampshire House) Phot. Soc. Annual Exhibition.
Kryn and Lahy (Letchworth) Phot., etc., Soc. "Figure Studies."

Friday, April 22.

Bedford Camera Club. "Picturesque Devon." (Ladies' Night.)

Saturday, April 23.

Hammersmith (Hampshire House) Phot. Soc. Outing. Richmond to Strand-on-the-Green.
Scottish C.W.S.C.C. (Glasgow). Outing to Gleniffer Braes.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, April 12, the president, Dr. G. H. Rodman, in the chair.

The President declared open a house exhibition of prints, selected from the competition organised among overseas readers of the "Amateur Photographer," which will remain open for several weeks.

Mr. R. J. Trump, B.A., B.Sc., delivered a lecture on a shutterless continuous-feed cinematograph in which the rays from the customary optical-projection system pass on to a set of mirrors which are successively angled to the lens axis. Marginal rays from the light-source are thus reflected on paths which, in the absence of obstacles, would meet in the focus of axial rays, so that a constantly moving picture in the gate of the projector is kept stationary on the screen by the synchronised movement of reflectors and film. The physical obstacle of the projector is avoided by the use of a second reflector, but it is claimed for the system that despite the twice-repeated reflection, the light efficiency is 80 per cent. as compared with an alleged 50 per cent. of a shutter projector. Although, theoretically, a projector having a given lens and mirror wheel is suited for only one distance from the screen, it was stated that the practical performance at various distances was satisfactory.

Some discussion followed the reading of the paper, and different opinions of the sharpness of the projections were expressed by two speakers who had witnessed them.

The general technics of cinematography were next considered in a series of discursive notes by Mr. H. M. Lomas, who touched briefly on film storage, definition, development and on many other photographic matters from the cinematographic standpoint.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Meeting held April 4. Present: Messrs. E. D. Young, J. Campbell Harper, J. B. Johnston, Norman Thomson, J. Drummond Shiels, Fergusson, Laing, Moffat, and Melrose. Mr. E. D. Young (President) in the chair. An apology for absence was intimated from Mr. Swan Watson.

The Secretary read a letter which the President had received from a photographer in the south of England, congratulating in appreciative terms the Society in their efforts to maintain the prices of professional work and on their endeavour to combat the question of "free sittings." He stated that the practice in London of giving "free sittings" was carried on by professional photographers to an alarming extent, and tended in a great measure to reduce the business standing of professional photographers.

The Secretary read a letter from Mr. Claude Lauder resigning his membership of the Society, which was accepted with regret.

Mr. Johnston and Mr. Norman Thomson, the members of the Heriot-Watt Committee appointed by the Society for waiting upon Principal Lauris in connection with the institution of a class for practical chemistry as applied to photography and optics at the Heriot-Watt College next session, reported that they had a long interview with the Principal last week. They stated that the Principal seemed to be averse from the idea of starting a class for the above subjects for photographers only, and desired the inauguration of a national school of photography in Scotland to embrace all classes of photographers and process workers. The lack of funds, however, together with the uncertainty as to whether the Education Authority were to undertake the management of the Heriot-Watt College, prevented the possibility of this scheme being attained in the meantime. Mr. Drummond Shiels suggested that an effort should at once be made to get a trade class for photography started as early as possible, and that the Education Authority should be approached with a view of instituting a technical class. His view was that to wait until a national school of photography was inaugurated would be to shelve the matter indefinitely. It was accordingly resolved to approach Mr. McNally, of the Education Authority, after the ensuing election, and to ascertain if they were willing to consider the formation of a trade class for photography at the night schools. Mr. Johnston and Mr. Norman Thomson were thanked for their services and were discharged.

Mr. Moffat next submitted the report of the Committee on the minimum prices of commercial photography. He laid before the meeting a costing basis table showing the actual cost of one unmounted print in the various sizes, with a percentage of profit added. The minimum charge for the operator's time was fixed at 2s. 6d. per hour—one hour being the minimum charge. The meeting expressed their indebtedness to the Committee for the trouble which they had taken in the matter, and considered that the costing system basis was undoubtedly the proper system to work upon. The members desired time to consider the table, and the secretary was requested to furnish each member with a copy. The secretary was also requested to urge each member to be present at the next meeting of the society, when the matter would be fully considered and decided upon.

The secretary reported that at the last informal meeting the minimum prices of groups were considered, and it was recommended that the present minimum prices for groups be approved of, but no minimum prices were to be fixed for whole plates or smaller sizes, and this was agreed to. It was understood that the minimum prices were to be for one dozen copies.

The proposal to increase the membership of the Society was cordially received by the members, and Mr. Yerbury and Mr. Campbell Harper were appointed to call upon each professional photographer in Edinburgh who was not a member of the Society and invite him to the next meeting, which is to be held in the Victory Café on May 2, and endeavour to get him to join the Society.

The president intimated that at the next meeting of the Society new office-bearers fell to be elected. It was only right that members should meantime consider the claims of members who were most suitable for nomination. A vote of thanks to the chairman for his conduct in the chair concluded the meeting.

CROYDON CAMERA CLUB.

The good-natured Mr. L. J. Hibbert kindly filled a gap, caused by a fixture falling through, with a capital exposition on "Photo-Micrography." An imposing array of apparatus was on the table, with which some excellent photo-micrographs were secured. Wise in his generation, he never confuses the tyro by saying too much, and his clear explanation of the theory and working of the instruments shown proved him to be an adept in the teaching line. A most hearty vote of thanks was accorded him.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held at 35, Russell Square, on Friday, April 8. There were present, among London members, Messrs. Marcus Adams, Angus Basil, Alexander Corbett, Alfred Ellis, W. E. Gray, Reginald Haines, George Hana, Richard N. Speaight, H. St. George, and F. G. Wakefield, and among country members, Messrs. Frank Brown (President), W. Illingworth, and W. H. Wedlake, with Mr. Lang Sims (Secretary).

Apologies for absence were received from Messrs. Chase, Dickinson, Lambert, Turner, Swan Watson, and Wheeler.

The Finance Committee submitted recommendations for payments amounting to £93 1s. The recommendations were approved.

The Secretary read the names of eighteen new members, and also reported two resignations, due to retirement from business.

The Chairman, in reference to a motion in his name which appeared on the agenda of the annual meeting, said that he had to apologise to the Council, on behalf of the Secretary and himself, for taking time by the forelock. It had been, he believed, the unanimous opinion of every member of the Council that the Association should be incorporated, but before any step could be taken in the matter it was necessary to introduce a motion to the annual general meeting, and as that took place a fortnight from that day, and it was necessary to give 14 days' notice of motion, there was no opportonity for submitting the form of motion to the Council first. The wording of the motion had been drafted by the Association's solicitor, and he understood that it was quite in order. As Mr. Illingworth was the first to introduce this subject, he thought that Mr. Illingworth should be associated with it at the annual general meeting as seconder. The motion was as follows:—

"That, having regard to the disadvantages of the present constitution of the Association, and with a view to it becoming a formal legal entity possessing legal rights, and with a view to the effective protection and indemnity of its officers and removing

impediments to its progress, and acquiring greater certainty in regard to its correct administration, government, and powers, it is resolved that the Council be authorised, at the expense of the Association, to register under the Companies Acts, 1908 and 1917, a new Association, not for profit and limited by guarantee, to be called the Professional Photographers' Association of Great Britain (Incorporated), and that by the constitution of such new Association the liability of members shall be limited to—

(*a*) A subscription of 10s. per annum, and

(*b*) A contribution to the assets of the new Association in the event of the same being wound up during the period of membership of each member or within one year afterwards for payment of the debts and liabilities of the Association contracted before the time at which such member ceases his membership, and of the costs, charges, and expenses of winding up the same, and for the adjustment of the rights of the contributories among themselves, such amount as may be required not exceeding 10s. per member.

"And that all the members of the existing Association shall be entitled to become members of such new Association when registered without payment of any further subscription until the expiration of the period for which their respective subscriptions have been paid to the present Association, and that upon the registration of the new Association the assets of the existing Professional Photographers' Association be transferred to such new Association.

"And that a Committee be elected from the Council of the existing Professional Photographers' Association of Great Britain with power to settle the Memorandum and Articles of Association embodying so far as practicable the objects and rules of the existing Association, and such further objects and rules as such Committee may be advised are desirable."

Mr. Wakefield asked what happened in the event of the Association desiring to raise the subscription.

The Chairman said that it would be necessary to apply to the Board of Trade.

Mr. Hana asked whether it had been considered that this was the most suitable form of incorporation.

The Chairman said that the solicitor had advised that this was the best form. It was not necessary to put the word "Limited" after it, as in the case of an ordinary trading corporation. He added that he had seen the solicitor, who had promised to attend the annual general meeting to answer any questions.

Mr. Illingworth thought this the best form for the Association. He desired to know what the solicitor's opinion was of the motion he (the speaker) had brought forward previously.

The Secretary said that it was from Mr. Illingworth's suggestion that the memorandum from Messrs. Hutchison and Cuff took its shape.

The Chairman, explaining further points, said that the articles of association had to be drawn up after the meeting had agreed to the prelimnary motion, and then the matter had to go to the Board of Trade. The drafting would come before them, most likely at the next Council meeting, for sanction. The stamp duties would be about £13, on the basis of a membership of 2,000.

Mr. Haines said that he thought the whole expenditure, including the stamp duties, which had been increased, and the solicitor's fees, would be well within £100.

The Council signified unanimous assent to the form of motion to be proposed by the Chairman and seconded by Mr. Illingworth at the annual general meeting.

Mr. Frank Brown said that the thanks of the Council were due to the Chairman, Mr. Alfred Ellis, and the Secretary, Mr. Lang Sims, for taking this matter up so energetically. He would like to propose a vote of thanks to them for their prompt action.

Mr. St. George seconded, and this was carried by acclamation.

The Secretary gave some account of the latest alterations in the Congress arrangements. A number of short papers were promised for Tuesday afternoon, in addition to one or two trade demonstrations. The visit to the Houses of Parliament, fixed for Wednesday morning, could not be undertaken, owing to the present restrictions. He had then thought of a visit to the Mint, but the parties of visitors allowed were too small in number to admit of the whole of the Congress members seeing it in a morning. Then he got into touch with Right Hon. the Lord Mayor of London, and had secured an invitation to the Guildhall. (Applause.) The Lord Mayor would receive the party (if circumstances would allow), and if he could not be present himself at the Guildhall, the whole of the members there would be officially received by Alderman Sir Lewis Newton in his stead. They would be taken over the building, and shown the various objects of interest. Thursday was devoted to the Kodak excursion (Euston Station, 10 minutes past 1 o'clock), and included in the programme was a Council picture and the usual group of the members.

It was agreed that, if possible, the visit to the Alhambra Theatre, on Sir William Jury's invitation, should take place on Wednesday afternoon and Friday morning, subject, of course, to the convenience of those who had issued the invitation.

Mr. Speaight thought that the retiring President should have an official vote of thanks from the Council. Accordingly he proposed, "That the thanks of the officers and Council of the Professional Photographers' Association be tendered to Mr. Frank Brown, President 1920-21, for the valuable services he has rendered to the Association during his year of office."

Mr. Adams seconded this proposition, and it was carried unanimously.

It was agreed that the resolution should be incorporated in a letter to Mr. Brown in script, on a framed piece of parchment, and handed to him at the annual dinner.

Some discussion took place on the arrangements in the event of a transport strike, and it was agreed that if there was a general strike an emergency Council meeting of London members should be called, the date and time to be left to the Chairman of Council. Mr. Speaight suggested that a final decision on this matter might be reached after the meeting of the Selecting Committee on the following Tuesday.

Mr. Adams reported that everything was going on satisfactorily for the annual Exhibition. Ninety packets had been received up to that day.

The Secretary read a letter from the Eagle Star and British Dominions Company, who said that they had had a total of 24 applications as the result of the announcement on the circulars. The company was now desirous that the Association should include life with their other assurances.

It was agreed to leave the consideration of this matter over to the next meeting of the Council.

After a sitting of three hours fifteen minutes, the business terminated.

News and Notes.

TUNBRIDGE WELLS PHOTOGRAPHIC SOCIETY.—An exhibition of old Japanese colour prints is being held at the club rooms from April 18 to 23. On April 20, at 3 p.m., and on April 23, at 8 p.m., a lecture on them will be delivered by their collector, Mr. Basil Stewart.

SECONDHAND APPARATUS.—Messrs. W. Watson & Sons, 313, High Holborn, London, W.C.1, send us an 8-page list of cameras, lenses, and some miscellaneous accessories which they are offering at greatly reduced prices. The list includes a number of their own admirable "Acme" field cameras and lenses by almost all the leading makers. The list is obtainable free on application.

MINIATURE FRAMES AND CASES.—Messrs. G. & E. Russell, Northfield Road, King's Norton, Birmingham, send us a descriptive illustrated list of their original designs of miniature cases in morocco, persian, or velvet calf leather, designed with the taste which characterises this firm's productions. The rims of gold-plated metal or antique, reeded or frosted silver, likewise mark the artistic craftsmanship displayed in these goods.

WESTMINSTER EXCHANGE LISTS.—The Westminster Photographic Exchange, 111, Oxford Street, London, W.1, and 110, Victoria Street, London, S.W.1, have just published three price lists, one of current photographic requisites, both apparatus and materials, at the present ruling prices and including a considerable number

of the firm's own specialties. This is a very excellent list for the amateur purchaser, and one which he can conveniently study before examining the goods themselves at one or other of the Westminster Exchange's depôts. The other two lists are of secondhand apparatus, cameras, lenses, enlargers, and, in fact, every description of apparatus in very great variety. The Westminster Exchange, which has a very sound reputation for dealing in goods of thoroughly reliable working quality, is evidently in the position of being able to save the purchaser a good deal of money if advantage is taken of the many bargains offered in these lists, any of which are obtainable free on application.

NEW METHOD OF EMBOSSING DIES.—At the Printing Trades Exhibition the Marshall Engraving Co., Ltd., are showing a new method of embossing, or, what might perhaps be considered a more accurate description, a new and inexpensive method of making dies for embossing. Hitherto the printer has had to procure an expensive metal die, then make his own counterpart before he can proceed with his work, but by this "New Method" embossing all the printer has to do is to send his design to the Marshall Engraving Co., Ltd., who will cut the die and counterpart and supply them ready for work within two days, and at about one-quarter of the cost of the ordinary metal die. There is no metal, no counterpart to make, no chemicals, no powder, and, what is most important, you can do the work on a light treadle press, and a further important point is you can have your machine ready for working in about five minutes after handling your dies. That these dies are thoroughly effective is proved by the fact that 100,000 impressions have been taken from one die, and it is still in use. Full particulars will be supplied by the Marshall Engraving Co., Ltd., 12/14, Farringdon Avenue, E.C.4.

Correspondence.

***Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

FORMALINE AND THE GELATINE FILM.

To the Editors.

Gentlemen,—Re the paragraph in the 1921 "B.J. Almanac," p. 366, "A Warning Against Formaline," I have used formaline every summer for the past ten years or more, and have not so far met with any objectionable after effects. In the heat of summer here—with all solutions and washing water anywhere between 90 and 100 deg. F.—it is the only thing I have found effective in keeping the film on the glass. Without it, the film simply runs off, or, in less extreme cases, develops that appearance resembling the grain of leather—"leathery film" I have heard it called. Perhaps the trouble described by your correspondent is due to other causes.

I should add that I use the formaline *after* fixing. I rinse under the tap and then immerse for about ten minutes in 10 per cent. solution of formaline and then wash.—Yours, etc.,

H. W. SMITH

O'Keefe and Regent Streets, South Brisbane,
Queensland, Australia.
February 24.

THE FOLLY OF CHEAPNESS.

To the Editors.

Gentlemen,—The lot of the average professional to-day is not a very happy one, and I have had some sympathy for him, but a recent event in our district leads me to believe that some workers do not make the most of their opportunities.

Last week there was unveiled in our parish church a most beautiful memorial stained glass window, and, as was to be expected, a local professional worker of good standing was soon after it; in fact, the unveiling ceremony was scarcely over before I saw him enter the church with his camera. I admired his enterprise, knowing of the demand for prints.

I am very much surprised, however, to find that his result—and a very excellent one—is being sold in all the local stationery shops in the form of postcards at 2d. each! Threepence would have been low enough in these days of high prices, and it is something of a mystery to me how excellent and real photographic postcards of particular local interest can be sold for 2d. No wonder complaints about bad business are heard when the profession throws away good chances of making an extra penny or two.—Yours faithfully,

EAST COAST.

AN APOLOGY.

To the Editors.

Gentlemen,—Having unwittingly infringed the patents of Messrs. Move-o-Graphs, Ltd., we are unable to supply the Movie Apparatus advertised in the "British Journal." At the request of Messrs. Move-o-Graphs, Ltd., we desire to apologise to them, as follows:—

"The Movie Photo Company, of 20, Cornhill, Bridgwater, hereby tender their apologies to Move-o-Graphs, Limited, of 60, Doughty Street, London, W.C.1, in respect to the advertisement in the 'British Journal of Photography' of April 1, and state that the apparatus offered was an infringement of the patents held by the said Move-o-Graphs, Limited."—Yours faithfully,

THE MOVIE PHOTO CO.

20, Cornhill, Bridgwater.
April 9.

STEREOSCOPIC RELIEF.

To the Editors.

Gentlemen,—Your correspondent, Mr. Tilney, has such a pleasant and lucid way of telling his experiences with the bewitched wallpaper of his bedroom that his gentle hint that we are not to attribute them to the D.T.'s is hardly necessary. As, however, his rather alarming visual aberrations may make his friends, and especially his women folk, somewhat anxious, and as he asks for an explanation of the phenomena, and as I happen to be one of those dry-as-dust individuals whose fate is to deal with the dull technical side of optics as a recreation (!), perhaps I may be permitted to endeavour to throw some light upon the matter. It would need a very clever person indeed to "explain" fully any right impression, or to discuss with any degree of finality the "actuality" or "reality" of the images he refers to, or to say whether they should be regarded as objective or subjective. These questions must be left to metaphysicians to fight over. But it may be said that the floating images he saw were just as real as any other images; that, optically speaking, they were produced in the same way as other images; but that his judgment as to size, distance and reality was prejudiced by his knowledge that they did not correspond to the external facts, and by their obviously artificial and unnatural character which caused them to disappear when he moved his head.

The phenomena Mr Tilney chronicles have been familiar to me since, as a child, I saw the roses on my bedroom wall suddenly become delightfully small and close together and waver beautifully in mid-space. What happens is that we have identical patterns, spread at regular distances from each other in all directions over a large area. Let us call three of these patterns A, B, and C, running from left to right as regards the eyes. It does not matter in what direction we take the three, provided the line joining them is parallel to the line joining the two eyes, i.e., that they are in the same plane as the eyes. If the head is horizontal on the pillow, then A, B, C must be vertically placed on the wall; if the head is only inclined the three must lie on a corresponding diagonal; if the head is upright, as when one stands, they must be horizontal. Now, suppose that we unconsciously squint a little, so that the left eye looks at B, while the right looks at A, then we have really converted the wallpaper into a big stereoscopic slide, and we are viewing it in such a way that the lines of sight to corresponding points cross each other and intersect in front of the slide. This brings the image nearer, and at the same time makes it smaller than the original. Anyone who cares to consult the terribly technical articles on this subject which I inflicted on your columns last year will see how

the image grows smaller and nearer as the points of intersection of the lines of sight approach the eyes. If we squint so that the left eye looks at C, while the right looks at A, we get a still smaller and nearer image. Having once got it we can let our eyes roam at will, or we can even move our head along the line A, B, C, or at right angles to it, but if we twist our head ever so slightly we break the charm, and are brought back to reality with a shock. Having discovered the secret and made it our own, we can,, by "playing about with it" (in the delightful phrase of Mr. Tilney), produce a wonderful variety of effects. I amused myself in this way for ten minutes in the interval of dressing this morning. A finger held before the face so as to come between each eye and the particular pattern it is looking at shows the real distance of the image.

The simple method of experimenting, which I used last year, was to take two slips of smooth paper, about 1¼ in. wide and fairly stiff. At one end of each slip I described a circle of 1 in. diameter. I then held one slip in each hand and treated the two circles as a stereoscopic slide, viewing them first directly, i.e., the left oriel with the left eye, and vice versa, and then squinting at them. Movement of the two slips towards or away from each other was in both cases attended with a marked change in the size and position of the image. This was sufficient to prove the absolute necessity for correct spacing of the prints where accuracy is required in the result.

It may be pointed out that a stereoscopic image is not necessarily three-dimensional. The stereoscopic image given by the wallpaper as a slide is simply another wallpaper—another flat surface—that is, if the patterns are really identical and equally spaced. The difference of plane noticed by Mr. Tilney between the vertical lines of the pattern and the flower sprigs may be due to a slight shift of the colour blocks in printing. The difference in colour might also have something to say to it. In my own case, when I examine a Michelin map the reds have an uncomfortable habit of floating above the blues and greens in consequence of the absence of colour correction in my glasses.

The question as to what is necessary in a photograph in order that an impression of stereoscopic relief may be produced in the mind of the observer is not one that I would care to ask, much less to answer. Messrs. Lumière have presumably tested their apparatus and obtained satisfactory results, and this would appear to decide the matter so far as they are concerned. But when a real object is viewed by the eyes there is a very definite difference in the image received by each eye; and the really urgent question for those who would like to see stereoscopic photography occupying the important place to which its wonderful capabilities entitle it is rather—what is necessary in order that the stereoscopic effect produced may be so accurate, so reliable, and so readily obtained, that the judgment of the observer is able without strain or hesitation to accept it as true and as exactly corresponding to the reality it represents.—Yours, etc.,

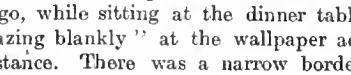
H. C. Browne.

Kingstown, Co. Dublin.
April 5.

To the Editors.

Gentlemen,—Referring to Mr. F. C. Tilney's letter, I am able to give an explanation of his experience with the wallpaper. About twenty years ago, while sitting at the dinner table in the kitchen, I was also "gazing blankly" at the wallpaper across the table at about 3 ft. distance. There was a narrow border at the bottom of the wallpaper about the same height as my eyes, the wall being panelled with wood beneath that to the floor.

The narrow border was about 4 in. wide, running horizontally across the wall; it had a repeating pattern such as this:—



I became conscious of the same effects as Mr. Tilney has described. I need not repeat them here. In less than a minute I was sure I had discovered, as far as I was concerned, what I had often looked for previously.

Here is the explanation in plain language. Some years previous I read an article in the "B.J." on how to obtain a stereoscopic effect without the aid of a stereoscope. In the article the writer said (so far as I can remember) that a sort of stereoscopic effect could be obtained by making the eyes squint inwardly, but this is not satisfactory and it is hurtful to the eyes. The proper way was to make your eyes diverge outwardly, but I could never understand how this could be done beyond the normal. While "gazing blankly" at the wallpaper or border slip I was, in fact, looking beyond the paper, i.e., my eyes were focussed at infinity.

Now, if you hold up your finger in front of your face and look at some distant object, say a hundred yards or so away, you will see two fingers with the tail of your eye, as it were. This is the whole secret.

The figures on the wall border scroll were all double, and each figure had moved just sufficiently to allow it to overlap on its neighbour and produce the effect Mr. Tilney speaks of. I tried the experiment on a stereoscopic slide and found the stereoscopic effect A1, only I may say that the picture looks smaller and the stereoscopic effect in some cases is slightly exaggerated.

Fix your eyes on some distant object, and, without altering the focus, slip a stereo slide in front of your eyes. You will then see four pictures instead of two, but with a little manœuvring you can quite easily get the two centre pictures to overlap and produce the same effect as a stereoscope.

What actually happens is simply this: You are looking at the right-hand picture with the right eye and the left picture with the left eye. You can easily prove this by first closing one eye, opening it again, and then closing the other.

Some people cannot see the right effect, even with a stereoscope; in fact, I have an assistant who sees two pictures instead of one, but I have not tried to find out the reason. For many years I could not see properly with binoculars, also seeing two pictures instead of one.

In practice it does not seem to matter much whether dissimilar views are used or not for distant views, but for near objects, such as a portrait bust, the effect appears to me quite flat unless the views are dissimilar.—Yours truly.

Norman Hunter.

The Studio, Port Glasgow.
April 4.

To the Editors.

Gentlemen,—I think that Mr. Tilney's difficulties are fully explained by the two letters given last week. I might add that when the pattern looks smaller than its actual size it is purely a mental effect due to squinting—actually, to the eye, the image is the normal size, but the brain has got so accustomed to associate converged vision with near objects that it cannot get rid of the habit. And when the eyes merge two objects in the wallpaper by gazing out on parallel axes the image, to the brain, appears bigger than normal and further away. Mr. Tilney's surprise at the butt joint being seen in duplicate is not justified; it is simply inevitable. Indeed, a quite useful test of whether a man is really seeing a stereo slide in the stereoscope is to ask, "How many pictures do you see?" If he is seeing properly he will see three separate pictures, the centre one of which alone is stereoscopic.

I had a curious experience of my own some weeks ago. I am not a teetotaller, and one day I caught myself with an empty wine glass at my lips, and looking through the bottom of the glass at the stem and foot I was surprised to see only the right-hand view of the stem. This was rather a facer, as I have been using both eyes on stereo views for over fifty years. Knowing that the left-hand view must be knocking about somewhere I put the glass again to my lips and shut the right eye. This, of course, brought up the left eye view. On opening the right eye again I got both views, but at the end of six or seven seconds the left eye view vanished again. I tried the experiment over and over again until I could hold both views together indefinitely, but it took me some minutes before I could see both right and left views of the stem without going through the preliminary shutting of the right eye. My subconscious brain evidently thinks it more convenient at such close quarters to work one eye only than to use both with such a great muscular effort of convergence.

Shortly after this I was showing a friend some slides, and after a bit found he was looking at them out of the stereoscope, insisting

that he could see them better so. I told him to first shut one eye and then the other to make sure that each eye could do its own proper work, and then to look with both eyes. In a minute or two he shouted, "Oh, I've got it, it's wonderful!" It was a miracle to him, and he was looking in vain at the stereoscope and then at the slide in and out of the stereoscope for some explanation of the miracle.

An oculist of my acquaintance tells me that this unconscious inhibition of one eye is quite a common defect, generally when looking at near objects, though sometimes it is only brought in when looking at distant objects. They put it down to laziness of the muscles used in convergent vision and don't so far bother much about it unless it is causing definite inconvenience. But if suspected, they have a quite simple test; they give the person a pair of spectacles, one lens of red and one lens of green glass, and then flash on the illuminated word "Friend," the alternate letters of which are red and green on opaque ground. If the eyes are not both in use the word appears as "F-i-n" or as "r e d."

I think that the inflexibility of most stereoscopes as regards inter-ocular separation is the cause of a great deal of difficulty in seeing slides properly. All stereoscopes ought to have the lens centres adjustable.—Yours truly, R. W. BLAKELEY.

Seedley Park Road, near Manchester.
April 11.

THE INVENTION OF SELF-TONING PAPER

To the Editors.

Gentlemen,—In an article by Mr. E. J. Wall, reprinted in your last issue, he ascribes the discovery of the self-toning principle to Mr. John Spiller. He may be quite right in doing so, but he does not give the date of Mr. Spiller's paper. [Mr. Wall, corrected, cited "Photographic News," Vol. 13, 1869, p. 401.—EDS. "B. J."] Reference is also made to a possible claim for Mr. Hennah. As to the latter, I may say that I was in Brighton in 1858, and greatly admired the work of Messrs. Hennah and Kent, whose studio was in the King's Road. Their specialty was whole-plate portraits on matt paper, but of quite a distinct character from the salted paper prints (then the alternative of albumen paper) of that time, they being generally either weak and foxy if untoned or grey and slaty if gold toned.

Hennah and Kent had a well-deserved reputation as being among the first, if not the first, photographers in the kingdom, and I remember reading in one of the Journals not long afterwards that people would come from all parts to Brighton to be photographed by them.

The formula for producing these brighter and more vigorous results was a well-kept secret, but some years later, when in business in Regent Street, I had on my staff a man who had been in the employ of Hennah and Kent, and he told me that Mr. Hennah used chloride of gold in the salting solution.

If Mr. Spiller made an independent discovery, and was the first to publish it, he certainly deserves full credit, whether or not Mr. Hennah previously practised the same method.

W. E. DEBENHAM

33la, Finchley Road, Hampstead.
April 11.

HALATION AND DEVELOPMENT.

To the Editors.

Gentlemen,—As the originator of the present run of correspondence under this heading I should like to say that I believe Mr. C. H. Mayes to be nearer the solving of the problem than any of the others who have taken part. You will remember that in your issue of April 8 I stated that I once exposed plates for a firm (who employed developing experts to develop all negatives sent home by their men operating abroad) who produced negatives quite free from halation, no matter how bad (halation-inviting) the subjects were. Although these expert developers worked more or less secretly, I do know that the developer they used was something like that advocated by Mr. Mayes. That is to say, stock percentage solutions of pyro and soda were used, but in what proportions I know not. I have made one experiment on the lines laid down by your correspondent, and I hope to make more—as I hope some more of your readers will—and it is just possible that the problem will be solved.

Mr. Mayes is also correct, I believe, in his statement concerning halation being minimised by prolonged development. In theory quick development should, of course, give less halation than prolonged development, and I fear too many of us have been led astray by thinking too much about theory and not enough about practice, there being a very wide gulf between them.

At a recent meeting of one of the suburban photographic societies there was shown an artificial light portrait study of remarkable quality, one in which a reading lamp was included. It was the kind of thing in which one expected to find halation, but not a trace of it was to be seen. This was sufficient to start the ever-green discussion on halation and its prevention. The taker of the portrait was not present to give details, but all the old hands present came to the conclusion that the negative must have been developed very rapidly, all present were, in fact, of the same opinion and authorities galore were quoted in support. At the close of the meeting, however, the taker of the portrait looked in and was at once asked by the chairman how he developed the negative. "Oh," he replied, "I used a very weak Azol developer and developed it for nearly two hours." Thus the house of cards built up by the advocates of very quick development tumbled down. In reply to further questions he said that he never thought about halation, it was the getting out of the details that concerned him.

The great difficulty in making experiments with halationary subjects is to get an object that we know will give halation, it being most difficult to produce where and when wanted. Until we can be really sure of producing it, or of selecting a subject we know will give it, it seems a little difficult to find a remedy for it. The only reliable test is that of cutting the exposed and undeveloped plate in half, and developing the two halves in a different manner. A leaded window of plain glass in a church appears to be the most suitable subject with which to experiment, but a more homely subject would be more convenient.—Yours faithfully,

GODFREY WILSON.

To the Editors.

Gentlemen,—I am also very interested in the correspondence on "Halation and Development," which has recently appeared in your columns. With over 30 years' experience in architectural photography, in which I have made hundreds of exposures on interiors, the question of minimising halation has always been with me. I entirely agree with your article of April 1, in which you advocate a "developer energetic enough to produce the necessary density before it has time to penetrate right through the film." I take it that energetic does not imply strong development. I always keep the pyro proportionately low and the accelerator fairly normal in quantity. Following this procedure, I found the method most effectual, when using fairly rapid plates (about H & D 270), well backed, the exposures on the ample side, to allow the shadow details to develop out easily, and then stopping development early, thereby obtaining negatives full of detail and soft in character. By these means I have obtained perfect immunity from halation under the most difficult conditions.

The double-coated variety, recommended by Mr. F. H. Evans, has, in my hands, proved superior to unbacked plates, but is also prone to halation under trying circumstances, which, no doubt, backing would obviate. As recently as last autumn I used some, and consider some of the drawbacks to their use to be the prolonged immersion in the extra strong hypo bath, extra washing required, and slow drying. Many years ago I used the "Sandell" multiple coated plates, and unfortunately many of the negatives are now useless, being badly stained, owing to the lack of knowledge of these characteristics, when they were made. I have seen some fine results on the new portrait films, which I hope to try shortly. I must admit I am somewhat sceptical as to their advantages over a well-backed and richly-coated glass plate for this class of work.—Yours faithfully,

EDGAR R. BULL.

7, Ballina Street, Honor Oak Park, S.E.23.
April 11.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

M. M.—We think you cannot do better than apply to the Premier Optical Co., 63, Bolton Road, Stratford, London, E.15.

P. C.—As you do not give us any idea of the intensifier used in either case, we can offer no suggestion, but if it was a mercury intensifier we think you must resign yourself to the fact that the stains cannot be removed.

R. B.—No doubt the book you refer to is "The Air Brush," by G. F. Stine, published a few months ago by "Abel's Weekly," 421, Caxton Building, Cleveland, Ohio, U.S.A, price 3 dols. 50. It is not on sale in this country, but you can get it by writing to Cleveland for it.

R. L.—The best cement for attaching anything to brass is gelatine dissolved in acetic acid. It is easily made, or may be purchased at the chemist's under the name of Kay's Coaguline. It might be well to give a thin coating to the brass and allow it to dry before proceeding to fix the blind.

P. W.—We have no doubt you could evaporate the hypo baths instead of throwing down the silver with liver, but it would be a very expensive process, and also the refiners prefer to have the silver sent to them in the form in which it is obtained by using the liver. Therefore, we do not think your suggestion is a practical one.

E. B.—There are no rules that we know of for the judging of competitions. If the prints are to be exhibited it is usual for the judge to mark each one as follows:—A. must be exhibited; B. may be exhibited; C. must not be exhibited, but, of course, that is only done when the exhibition aims to represent a certain standard of work.

W. M.—Any ordinary heavy sheet glass would be suitable, but for your purpose the finely-ribbed variety, known as Hartley's rolled plate, would answer best. This does not altogether stop the direct sunlight, but it diffuses it to a very considerable extent. It is in use in many studios. The ribbed side should of course be fixed inside or dirt will lodge in the grooves.

A. F.—An ordinary hydroquinone developer will give a considerably stronger print, particularly if you develop much darker than usual (too dark), and then bring the print back with weak Farmer's reducer, or better, weak iodine-cyanide reducer. If this does not give bright enough prints, about the only other method is that on p. 460 of the current "Almanac."

O. M.—We have never taken very kindly to the various meters which have been sold for ascertaining the time for printing on gaslight and bromide papers from various negatives. In our opinion a little test strip of paper is as quick and reliable as any other method, but we believe that about the best is Dawson's "Densitometer," which is, or was, supplied by Houghtons.

H. L.—It is rather a long story advising you on equipment for outdoor work, and perhaps the best help we can give is to refer you to an article on this subject in the "B.J." of June 11, 1920. The little book "Commercial Photography" which we publish contains a good deal of information on this same kind of work, and we think, perhaps, bears more directly on it than the "Photo-Miniatures."

E. G.—There is no objection whatever to your trading under the name, but if you do that you must register your business with the Registrar of Business Names, 39, Russell Square, London, W.C.1, at the cost, we think, of 10s., and comply with the regulations of such registered businesses. The chief of these is the name of the actual proprietor shall appear on note headings, invoices, and other business stationery.

G. G.—There is nothing the matter with your developing formula, although it contains rather more bromide than is usual for many papers, and that perhaps would account for the long time taken to develop. If we were you we should try making up a developer without bromide, and then adding, say, only 30 minims 10 per cent. bromide solution to each 20 ozs. That ought to be quite sufficient to keep the whites of a good paper pure during 4 or 5 minutes' development.

H. S.—We believe your friend is perfectly right in point of law. We had a paragraph on this very subject in our issue of February 25 last, page 105, in which it was pointed out that under the present Act, which came into force on June 30, 1912, unless the copyright is assigned to the purchaser when a negative is sold, the copyright remains in the hands of the seller. Of course this is an absurdity, and very likely was not intended in the drafting of the Act, but, at any rate, there it is in the Act, and in the absence of any judicial ruling the above is the only opinion that can be given. We refer you to our issue of February 25 for a further discussion of the matter.

C. K.—There is probably no better lens than the one you have, but, of course, the depth of focus with a 7-inch lens of *f*/4.5 aperture is not very great, particularly on near distances. This depth of focus has nothing to do with the construction of the lens, but only with the size of the aperture, and if you were to get another lens, of say *f*/6 or *f*/8 aperture, you would get just the same degree of depth as you would by stopping down your lens to one or other of these diaphragms. We do not think that you can benefit by making a change, unless, of course, the focussing scale is wrongly engraved, or the lens as a whole not correctly mounted. It might be worth your while to have the camera overhauled in these respects.

C. C.—You don't tell us much of the lighting of the building where the tablet is, but it is evident from the photograph that there are other windows to one side or the other, and perhaps behind the camera, light from which falls on the tablet and is reflected into the lens, giving the shadows in the photograph. About the only successful remedy for this is to fit up a kind of tunnel of muslin from the tablet to the camera, so that the light from all the windows is cut out and reaches the tablet as very diffused illumination. Very likely a screen on one side only would be sufficient, but that one cannot tell without seeing the place, or a plan of it. Exposure would, of course, be a good deal longer, but that need not be any objection.

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Contents.

SUMMARY

The Congress of the Professional Photographers' Association opened on Monday last, when the President, Mr. Frank Brown, delivered an address. (P. 233.)

The exhibition of professional photography, held in connection with the Congress, is reviewed by Mr. F. C. Tilney on page 235. Mr. Tilney rejoices to observe a growing appreciation of straightforward lighting and effects.

It is to be regretted that the technical and commercial photographs are few in number, but a start has been made in organising this section which, no doubt, will receive a larger measure of support next year.

Mr. Raymond E. Crowther, in an article on page 231, describes some of the more recent work of Dr. Luppo-Cramer on desensitising with phenosafranine, and in particular the remarkable effect of the process upon the Watkins factor of the developer. Mr. Crowther has also made the remarkable observation that the transparent backing of Kodak plates acts as efficiently as a desensitiser of the emulsion as does a special safranine preparation. Since backing of this kind has been in use for several years, many users must have been desensitising without knowing it.

In a leading article we discuss a few practical points connected with the design and use of the reflex camera, which were suggested by two recent lectures at the Royal Photographic Society. (P. 230.)

Practical notes on the washing of prints are contained in an article by Mr. Arthur G. Willis on page 237.

At the Royal Photographic Society on Tuesday evening last Mr. A. Pereira delivered a lecture on the printing of cinematograph positive films. He showed the working of an actual film printer, and gave an exhibition of a film illustrating the methods employed by cinematograph printing firms. (P. 241.)

A simplified method of making half tone blocks of from 60 to 80 lines per inch is announced as in process of exploitation in America. (P. 229.)

The working methods in modern photo-lithography, processes of making paper stencils by photographic means, are among the "process" topics of "Photo-Mechanical Notes." (P. 238.)

In panchromatic photography the use of backed plates will obviate many of the difficulties of manipulation, the two sides of the plate being then readily distinguished by touch. (P. 230.)

With all the advantages of artificial light in the studio, the merits, both technical and hygienic, of daylight must not be overlooked. (P. 230.)

A close match of the colour of an original may be secured in an oil or Bromoil print by appropriate preparation of the ink. (P. 230.)

EX CATHEDRA.

Fair and Congress. Never have an exhibition of the photographic trade and the accompanying Congress of the P.P.A. been launched under such conditions of uncertainty as prevailed last Friday, when even the weather added an appropriate contribution of a snow storm to the threatened industrial discord. However, the inherent commonsense of the British nation emerged before the day was finished, and though reduced railway facilities have no doubt been a minor factor in lessening the attendance at the Congress of professional photographers from the provinces, it is evident that the Fair has never been so largely visited before. During the comings and goings of last Friday, while the fate of the nation hung in the balance, it was not to be expected people would flock in numbers to any exhibition. The advertisement programme carried out on that day has, however, amply proved its effectiveness in the shape of the attendances recorded when once the shadow of a national upheaval had been removed. In referring to these circumstances, it is fitting that we should take the opportunity of paying a tribute to the obstinate cheerfulness preserved at every hour of last week's days of crisis by Mr. Arthur C. Brookes, organiser of the exhibition. The quality of Mark Tapley has always been a distinguishing trait of our confrère of the "Photographic Dealer," but has never, so far as we know, had to endure such an acid test as that applied to it last week. We congratulate him, not on his luck, but on the not-to-be-beaten spirit in which he met what looked like being a most unpleasant blow of fate.

* * *

Simplified Half-Tone. We hear from a well-informed correspondent that a process is shortly being launched in the United States for the making of half-tone blocks according to a system by which the work may be done in a very much simpler manner than that which is the current practice in process establishments. The system, however, applies only to comparatively coarse blocks, namely, those of 60 to 80 lines per inch, but, nevertheless, even with this limitation, has a considerable field among newspapers, industrial companies and similar concerns requiring reproductions of photographs, etc. According to the particulars which have reached us a continuous-tone transparency is first made from the original negative, or from a copy negative of a print. This transparency is placed at the front end of a box, and at a fixed separation in front of it is placed a ruled screen, and in contact with this a flat process film. At the other end of the box there is a light-chamber with an electric bulb. In the partition separating the light-chamber from the interior of the printing box is fitted a variable opening or diaphragm. An exposure, which rarely exceeds two minutes, gives the desired half-tone negative. This is printed on copper by the usual fish-glue process, the technique of which has been simplified

for its use in this specific way. Results which have been produced are stated to be exceedingly good in vigour and long range of tone gradation; in fact, to a degree unusual in coarse screen work.

* * *

Backed Panchromatics. At last it appears that the average photographer has "discovered" the panchromatic plate. For many years it was used only by specialists and artistic amateurs, but it is now coming into everyday use for many classes of work. The improved sensitiveness of green has precluded the use of the green safelight (more safe than light), and consequently all manipulations have to be done in total darkness. This causes a serious risk of mishap at more than one stage, for the plate may either be put wrong way round in the slide or upside down in the developing dish. To avoid such mishaps it is a good plan to make a rule of using backed plates only. The backing is quite rough to the touch and it is hardly possible to make a mistake in working. Beyond the slight extra cost there is no disadvantage in using a backed plate, and with the great majority of subjects there is a distinct gain in quality, particularly in the rendering of light drapery. The backing is easily soluble and does not require any rubbing; as a rule it is entirely removed during development, and therefore does not darken the fixing bath.

* * *

Day and Electric. The facility of working and the wider choice of premises made possible by using one or other of the modern systems of electric lighting has had a tendency to blind many photographers to the very solid advantages of working by daylight, when it is possible to do so. Not the least of these is the effect on the health and nerves of the operator who is deprived during the greater part of the day of the beneficial effect of the sun's rays, and it cannot be expected that the sitter will not feel a certain amount of depression on leaving the brightness of, say, a seaside parade and walking into the subdued light of an electric studio. Many operating rooms which are now solely lighted by electricity have sufficient window space to allow of all, or nearly all, bust portraits and half lengths to be taken by daylight during certain hours, and for both hygienic and artistic reasons this course would seem desirable. In one drawing room studio which we have visited the electric light was installed at one end and during the day was used only for full lengths and groups, while all other work was done by the light of large French windows which opened upon a well-kept lawn; exceptionally fidgetty youngsters were often taken outside with the aid of a reflex.

* * *

Colours in Oil printing. As a rule oil printing and Bromoil are regarded only as media for artistic expression and the technical or commercial application of these processes is entirely overlooked. As a matter of fact, oil printing is practically identical with the process of making photo-litho transfers, and lends itself excellently to the reproduction of prints or engravings. The point to which we wish to call attention is the ease with which the colour of the original ink can be reproduced in the oil or Bromoil copy. There is a fairly good range of colours issued ready ground, and these may be combined to get intermediate tints, while further modifications may be obtained by adding more or less of the finely-ground dry colours to be obtained from any good artists' colourman. The dry powder should be worked up with a few drops of the oil medium before incorporating with the stock colour, and then well worked with a palette knife. For "straight" work it may be found more convenient to use a roller instead of a brush for pigmenting, either a fine leather or hard composition letterpress roller being suitable. As when working with the brush, a steady pressure with the roller puts on ink, while a light quick rolling clears up the whites.

SOME FEATURES OF THE REFLEX CAMERA IN PRINCIPLE AND PRACTICE.

THE meeting of the Royal Photographic Society, which a week or two ago was devoted to the reflex type of camera, provided incidentally, rather than deliberately, the occasion for some notes on the subject, which it may be well to publish at about the time at which presumably the official report of the proceedings will appear. The technics of the construction of a reflex camera were set forth by Mr. Arthur S. Newman. than whom there is no one we know better qualified to discuss the mechanics of photographic apparatus. Mr. Newman has a flair for making a mechanical device for doing anything that man can want done mechanically. If you asked him to make a machine for poking the fire or dealing a pack of cards, he would make it. It would cost a pretty penny, but it would continue in working order until the end of time. Of the constructional features of a reflex camera to which Mr. Newman referred, we wish to select one for a little further reference, because it relates to a matter on which the purchaser of such a camera is often in doubt. This is the movement of the mirror from its down position across the lens axis into the up position where it seals, or should seal, the camera box against entrance of light through the focussing screen. The importance of mechanically controlling this movement received special emphasis. It is of the highest importance to balance the movement of the shutter so that it does not come up against its seating with a bang, just in time to jar the camera the instant before exposure. At the same time it is necessary to move the mirror with the greatest practicable rapidity, in order to reduce to a minimum the interval between pressure on the release and exposure of the plate. Mr. Newman drew on the blackboard diagrams illustrating the mechanical devices for accomplishing both these things, and these details will probably be found to form the most interesting part of his discourse when published in the "Journal" of the Royal Photographic Society. The aim of the constructor is to move it slowly at first, then exceedingly quickly, and slowly to bring it to rest against its upper seating, all within a tenth or a twentieth of a second. Mr. Newman, however, did not refer to the type of reflex in which this operation is performed, not by an automatic mechanical device, but by "that clumsy tool, the human hand," as Mr. Bernard Shaw would say. The "release" on the outside of a reflex camera in which this principle is adopted is not actually a release at all, but a lever by which the mirror is swung upwards with a vigour and at a rate which depends upon the human operator. It can scarcely be pretended that a camera in which the mirror is moved in this way is comparable in uniformity or smoothness of action, or even in mere mirror-velocity, with one in which the mirror is moved mechanically. Mr. Newman did not attempt to draw comparisons. He has a habit of emphatic expression; perhaps he refrained. But it is not uncommon to find cameras with hand-raised mirrors ranked with those having mechanical raising, and even a superiority claimed for the former in certain respects. Thus it is stressed that the hand-raised mirror falls after exposure, whilst the other has to be put down, which is

true enough, but of no particular advantage, and, moreover, usually means that such a reflex camera cannot be used upside down at arm's length above one's head—a measure which occasionally is of great service. Against the variability and jar of a hand-raised mirror may be set its cheapness, but that is about all that can be said for it.

Mr. Newman was followed by Dr. Abrahams who, apparently from no fault of his own, found himself in a rather awkward position. Invited to speak on the use of a reflex camera, he appeared to think it necessary to reconcile his own expert practice in the high-speed photography of sporting subjects with the various advantages of the reflex type of camera. But he was dealing with two different things which cannot be reconciled in all respects, and the attempt to do so involved certain inconsistencies which it seems worth while to point out, for Dr. Abrahams, as spokesman for the reflex, evidently attempted merely to smooth away the differences. For example, it is a very reasonable objection to the reflex camera that it cannot be readily used at the eye level, but it is no answer to that objection to point out that Press photographers in using their ordinary folding focal-plane cameras go down on their knees in order to get a low view-point. The reflex user, who happens to want a higher view-point than that at waist level naturally does not care twopence for any reason which prompts Press photographers to assume an attitude of devotion. At the sacrifice of much of the visibility of the image on the focussing screen the reflex can be used at a higher level by means of a mirror fixed in an inclined position in the hood. The Graflex, and, we believe, other reflex cameras, have been fitted with an accessory mirror for this purpose, and, as we have already pointed out, the inverted reflex, if fitted with a spring-actuated mirror provides the facility of a higher view point than any other type of hand camera.

We are glad to be in agreement with Dr. Abrahams on the absurdity of the claim which is sometimes made that you can keep a rapidly-moving object in focus on the ground glass of a reflex camera by operating the head of the focussing pinion whilst a finger of the other hand is kept in readiness for release at the critical moment. We have never been able to find anybody who could use a reflex satisfactorily in this way, and, that being so, the motive for having the release on one side of the camera and the focussing pinion head on the other disappears. Yet Dr. Abrahams, if we understand him correctly, characterised the placing of release and pinion head on the same side of the camera as the act of a lunatic. But a long experience of various reflex cameras has convinced us that this is much the preferable construction, since the camera may be held firmly against the body with one hand, the other being then free, first for focussing on a pre-determined spot and then for release when the moving object is seen to arrive there in sharp focus. If the release is on one side and the focussing pinion head on the other there is necessarily an alternation between the hands as regards holding the camera in position, which makes it less easy to hold it firmly.

Plausibility in his rôle of protagonist of the reflex led Dr. Abrahams into some inconsistencies in the advice he gave on the use of a long-focus lens and of a swing-front on the reflex camera. He very rightly stressed the merit of a long-focus lens as regards correct drawing, but he did it as though there were some magic in a 12-inch focal length which did not reside in a 5-inch focal length. The half-truth of regarding focal length in this way instead of explaining that focal length simply determines scale of reproduction, whilst distance of view-point determines drawing, has, however, so often been stated that its spurious doctrine is, perhaps, immediately detected nowadays. The narrow-angle photographs shown by Dr. Abrahams so excellently demonstrated the value of the more distant view-point that it was difficult to conceive how their maker should assign so negligible an influence to the use of a lens angled from its position at right angles to the sensitive surface by means of a swinging lens-front. The latter is an optically wrong device which in certain circumstances can be very useful. But one effect which may often be produced by it, dependent on the lay of the subject, is to exaggerate the foreshortening which is exhibited in negatives taken at close quarters with a short-focus lens. Its bad effect is then additional to that of the near standpoint and of the same kind. If good drawing is a thing to be sought, the defect of the swing-front in this respect requires to be emphasised instead of being passed over as of problematical existence.

FURTHER NOTES ON DEVELOPMENT IN A BRIGHT LIGHT.

The recent publication in Germany of Dr. Lüppo Cramer's researches on desensitisation in book-form—a small volume which is one of the most important appearing since 1914, and which should be translated and so made generally available without delay—affords an appropriate opportunity of again referring to this subject. The process of desensitisation, despite the drawback attendant on the staining of the gelatine film, is rapidly becoming popular amongst amateurs who, as a class, are perhaps less conservative than their professional brethren. The professional worker will follow in due season and enjoy the comfort and other advantages of a really light dark-room illuminated by reflection from the ceiling with light passing through, for example, the Wratten "O" safelight. Amongst club amateurs the subject of removing the stain from desensitised plates is being constantly discussed, the consensus of opinion being that running water after an acid hardening-fixing bath is the most reliable method to employ. It will be frequently noticed that a desensitised plate will wash to a colourless stage, but on drying, a bluish-violet tint is developed. This appears to occur most frequently when the Desensitol has been used mixed with the developer, and the only remedy which I know is one of the chemical treatments recommended in the article in the "B.J." of January 7 last. As will be seen later, all staining of the gelatine can be obviated and the fastest of plates developed in comfort.

Ability to develop in bright light is not the only effect of desensitisation. In addition there are some remarkable effects which cannot fail to have been noticed by the photographer of catholic taste in developers. The most striking of these phenomena is perhaps that of the acceleration of the rate of development by hydroquinone. The slow-acting, low-Watkins-factor development characteristics of hydroquinone are too well known to necessitate comment. The presence of Desen-

sitol, either in the film as the result of preliminary bathing, or in the developing solution itself, causes this developer to behave like metol—the image as a whole flashes up in a few seconds and density is only obtainable on raising the factor some fourfold. The magnitude of the development disturbance in the case of hydroquinone appears to be considerable; with most of the other developers retardation of the reaction occurs, the amount of which varies considerably according to the desensitiser employed. With phenosafranine as the desensitiser, and leaving hydroquinone development out of consideration, the disturbance of development speed is, as far as the writer is aware, less than with any other of the compounds—developers or dyes—of which Lüppo-Cramer gives a list in the book already referred to. The majority of workers, however, will experience no inconvenience from this development effect, for when using Desensitol and an average M-Q developer there is practically no difference in either the time of appearance or the Watkins factor between a plate bathed in the dye solution and one simply soaked in water before development. With other developers this is not the case, as the following figures, in obtaining which a preliminary bath of 1 : 50 Desensitol was used, will clearly indicate :—

With pyro-soda time of appearance alters from 95 sec. to 60 sec.
factor ,, ,, 12 8

With amidol the alterations are 6 sec. to 14 sec., and 18 to 12 respectively. In short, desensitisation, except in the case of an M-Q developer, completely upsets all figures hitherto recommended for factorial development. This may appear perhaps to be a matter of but small moment, but when it is noted that for a given gamma the total time of development is radically altered it is evident that the matter is of practical importance even when Desensitol is used as the preliminary bath. "Even when Desensitol is used" needs emphasising, for there are at present on the market plates which are backed with red backing the dyes in which, in one case at least, are powerful desensitisers and which exert considerably more influence on the rate of development than either phenosafranine or Desensitol. Therefore more specific information on this point which I now give will perhaps be appreciated.

The most efficient desensitising backing I have so far met with is that designated "Transparent," with which Messrs. Kodak, Ltd., back all plates except the panchromatic. So active are the dyes used in this backing that if the backed plate be bathed, either in the dark or in a "safe" light for a minute and a half in water (1 oz. to a ¼ plate) the development may be subsequently conducted in the light which is usually employed when working with bromide papers. Even with an ultra-rapid plate no fog whatever appears during five minutes' development at 36 in. from an "O" safelight, the illuminant behind which is a 32 C.P. tungsten wire electric bulb. Although treating the plate in water before development leads to the greatest depression of sensitiveness, it is not necessary, as the developing solution itself rapidly dissolves the backing (a strip of glass cut from an old negative and placed under the negative at one end of the dish will ensure access of the developer to the backing) and desensitises the plate. The adhesives in the backing necessitate a somewhat longer time being devoted to the desensitisation than when a plain aqueous solution of dye is used, but one and a half minutes is quite sufficient to do all that is required. In this time, using water as the solvent of the backing, it was found that the speed of the plate was reduced to approximately 1/250th of its original value, and when using the developing solution as the solvent, to 1/200th of the original value. Whichever method of working be adopted the plate leaves the developer with its film unstained, and there is nothing in the finished negative, other than the complete absence of fog, to indicate that a desensitising bath has been used in its production. It must have been obvious to many that this "backing" variation of desensitisation would come into vogue, but that for several years self-desensitising plates were on the market, was not even suspected, although the statement that generally plates were nothing like so sensitive after they have been in the developer for a minute or two may be attributable to this fact. It may be noted, *en passant*, that the supply of dye in the backing is so liberal that the solution made by using 1 oz. of water per ¼ plate will effectively treat three or four ¼ plates. A source of supply of desensitising solution is thus ready to hand with every box of plates coated with transparent backing. The incidence of these backings may also be responsible for many of the conflicting statements which have been made regarding factorial development, for unless the backing is removed by means of a damp sponge before development, it may be safely stated that the Watkins factor may depend more on the vigour with which the dish is rocked than on the particular developer employed.

With regard to the action of desensitisers on the latent image, doubts have been expressed as to the accuracy of Lüppo-Cramer's statement that this entity suffers no destruction during desensitisation. As far as my experience goes, the statement is one of fact. It must not be forgotten that comparative tests in this work are not quite as simple as usual to carry out. The factors of wetting the plate before development and of considerable disturbance of the rate of development both enter into the matter, and their effects have to be eliminated before any conclusions are drawn as to destruction of the latent image. I believe that the suppression of tendency to fog in development allows of the fullest realisation of the speed of any emulsion—comparative experiments leave little doubt that the faintest shadow details can be developed more strongly on a desensitised plate than on one not so treated. In other words, the effective sensitiveness of the emulsion is enhanced—the H. and D. speed probably remaining unaltered—by desensitisation. The entire absence of fog further allows of the negative's being very cleanly intensified, a fact which should be of interest to astronomical photographers who are always demanding greater sensitiveness.

Before leaving the matter of self-desensitising plates, a note of warning should be added : the wrapping paper should never be allowed to come in contact with the face of the plate before exposure as there is a risk of the paper's being contaminated with some of the dye. It may be safely assumed that if the backing has been transferred to the paper it is sufficiently moist to desensitise the emulsion, with disastrous consequences in the subsequent exposure.

As was mentioned in the former article, the oxidation products of many developers are desensitisers. Amidol, for example, at a concentration of 1/2000 will reduce the sensitiveness of a plate to about 1/200th of its original value, even although the solution be freshly prepared and hence contains but a small proportion of oxidation product. It is significant that in the case of these products sulphites entirely prevent desensitisation. It is also remarkable that in the case of amidol the product which is formed by complete oxidation does not desensitise at all, but, on the contrary, induces red-sensitiveness. This product is essentially different in chemical constitution from those dyes which are used to prepare panchromatic plates, and although oxidised amidol as a red-sensitiser is of no practical value the knowledge of its action may stimulate research with similar compounds. Very little has been said with regard to the theory of desensitisation, and, indeed, up to the moment there is very little to say about it. Dr. Lüppo-Cramer has recently informed me that the action is one of oxidation, and he has promised particulars of some interesting confirmatory experiments at some future date. When these particulars come to hand they may, if circumstances permit, form the subject matter of a further short communication. In the meantime it behoves all who can do so to make themselves acquainted with the contents of the small book referred to at the beginning of this article, as it contains very much more information than can possibly be condensed into one or two articles of the present type.

RAYMOND E. CROWTHER.

THE P.P.A. CONGRESS.

The Congress of the Professional Photographers' Association at the Photographic Fair opened on Monday evening last with a reception of members by the President, Mr. Frank Brown, of Leicester, and members of the Council, following which a meeting was held, when Mr. Frank Brown presided, supported by Mr. Swan-Watson, president-elect; Mr. Lang Sims, secretary; and Mr. Alfred Ellis. A pleasant feature of the inauguration of the Congress was the presentation to Mrs. Frank Brown, who occupied a place on the platform by the side of her husband, of a bouquet of roses by Madame Yevondo.

The President delivered the address to the members which appears below, and followed it by an interesting series of notes, illustrated by lantern photographs, on the studios of notable professional photographers in different parts of the country.

On the proposition of Mr. Alfred Ellis, seconded by Mr. W. Illingworth, the hearty thanks of the meeting were accorded to the President for his address.

The Secretary announced that owing to the curtailment of the railway service as the result of the coal stoppage, the special train which was to have conveyed members to the Kodak works at Harrow on Thursday (yesterday) could not be run, but the Kodak Co. were making other arrangements, and the Secretary assured members that suitable arrangements would be made for their visit to Harrow.

The President's Address.

Ladies and Gentlemen,—It is with very great pleasure that I have the honour, as President of the P.P.A., of offering you a very hearty welcome to this, the sixth Congress held in connection with the Association. This welcome I offer not only for my own part, but on behalf of the Council who have worked most energetically and consistently in order to bring this Congress into such a position as will, I feel sure, make it of equal if not of greater importance and interest than any of its predecessors.

A reference to the programme will show the comprehensive nature of the labours of the week, and will bring more completely to your mind the ever-growing importance of the Congress, together with the gratifying expansion of our Association as a body. The very beneficial influence of such a convention as this cannot possibly be ignored; for here we have an annual rendezvous—on neutral ground—where we may meet without formality and restraint, and with that openness of mind that promotes good-fellowship, that breeds confidence and trust, the frank interchange of opinions, the promulgation of ideas, and the consequent widening of experience which results in a return to our daily labours with renewed zest and enjoyment.

The Exhibition of work by professional photographers in the room adjoining is becoming a more popular and, I may add, a more serious item connected with the Congress, being an illustration of a degree attainable by the professional portraitist, without unduly floundering in the ultra-artistic and sometimes freakish indulgences connected with some exhibitions—not necessarily of photographs—but still claimed by Art.

The trades exhibition is highly indicative of the zeal, enterprise, and inventive genius of our manufacturers, and will prove of immense value to the provincial photographer whose visits to the factories of the various firms exhibiting are of such rarity as to be practically non-existent. I trust the inventive genius of our manufacturers has discovered a method of lowering prices.

We have immense cause for congratulating ourselves on the fact that the threatened strike—the most formidable, I think, we have ever had to contemplate—has happily been modified. I have no doubt we should have got over most of the difficulties, although it is quite reasonable to presume that the attendance here would have been curtailed, and some slight disorganisation created by the partial interruption of the railway services. It is not my intention to dilate upon the subject of strikes, but as the present head of an association of business men I feel it my duty to protest against the possibility of a single trade being able to disorganise the whole community by any means, but particularly do I protest against sympathetic strikes. In my opinion, the sooner legislation is brought to bear upon this matter the better for the nation. When I say legislation I do not mean such as would penalise one class at the expense of another, but legislation such as will find the means of instituting compulsory arbitration, the verdicts of which would cover a certain reasonable period, and at the end of that period be reconsidered and readjusted if desirable or necessary. Meanwhile, there should be no stoppage of work.

It may, however, be that the adjustment of the coal question will take place by other means than arbitration. Continental powers have been for some time turning their attention to water-power for the generation of electricity, whereby cities can be supplied with light, heat, and motive forces, with the saving of millions of tons of coal. By hydro-electric power Ontario, Canada, is saving 6 million tons of fuel per annum. While this struggle is being carried on in England, other countries, formerly our customers, are finding means for dispensing with our greatest asset—coal—and in a few years colliers will probably be looking for other jobs. These observations may be looked upon as irrelevant, but I think otherwise. That such disturbances affect trade generally is perfectly understood by everyone, but I would suggest that our own profession is perhaps more severely chastised than most, being, as it is, a luxury; and luxuries are always first dispensed with. The slump, followed by this threatened strike, has hit many of the cheap photographers severely; and the depression in some quarters is positively acute.

The vital question, then, that naturally arises is, what can we do during these times of depression? and my answer is, economise to the utmost limit, see what can be done towards the improvement of your premises by careful personal application, and, above all, take steps to improve the quality of your work, and so be prepared for better times that sooner or later will surely appear.

Turning now to the everyday affairs of our Association, we have reason to congratulate ourselves to some considerable extent upon our position, both financially and numerically. I say "to some extent," because my hopes have been that with the expected settling down after the war we should have a grand influx of members, but I am rather disappointed to find that, although there certainly has been an accession of members, it has not been as great as I could have wished.

With increased membership comes improved finances, and, to put it the other way, with improved finances comes increased membership, owing to the fact that your Council can spend a certain amount upon the propaganda requisite to impress upon the outside, shall I say, professional photographer the necessity of subscribing to an Association designed for the protection of his own interests in particular, and those of his professional brethren generally. With this propaganda in view, the Council have for some time been deliberating upon a course that they hope will be effective in the enlargement of our membership to a very considerable extent.

The Association has now reached its twentieth year of existence, and I am happy to assert that, as it approaches its majority, it begins to feel the strength of manhood, so to speak, infused into its being. Its expansion becomes almost

daily more apparent, an expansion *proved* by its increasing responsibilities, and the ever widening scope of its activities.

At this juncture it will no doubt interest you to get some idea of what these responsibilities and activities consist, therefore it may not be inopportune to draw your attention firstly, to the announcement already in your hands relative to the incorporation of the Association as a company, limited by guarantee. This was proposed by Mr. W. Illingworth, of Northampton, and has now arrived at a stage where it awaits only the consent of the members before becoming an accomplished fact.

Considerable time, attention, and a very great deal of work by your Council and its sub-committees has been devoted to the consideration and practicability of creating an improved and more ambitious periodical to replace our P.P.A. Circular, which it has been proposed should be re-named "The Record." It has been felt for some time that a journal designed for the sole use and information of members of this Association is desirable, embodying with its present matter a much wider field of news and general information, together with a number of advertisements, the proceeds from which, it is believed, would assist materially in defraying the cost. This project has been examined most thoroughly in all its bearings, financial, editorial, and commercial—so thoroughly, in fact, as to cause the Council to decide to allow the matter to rest awhile on account of the many serious issues involved. But it will be brought up again for further deliberation in due course, I have no doubt, and the result remains to be seen.

Much has been written and said during the last twelve months relative to the training and education of our assistants, and your Council have been thoroughly alive to the importance of this question. Many schemes have been suggested, and talked over by them, some grandiose and idealistic in the extreme, others more sober and practicable; but, I regret to say, unattainable through insufficiency of funds. On this subject I can say little more at present than to advise our brethren to give to their assistants every facility and encouragement for attendance at Art classes connected with technical schools, now so general throughout the country. Art is the fundamental basis of photography, and to our assistants I would take the liberty of quoting the old saying, that "the gods help those who help themselves." It is to their own benefit that they should grasp every means of improvement obtainable, even at the sacrifice of a certain amount of pleasuro

Now I have so far alluded to these activities and responsibilities as those of the Association, but I think they should be called the activities, responsibilities and successes of the twenty-four or so of men who, from time to time, have constituted your Council, who have laboured persistently and consistently for these twenty years, and whose only reward has been the satisfaction of bringing the P.P.A. to its present state of usefulness and vitality.

I have been repeatedly asked the question: "Of what use is the Association to me? What does your Council do?" And in the public Press "A Member" asks: "Are the P.P.A. Council alive to their responsibilities of sagacious leadership?" I tell *you*, ladies and gentlemen, that this Association is full of vitality; it is alive. Its Council is alive, and where the interests of its members are threatened it will prove it is alive—and kicking!

What does the Council do? I will tell you. Most of its sittings are from 3 to 3½ hours' duration, exclusive of sub-committees. During that time full consideration is given to your affairs, sometimes individual, sometimes collective; and here let me acquaint you with a few of the subjects with which your Council has to deal:—Matters concerning copyright; faulty materials; goods damaged in transit; a firm advertising photographic sundries from which neither goods could be obtained nor money returned; breakages of negatives in the post; troubles with glass merchants; advisability, or otherwise, in certain cases, of insisting upon a charge for re-sittings; applications for assistance from members for help on resettlement after demobilisation; fire insurance inquiries; difficulties regarding electric installation; cost of supplying current; the non-supply of roll-films to professional photographers, and many others. I would like to give you two or three cases in detail now.

On one occasion the Secretary reported the case of a Hackney photographer whose shop front had been damaged by a motor car, and whom the insurance company had at first proposed to compensate to the extent of £10. On the photographer appealing for the help of the Association, our Secretary succeeded in getting the compensation raised to £27 10s., a goodly return for a 10s. subscription.

Another case related to a supply house which had failed to carry out its contracts to deliver goods carriage paid, and your Secretary proposed to enforce our member's rights in the matter. Only a small sum was at stake, but advertisers had to be taught that they must carry out their undertakings.

A second case discussed at the same Council meeting as the one preceding was against a newspaper, and was more contentious, but it was thought our member had a good fighting case, and should be supported. Both these cases were placed in our solicitor's hands.

Mr. F. S. Wakefield, a member of the Council, and an enterprising and successful photographer, makes his complaint very clear against trade enlarging firms who cater direct for the public, and expect at the same time to supply the professional. Frankly, the issue is in the photographer's own hands, and my advice is to combine by joining the P.P.A. Thus it is you will be able to meet combine *with* combine.

It will be scarcely necessary for me to remind you—I quote the words of our Secretary—how full the air has been of late of the word "combination." There is a possibility that trade combinations are affected with the idea of economic production. We therefore trust that the combines that have been brought about in photographic manufactories within the last two years will have the effect of cheapening materials all round. But where there is light there is usually shadow near by, and the shadow side in this case means a possibility of raising instead of decreasing the prices of commodities used by us. On the other hand, the prospect of keen foreign competition in the near future may have caused our manufacturers to pool their interests, and, with such an end in view, we cannot blame them. It is possible, therefore, that a strong organisation of professional photographers may be able to assist the manufacturers when it comes to foreign competition; but, anyway, a strong combination of our own is in a better position to give and take than is a large number of disunited units.

With respect to the question of trade enlarging, together with your Secretary I visited one of these firms, and, while being most courteously received, we were told that the conditions could not be altered; but at the same time this firm would be prepared to come into line if *other* firms doing the same thing would arrive at some understanding in the matter. It also pointed out that the professional *did* receive an extra discount, but we found that discount was practically a negligible quantity, and such an infinitesimal profit was of no use to any man who had to make his living by the sale of enlargements as part of his business. This is a matter requiring further discussion, and will not be allowed to remain as it at present stands.

An interesting letter during my year of office has been received from Mr. A. Cecil Coyne, the honorary secretary of the Professional Photographers' Association of South Africa (Natal Section), expressing the goodwill and appreciation of South African photographers for the work being done by the P.P.A., and also desiring that his Association should become affiliated to the P.P.A. Mr. Coyne stated that the desire of his Association was to strengthen the hands of the P.P.A. as far as possible, and to encourge their good work as the national and parent Association.

I have little more now to say, with the exception of a few words relative to the construction of your Council, which, on several occasions, has been questioned, but I am confident that it cannot be improved under existing conditions. The only alternative to the 12 London and 12 county councillors would be the election of representatives by branch associations affiliated to the P.P.A., or districts properly organised, who would probably pay the railway expenses incurred by their deputies when attending meetings of the Council. However, as up to the present branch associations do not seem to flourish, there is little prospect of any change; and change is, I believe, quite unnecessary. The London members work hard in your interests, so do the country men. The latter, as provincial photographers, are qualified to represent any and all country professionals, near or far, and they pay their own expenses. I would say that all are most worthy of your gratitude and your highest commendation.

In conclusion, I sincerely trust your visit to this Congress may be beneficial to your knowledge, and of immense utility in the conduct of your respective businesses; also that you may assist in bringing further members to an Association that will be an active combination, and able to meet other of our trade combinations on equal grounds, not necessarily as a fighting force, but as a body commanding encouragement and respect.

FRANK BROWN.

Studios and Their Effect on Sitters.

Following the above address, Mr. Frank Brown delivered a brief illustrated lecture, in which he dealt chiefly with the considerations to which importance is attached by the modern portrait photographer in the arrangement of his studio in respect to inducing a pleasant frame of mind, which has its outcome in an agreeable likeness. By the kindness of a number of friends he was able to show lantern photographs of a number of studios illustrating the gradual evolution from the old to the modern style, together with some of the portraits made in them. His first illustration was that of the Kent Lacey studios at Eastbourne, where, owing to the access of direct sunshine, conditions of work were more difficult than in many others. He showed examples of the very excellent portraiture made in the strong light of this studio, but expressed the opinion that there was a certain quality inseparable from the use of broken-up sunlight and different from that of work done in a studio which utilised only north or reflected light.

He then showed photographs of the studio of Mr. Halksworth Wheeler, Folkestone, pointing out the very small area of light employed by Mr. Wheeler in the production of his beautiful work. In this connection he recalled the advice to "concentrate your light" given to him many years ago by Mr. Walter Barnett—counsel which he had never forgotten.

As an example of the studio designed and furnished with the object of giving a homelike atmosphere to the room, he illustrated that of Miss Clara Cooper, Edgbaston, Birmingham, and showed several examples of the portraiture done in it. Another studio, also of a talented woman photographer, was that of Miss Ethel Eadon, of Sheffield, exhibiting more than a mere desire to escape from the old style.

A number of photographs were shown of the studio of Mr. Walter Scott, Bradford, which was designed by Mr. Drinkwater Butt. It extends over the top of three houses, has not any skylight, but a high sidelight of about 13 ft. for floor dimensions of about 40 ft. x 16 ft. Mr. Frank Brown quoted Mr. Scott's opinion, after several years' practice in it, that if he were rebuilding it he would not make any alterations. A feature of the furnishing of Mr. Scott's studio was the plain white panelled walls, of which effective use was made in the production of portraits in delicate scales of tones.

The President then showed a number of lantern slides illustrating his own Leicester studio, or rather studios, for the different parts of the building provide a very great range of lighting effects. The studio is situated in a garden, and the garden approach to it and the bright scene which it displayed in summer is constantly the occasion of sitters coming before the camera with an obvious sense of pleasure in their surroundings. He explained, and showed by examples of portraiture, that for some years past he had entirely given up the use of painted backgrounds, obtaining most naturalistic grounds from the walls, windows and angles of the studio, which is provided in one part with panelling and in another with tapestry wall covering, and thus affords endless opportunities for variety in the posing and lighting of sitters.

In conclusion, Mr. Frank Brown referred to the pioneer work in flashlight photography of his old friend Mr. Joseph Byron, of New York, whose reputation as a pioneer of flashlight portraiture, and particularly of stage scenes, was unique not only in the United States, where he had made his home for many years, but in other parts of the world. Mr. Byron, who is an Englishman, is now a very old man, and it gave him (the President) a great deal of pleasure to show some examples of the extraordinarily clever work which he did long before such results were achieved by other photographers.

EXHIBITION OF PROFESSIONAL PHOTOGRAPHY.

WHEN the Professional Photographers' Association displayed their work last year at the Photographic Fair, this journal took rather a resentful view of the nature of the work shown. The collection was to have proved that the portraiture of commercial studios could be as artistic as any that graced the walls of the amateurs' exhibitions. It sought to substantiate this contention by offering a large percentage of fancy subjects in which the facilities and resources were greater than those which came in the ordinary run of legitimate portraiture.

This year all that has been changed it is said. I learn that a vigorous selection resulted in the rejection of everything that smacked of the arty "stunt." It is only fair to say that the present show of work does not, in the main, promise more than any professional could offer to the average sitter. I am prepared, therefore, to accept the fact that the exquisite back-view of a nude damsel, called "The Casket" (27) is just as legitimate a portrait as the veriest *carte-de-visite* of our grandmother's days; only remarking that it has not yet been my happy fortune to receive such *intimate* "likenesses" from many a lady friend of mine from whom such a thing will be particularly acceptable. I must also believe that two more back-views of nudity, called "The Twins" (100), are now "the usual thing," as well as a profile silhouette of Miss Hylda Lewis, which, effective as it is, might, it seems to me, represent anybody.

Apart from these examples, there is no doubt whatever that the work shown is indeed legitimate, and the pleasing reflection is, that in spite of this fact, the display is every bit as artistic as the last. Theatrical subjects open a wide door for the entry of much freedom and novelty impossible in earlier years. Thus we have dancers and acrobats and a "Jazz Pierrot" (22) of the kind that exercise their seductions just outside the box-offices of "palaces," and "dromes." This

genus is indeed a large one, and includes an ingeniously combined group of *figurantes* under the title of "Karsavina—English Corps de Ballet" (8), which by the bye, is studio rather than stage-lit; and a lively "Petruchio" (52), of which the same may be said. But a real stage scene—a most difficult subject—appears in "The King's Bedchamber" (10), where the conventional lighting marks it at once for what it is, even to the terrible "property" window lit from behind. This is all managed with remarkable cleverness. It doesn't look true to life: it could not; but it will charm the stage-manager.

Perhaps the leading characteristic of portraiture to-day is its obvious effort to be interesting by adventitious means. Sitters are subjected to trick-lighting, to striking costume, to unusual posing, and other resources thought to be of service in lifting a work out of the common rut. The sitter's own personality, or psychology, as Mr. Marcus Adams would rightly describe it, does not seem to get enough serious attention. There is here a head of an old man quite simply taken, which is, in my humble view, one of the real gems of the show, because the face arrests you by its calm dignity and the fascination of its quiet yet penetrating glance, speaking of world-experience, life wisdom, human endurance. This is called "The Old Pedlar" (93): it looks as though it might be a portrait of a learned Rabbi, with its beard and serene expression. It is evident here that nothing has been lost by any of those post-exposure processes which have always been the obstacle to truly artistic portraiture. On the other hand, the inherent interest of the subject once seized, everything has been done to preserve it and give it full effect. Another old man's head, "A Portrait" (21), has character of a different kind, but little less admirable. He is smiling. The lighting and modelling is given with a robustness necessary to the subject, with a fine breadth in the shadows. "Lucien Pissarro, Esq." (96), is another case of a portrait relying solely upon a due rendering of the sitter's personality. He looks like an artist, not because of his hat and cape, his beard, and the gravity given to his eyes by his glasses, but because of the serene and intense expression that he wears. You would say, "a distinguished-looking gentleman." Surely a sitter and his friends would acclaim a portrait a successful one that gave such results.

Now take "An Artist" (41). Is there not a look about this as though the photographer had laid himself out to poke fun at the thing? The hat and tie are first rate as a rendering of that kind of "character" which just stops short of caricature. This is a fine thing in its way, I admit; but it represents the artist of fiction and drama. Take again "Mr. Joseph Holbrooke" (79); it has excellent style, a fine "pattern," and everything else in pose and treatment that would win it a place upon an exhibition wall; but does it look like a musical composer of some status? Has it not a deal too much "character"? In the case of "G. K. Chesterton" the paradoxical style of the sitter's writings seems ingeniously taken as a motive. He smiles either at us or with us, whilst his brows are puckered into a forbidding frown; humour tempering pessimistic philosophy.

There is no denying that ladies supply subject-matter that lends itself more amenably to art-for-art's sake; but the fact seems to be too often a ground for treating them always as though they were artists' models, hired for the purposes of picture-making. The portraiture, the psychology, seems to escape as the art comes in. There are some brilliant exceptions to this generality on these walls; for example, the fine "Mrs. G. F. Watts" (75), which is an unsophisticated, straight-forward likeness of delightful quality (perhaps a little marred by the too fierce high-light on the forehead). But quite a number of ladies' portraits aim, not at artistic portraiture, but at a kind of decorativeness or picturesqueness that leaves the humanity of the subject out of account.

"Miss Tessie Thomas" (11) is a beautiful work; and would have been more beautiful still had the light on the plane of the breast not been suppressed; "Liliane Gilbert" (61), displays most artistic lighting; "Miss Jean Chown" (71) is a fine bold work, with a fleshiness that holds the eye; but none of these can really be said to be portraiture in the strict sense of the word: they are pictures. We should like to possess them as pictures, perhaps, but we are not drawn to the subjects as persons whom it would be a privilege to know, and this is no doubt an injustice to each of them.

In the combined mother and child portraits the human element will not be kept out. It asserts itself in spite of artistry. The lines of "The late Mrs. Lionel Crane and Son" (26), are so excellently planned as almost to be obvious, especially as both figures are in profile; "The Hon. Mrs. Hope Morley and Children" (78) is a triumph of posing; but although in both these the art is not concealed it cannot rob the works of the charm of domesticity.

But, of course, professional photographers do not all have the same *clientèle*. Those who cater for theatrical people will find the decorative motive of more use to them than the psychological that aims at the human document. On these lines the development of the figure-study, such as that called "A Portrait Study" (85), is easily explained. Here we have not a sitter but a model—at least, so it would appear—the print is a large one, the costume shows anatomical details that have no place outside an artist's studio, the posing is highly "pictorial," the lighting unconventional, and—nobody denies it—the effect superb. But its title is a misnomer.

As a rule, the professional is at his best with children. He has a knack with them, and pictorial as he makes them, they are, generally speaking, delightfully childlike. "Child Portrait" (83) has the charm of a Lawrence. "The Lace Cap" (101) is a bold, strong presentment of a baby with a ball. "Child Study" (59), with just a touch of back-lighting, has been delightfully managed. There are too many to mention. All are good. The Bartolozzi red of "Olive" (4), treated in a circle, is very dainty.

I have always maintained that the professional who is worth his salt knows his composition well: so well, indeed, that he is often tempted to flout it. This surely has been done in the case of "The Turban" (9), where the lines all run down in a sort of stampede to the left. Here are the makings of a fine figure-study, the roundness and shapeliness of which has been lost by the unfortunate cutting off of the shoulder. With regard to tonal values, the professional is not on such sure ground. Enlargement plays him false, and a queer idea of strength frequently results in sootiness, as, for example, in "Field-Marshal Earl Haig" (87), which has the appearance of an excellent print accidentally dirtied. Sometimes that old fetish "sunning down" is responsible for defects which must be obvious to the most uninitiated. The sitter's book or newspaper is represented in such stygian gloom as to make reading impossible, especially as the face receives a full flood of concentrated light. As the sitter usually makes no attempt to read, it is thought perhaps that naturalism and rationalism is thus safeguarded.

This kind of "monkeying," with the light is the last remaining obsession of professional work which has to be shaken off. Why must a sitter's hands always look as though they had gloves on? I know the answer myself. The interest must be concentrated on the face. But this I maintain is an illogical method of concentrating interest. There are plenty of works here that show simplicity, or the avoidance of complex interest, by a rational lighting over the whole subject, which prevents high-toned spots from being antagonistically opposed by joining them up. Composition can be a far better help than "sunning down." The light parts can be massed sometimes; or they can be effectually shaded in the subject before exposure; a resource which gives in a legitimate way the result which sunning attempts with less perfect artistic effect.

Professional portraiture is now awakened to its best chances: there is no doubt about that; and amongst these exhibits there are evidences of subtle skill and fancy in designing. "Yvonne is Tired" (29) occurs to me, and "Portrait of a Child" (84). A pleasing fitness of treatment is seen in the mid-Victorian "Crinoline" (47), with its domed top, and border appropriately mid-Victorian also. But better than happy fancy are the signs of appreciation of the natural aspects of things; common-

place illumination, with its delights made plain, as in the masterly "William Harbutt" (94) (I am avoiding any joke about the *modelling*, splendid as it is). Here the beauty of flesh and textures are due entirely to a straight-forward explanatory lighting, and it is in this direction of ordinariness that the finest art lies. Putting the source of illumination at the back of the sitter or underneath or all round or on one side only, may give the jaded operator himself some little excitement of change and novelty; but he must remember that the sitters and the public are not always on the look out for something startling. They are not "used to it," like the eels that were being chopped up every day. They want something that shall make them feel pleased and proud of themselves; they don't care a toss for the photographer's reputation for art-resources. They will be pleased and proud if the portrait they get gives their likeness at its best, whilst it makes them appear to have brains and a heart and a conscience. The theatrical tendencies may produce profitable results in an art-for-art's sake direction, if the professions, both, do not lose their heads; but these tendencies are of no use at all in legitimate portraiture, which must first and foremost devote itself to taking *likenesses*, not decorative schemes; to rendering character, temperament, and personality; not legs and arms and backs as such.

The making of designs with sitters as motives; the evolving of tonal schemes with sitters as material, is by no means the same thing as taking a portrait with a keen sense of design, and a fine feeling for tone-values. Beauty must always be uppermost in the operator's mind, but he must seek it in those everyday conditions in which the sitter most easily recognises himself. There is plenty of it under these conditions. We most easily respond to sublimity in the commonplace; cataclysms only frighten us.

F. C. Tilney.

WASHING PRINTS.

There is no more unpopular operation in present-day photography than the washing of prints. Everyone, from the amateur rinsing a couple of P.O.P.'s in a soap dish, up to the trade house which has to free from hypo. some thousands of prints a day—everyone dislikes it.

Yet it is most essential that this should be done thoroughly. Modern investigation tends to lay greater stress on thorough fixation than on the total elimination of hypo., but the fact remains that no business can afford to scamp the later operation. A good deal of water and labour might be saved by some consideration of the facts involved; and it is the purpose of these notes to suggest some points worthy of attention.

Many professionals would gladly pay the added cost and use a hypo. eliminator, if they felt sure of the permanence of the prints so treated. Their distrust of chemical agents is only too well founded; it is true that the hypo. is perfectly destroyed by many commercial preparations, but it is not removed, and in the present state of our knowledge it is not possible to say that the compounds formed in its place are any more easy to remove or less harmful to the print than is the unchanged hypo.

Potassium permanganate is, as a matter of fact, by far the safest eliminator, because its strength and its action can be very accurately gauged by its colour; but even this is no substitute for water, and should only be used in exceptional circumstances.

There are three main ways in which we can utilise water for the washing of prints. In sinks or dishes, in mechanical washers, and in "sectional" washers. The second of these is not to be recommended. I have seen no mechanical washer in which any efficient method of separating the prints was used, and it is hard to conceive of such a method. And if prints stick together, it matters not how much water you use or how vigorously it is applied; it is impossible to remove all traces of hypo.

The sectional washers are better than this: their construction does preclude prints sticking together, but they have disadvantages. They take some time to fill and empty of prints; the same prints are always at the bottom of the batch, which is not good; and they hold only a limited number of prints.

On the whole, washing in tanks or sinks is undoubtedly the most generally efficient. It takes time and labour, but the results are most satisfactory when it is properly done. To be well washed, without a waste of water, prints should be treated as follows:—We will suppose there to be two sinks side by side; the prints are in sink A, face up. First, turn each print separately face down; then, draining each print as you pass it over, transfer them to sink B, face up. When all are over, turn each print face down again, and again transfer them to the other sink and fresh water.

To throw a lump of prints from one sink to another is *not* washing. Working on the above lines, turning each print in each bath of fresh water and draining at each time of transfer from sink to sink, ten, or at the most a dozen, changes will be quite sufficient. If you simply transfer them from sink to sink in a lump they will retain hypo. after fifty or more changes.

It is as well to test the last washing water for hypo. before putting the prints to dry. If this is done with permanganate the cost is practically nil, and it is an excellent safeguard against scamping, if unreliable labour is employed. Also it may show you that your washing goes on long after the hypo. is removed, and thus point the way to an economy of time and water.

There is one further point which I have found is not always well understood. Some papers—Satista, for example—we are told to wash for thirty minutes, the average time for bromides being an hour. I have known—at a reputable studio, too—a batch of Satistas and bromides placed in the same sinks for washing, and at the end of thirty minutes the Satistas were removed, oblivious of the fact that they must have been full of water hypo. impregnated by the surrounded bromides.

In districts where the water comes through chalk it is almost essential either to filter the water—a thankless job—or to wipe over the face of each print with a swab of cotton wool before placing them to dry.

In case anything in these notes may be taken as prejudicial to mechanical *plate* washers, I wish to say at once that some of these are most efficient. There is, of course, not the slightest risk of the plates striking together, and the ways in which the changes of water are effected are most reliable and competent to remove the hypo. in the least possible time.

Arthur G. Willis.

Butcher's Abridged Catalogue.—This 220-page list, just issued by Messrs. Butcher, Camera House, Farringdon Avenue, London, E.C.4, although much smaller in size than the bulky catalogues of pre-war days, describes the firm's innumerable supplies for amateur photography in adequate fulness and with illustrations in almost every instance. It contains particulars of the very latest introductions, such as the "Carbine" daylight development tank. Emphatically a list which the amateur worker should have at hand.

Photo-Mechanical Notes.

After Washing Bitumen.

THE by-product left after washing even 1 lb. of bitumen is somewhat considerable, and seems at first sight a great waste of good stuff. Anyone skilled in laboratory practice, and possessing the necessary apparatus, can recover the ether by distillation, and if distillation is not carried too far the thick residue is very useful as a cement when making wooden dishes or for repairing any that leak, this cement drying rapidly, and remaining when dry quite elastic, though hard.

Without recourse to distillation the solution makes a very fine black varnish for either wood or metal, and has a remarkably great covering power. It dries quickly and to a hard surface. Lantern announcement slides may be made which, when written on with a steel point, give clean-cut lines.—O. P.

Modern Photo-Lithography.

PROCESS engraving, photogravure and collotype are all standardised, so that little or nothing in the technics admit of improvements. Photo-lithography, on the other hand, is seething with activity, and most of the larger firms are putting down plant for negative making and for printing the image for the press, the older paper transfers being discarded as more or less obsolete.

Negatives up to 30 x 20 are being made with the aid of a step-and-repeat machine, containing from one dozen replicas to as many as twelve dozen, each replica of the subject being in perfect alignment and of the same density. These negatives can be utilised for single printing, or for the component negatives necessary for two, three, or any number of colours. These negatives, 30 x 20 inches, or smaller if desired, are used to print the ink image on plates 60 x 40, or smaller for direct and offset rotary machines or for flat-bed machines.

The metal plates are sensitised with bichromated albumen, and are dried on a whirler of the simplest construction. This plate, when the sensitive coating is dried, is laid face up on the bed of a large printing frame made in iron, and the negative laid upon this to register marks. Vacant spaces on the sensitive plate are then covered with thin tinfoil; thin card bearers disposed over this to equalise the space caused by the thickness of the glass negative, so as to prevent bending the thin metal plate.

Next a large frame carrying a sheet of plate-glass is lowered into position, covering the negative-covered sensitive plate; a clamp on each side presses this plate-glass in contact with rubber ridges running round the bed of the press, and then the necessary contact is obtained either by means of a small pump motor-driven by electric current or by a power vacuum. Innumerable Newton's rings show that the vacuum is complete, then the frame is swung from horizontal position to a vertical one, and exposure is made to a frame carrying eight or more mercury vapour tubes (some firms prefer arc lamps) for about five minutes.

Exposure finished, the frame is swung to the horizontal position, the plate-glass front wound up, and then the negative is moved over to the vacant portion of the frame. The image is adjusted to the register marks, again the tinfoil and card-bearers are put into position, the plate-glass front lowered, the vacuum secured, and another exposure made.

The sensitive plate then receives a coating of ink, applied either with a leather or composition roller, or by rubbing over with a pad charged with ink. Chalk litho ink thinned with turpentine is the favourite ink used. The image is developed in a large sink, the plate being deluged with water and the superfluous ink removed with wet cotton wool.

When developed and the edges all cleaned off, the plate goes to the pressman, and the photo-operator gets on with another.

If the printing plate is 60 x 40, and the negative 30 x 20, the image would be printed down four times and perfect register obtained.

Lithographers who have once begun to use printed-down plates on their machines quickly grasp the great advantage of this method over the older transfer and sticking-up methods. They are prepared for press in an abnormally shorter time, give far less trouble during the printing run, last from ten to twenty times the run, and hold the quality to the end.—W. T. WILKINSON.

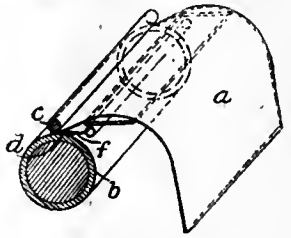
Photographic Stencils.

THE following stencil process invented by Lieut. Walters is very similar to the wax stencils used on the rotary duplicators, only in place of the wax film a gelatine or fish glue one is substituted, supported on butter muslin or some porous support. The film is made sensitive to light by the addition of bichromate of potash. Such a film is soluble in hot water, except when exposed to light, when it becomes insoluble. It will be seen that it is closely allied to the well-known carbon process.

The sensitive film is exposed to light under an ordinary ink tracing or manuscript written or drawn in an opaque ink; or it is possible to use a photographic positive of a drawing, type matter, or even a coarse screen half-tone positive. The parts that are protected from light, represented by the opaque portion of the positive, remain soluble and wash away; the parts under the transparent parts become insoluble. The sheet after exposure is developed in hot water, the result being a stencil of the original. Prints can be made either on a flat bed duplicator by the use of the inked roller or by means of the rotary cyclostyle 30 or 40 prints can be obtained per minute. Prints on all grades of paper can be secured, but with papers having a hard non-absorbent surface it is necessary to interleave each copy with blotting paper.

Photo-stencils can also be made by the ordinary methods of line etching. This zinc is coated with bichromated albumen and exposed under a photo-positive or drawing on tracing paper, or it can be drawn direct upon zinc, in an acid resisting varnish, but reversed from left to right. The zinc is etched in the same way as for ordinary line etching. It must be remembered that the drawing should be specially prepared for stencil work by adding supporting portions to prevent the centre of letters or designs falling out when etching.

LAYING TISSUE ON METAL. — According to a patent specification, No. 157,704, of H. Schulte, Frankenthal, Rheinpfalz, Germany, claims the following process :—In transferring a pigment paper or fabric on to the printing surface, the face of the paper or fabric



is moistened as it is being fed and pressed on to the surface. For this purpose, a jet of water *f* is directed on to the edge *d* formed between the printing surface *b* and the pigment paper or fabric *a* by the pressing roller *c*. The specification is open to inspection, but is not yet accepted.

FORTHCOMING EXHIBITIONS.

April 13 to 23.—Portsmouth Camera Club. Particulars from the Hon. Secretary, C. C. Davies, 25, Stubbington Avenue, North End, Portsmouth.

April 15 to 23.—Professional Photographers' Association, at the Photographic Fair, Horticultural Hall, Westminster, S.W. Hon. Secretaries (Correspondent), Marcus Adams, 43, Dover Street, Piccadilly, London, W.1; (Exhibits), R. N. Speaight, 157, New Bond Street, London, W.1.

April 15 to 23.—Photographic Fair. Horticultural Hall, Westminster. Sec., Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

April 28 to 30.—Nottingham and Notts. Photographic Society. Particulars from the Hon. Secretary, A. Beeston, 103, Nottingham Road, Nottingham.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, March 29 to April 2.

COLOUR PHOTOGRAPHY.—No. 9,453. Cameras and projection apparatus for coloured photography. R. von Arx.

STEREOSCOPY.—No. 9,696. Attachment for taking stereoscopic pictures with any camera. W. B. Boothman.

RETOUCHING.—No. 9,639. Retouching screens. I. Boysen.

PHOTOGRAPHS.—No. 9,669. Photographs, and mounts therefor. G. R. Howley.

PRINTING APPARATUS.—No. 9,834. Photographic printing apparatus. Huebner-Bleistein Patents Co. and W. C. Huebner.

APPARATUS.—No. 9,836. Apparatus for positioning printing-plates of photographic printing apparatus. Huebner-Bleistein Patents Co. and W. C. Huebner.

CAMERAS.—No. 9,703. Photographic cameras. S. E. Neame.

LIGHT AND SOUND RECORDS.—Nos. 9,476, 9,634, 9,732. Process and apparatus for simultaneously reproducing optical images and sound waves photographically recorded on a film. E. Reisz.

CINEMATOGRAPHY.—No. 9,284. Cinema pictures, etc. S. Atkin.

CINEMATOGRAPHY.—No. 9,663. Projection of motion pictures. C. W. and W. Fennell.

CINEMATOGRAPHY.—No. 9,448. Cinematographic apparatus. G. W. Ford and H. G. Ponting.

Applications, April 4 to 9.—

TYPE PRODUCTION.—No. 10,218. Mechanism for photographic reproduction of type, etc. W. Broadbent.

TRANSMISSION OF PHOTOGRAPHS.—No. 10,233. Means for transmission and reception of photographs. M. J. Martin.

PROJECTION APPARATUS.—No. 10,088. Projection apparatus. L. Marzocchi.

CINEMATOGRAPHY.—No. 10,099. Shutter for bioscopes. R. W. Bond.

CINEMATOGRAPHY.—Nos. 9,852 and 10,004. Cinematographic pictures and apparatus for production thereof. S. H. Crocker.

CINEMATOGRAPHY.—No. 10,085. Spools and film holders for cinematograph films, etc. J. K. Douglas.

CINEMATOGRAPHY.—No. 10,379. Light control in cinematograph projectors. G. W. Ford and H. G. Ponting.

CINEMATOGRAPHY.—No. 10,380. Cinematograph projectors or cameras. G. W. Ford and H. G. Ponting.

CINEMATOGRAPHY.—No. 10,202. Solution for coating cinematograph films. A. Ott.

CINEMATOGRAPHY.—No. 10,203. Safety shutter for cinematograph machines. W. H. Penny.

CINEMATOGRAPHY.—No. 10,414. Cinematography. C. H. Verity.

COLOUR CINEMATOGRAPHY.—No. 10,062. Colour cinematography. Industrial Inventions, Ltd., and F. Perry.

COLOUR CINEMATOGRAPHY.—No. 9,993. Colour photography and/or cinematography. M. Martinez.

STEREOSCOPIC CINEMATOGRAPHY.—No. 9,992. Stereoscopic cinematography. M. Martinez.

CINEMATOGRAPH-PHONOGRAPH.—No. 10,501. Cinematographic apparatus for performance of musical films. C. Vische.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

COLOUR CINEMATOGRAPHY.—No. 135,171. (November 9, 1918.) The invention is a symmetrically arranged printing machine for the production of coloured cinematograph films by successively copying the different series of colour components of a negative film ribbon upon one and the same picture surface on a positive film. The arrangement comprises on both sides of the light-exposure device two feeding sprockets for the negative ribbon, one of which is rotated intermittently by means of a Maltese cross while the other makes a continuous rotating movement. On both sides of the apparatus are two feeding sprockets for the movement of the positive ribbon and means for rotating the latter sprockets at one third the speed of the corresponding sprockets for the negative film; the feed sprockets situated on both sides of the printing gate are synchronously rotated from the same driving mechanism.

Oscillating levers support the ribbons at the printing gate, and there are means to clamp the ribbons between two plates; also to assure the exact coincidence of the negative and positive pictures.

A shaft is driven from a main shaft and fitted with arms which mesh with V-shaped notches in a disc fixed to the shaft of one of the guiding drums of the negative ribbon for the purpose of doing away with the lost motion of the wheel gearing, so as to enable that under all circumstances both ribbons may be registered by the pins.—Serge de Procoudine-Gorsky, Granstad, Konnerud, near Drammen, Norway, formerly of Petrograd, Russia.

The following complete specifications are open to public inspection before acceptance:—

REPRODUCTION PROCESS.—No. 160,739. Photographic reproduction by means of a phosphorescent medium. J. H. Christensen.

CINEMATOGRAPHY.—No. 160,749. Cinematographic apparatus. Jungst and Fabarius.

CINEMATOGRAPHY.—No. 160,797. Cinematograph and like apparatus. E. Coulon.

RETOUCHING.—No. 160,836. Retouching screens. I. Boysen.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

UFAG.—No. 383,896. Sensitised films for photography. Universum Film Aktiengesellschaft, Unter-den-Linden 56, Berlin, Germany, manufacturers. June 13, 1918.

VITTEX.—No. 408,883. Photographic printing paper and postcards. L. Gevaert and Compagnie, 23, Septe Straat, Vieux-Dieux, Belgium, manufacturers of photographic materials. October 19, 1920.

FAERIE CINEMA.—No. 409,603. Photographs. William Rampling Rose, 22, Bridge Street Row, Chester, Cheshire, manufacturer. November 10, 1920.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

SENSIBLA.—No. 408,884. Photographic chemicals, photographic plates, and photographic films. L. Gevaert and Compagnie, 23, Septe Straat, Vieux Dieux, Belgium, manufacturers of photographic materials.

TRADE MARKS REMOVED FROM REGISTER.

In the official language of the "Trade Marks Journal" the following trade marks have been "removed from the register through non-payment of renewal fees." Such non-payment is of course the method adopted by a firm having no further occasion for the use of a mark.

CATATYP.—No. 255,505. Neue Photographische Gesellschaft-Aktiengesellschaft. Registered in 1903 in class 1.

HYDRONAL.—No. 261,734. Dr. Luttke and Arndt. Registered in 1904 in class 1.

PERCHROMIN.—No. 265,703. Aktien-Gesellschaft für Anilin-Fabrikation. Registered in 1904 in class 1.

OMNAR.—No. 268,876. Rathenower Optische Industrie Anstalt Actien Gesellschaft. Registered in 1905 in class 8.

ENPEGOL.—Nos. 272,764-65. Neue Photographische Gesellschaft-Aktien Gesellschaft. Registered in 1905 in class 1.

BICHROMIN.—No. 274,051. Actien Gesellschaft für Anilin Fabrikation. Registered in 1905 in class 1.

CANVASETTE.—No. 286,781. Rotary Photographic Co., Ltd. Registered in 1906 in class 39.

AFPI.—No. 286,214. Emil Wünsche Actien Gesellschaft. Registered in 1906 in class 39.

WATALU.—No. 287,937. The Self-Developing Plate Co., Ltd. Registered in 1907 in class 1.

RAJAR.—No. 287,481.—Rajar, Ltd. Registered in 1907 in class 39.

RAPID ISOCHROM (label).—No. 288,397. Ilford, Ltd. Registered in 1907 in class 1.

TONNO.—No. 288,760. The British Gelatine Works, Ltd., Registered in 1907 in Class 1.

CUPIDO.—No. 286,122. Fabrik Photographischer Apparate auf Aktien vormals R. Hüttig und Sohn. Registered in 1907 in class 8.

PRESTO.—No. 290,186. O. Scholzig. Registered in 1907 in class 39.

RAINBOW.—No. 288,346. Geo. Nelson, Dale and Co., Ltd. Registered in 1907 in class 1.

REGISTRATIONS RENEWED.

OZOBROME.—No. 284,546. By Ozobrome, Ltd. Registered in 1906 in class 39.

VICTRIX.—No. 286,220. By Emil Wünsche Actien Gesellschaft Registered in 1906 in class 8.

ISOSTIGMAR.—No. 288,362. R. and J. Beck, Ltd. Registered in 1907 in class 8.

TWINK.—No. 290,190. Ilford, Ltd. Registered in 1907 in class 1.

CARL ZEISS, JENA (DEVICE).—No 233,791. The firm trading as Carl Zeiss. Registered in 1906 in class 8.

NIXE.—No. 286,217. Emil Wünsche Actien Gesellschaft. Registered in 1906 in class 8

REICKA.—No. 286,218. Emil Wünsche Actien Gesellschaft. Registered in 1906 in class 8

SIRÈNE.—No. 286,219. Emil Wünsche Actien Gesellschaft Registered in 1906 in class 8

Commercial & Legal Intelligence.

LEGAL NOTICES.—A first and final dividend of 5s. 6d. in the £ has been made in the case of Daniel Prodger, photographer, Fernbank, Eynsford, Kent, lately residing and carrying on business as C F. Treble, at 373, Brixton Road, S.W. The dividend is obtainable at the Official Receiver's Office, 280a, High Street, Rochester.

EASTMAN KODAK COMPANY.—The directors have declared the following extra dividends :—10 per cent. upon the common stock, payable on June 1 to stockholders of record on April 30; 5 per cent. upon the common stock, payable on July 1 to stockholders of record on May 31. The ordinary quarterly dividends of 2½ per cent. upon the outstanding common stock and of 1¾ per cent. upon the outstanding preferred stock will be paid as usual on July 1 to stockholders of record on May 31.

NEW COMPANIES.

VICTORIA PHARMACY, LTD.—This company was registered on April 12 with a capital of £400 in £1 shares. Objects : To carry on the business of opticians' and photographers' sundriesmen, etc. The subscribers (each with one share) are : Miss Violet G. Waplington, 70, Goldsmith St., Nottingham; H. S. Ball, 52, North Road, West Bridgford, Notts., pharmacist. Violet G. Waplington is permanent governing director. Qualification : £100. Registered office : 20, St. Ann's Street, Nottingham.

New Apparatus.

The Williamson VIII. Cinematograph Camera. Sold by W. Butcher and Sons, Camera House, Farringdon Avenue, London, E.C.

SOME time ago we reviewed in these pages the two Williamson cinematograph cameras, the types IV. and VII. supplied at the prices of £28 and £42 respectively.

The third model, sold as the "Professional Camera, Type VIII.," is a full power instrument not only for straightforward topical work, but also for trick effects produced by reducing the speed of the film or reversing its direction. Moreover, the mechanical facilities are greater. The claw movement of the less expensive models is adopted, although in a somewhat modified form, but the gate is made instantly detachable for dusting, and the exposure punch operates on the edge of the film. One feature of the film mechanism is that the picture may be masked according to either the English or Continental standard. Also there is a mirror attachment by which the picture, when necessary, can be actually focussed up to the instant of exposure. The through sight finder has adjustments for making it accurate over a wide range of distances, and is provided with masks corresponding with lenses of different focal lengths.

As regards gearing, the instrument is provided with both standard and single-picture turn, and an indicator provided showing

the speed of turning on a scale ranging from 12 to 24. Reverse direction of the film is done very simply by taking the drive through a special pulley, and, in conclusion, a point which deserves to be emphasised perhaps more than any other, is that the whole mechanism is built and supported on its own framework, the case of the camera being simply an erection attached to this framework. Any warping or distortion of the case can have no effect on the relative positions of the parts of the mechanism. As showing the way in which little details have been studied, it may be mentioned that three studs are provided on the bottom of the camera in order to form a rigid three-point support for the instrument on the tripod head, and the handle on the camera case is set somewhat crosswise to the length in the position most convenient for carrying. It is evident that the whole instrument reflects an expert designer's care in every respect. The price of the outfit is £95.

ONTOSCOPE CAMERAS.—We are advised by Messrs. Robbins, Manistre (the London Camera Exchange), 2, Poultry, London, E.C.2, that the prices of the "Ontoscope" cameras, noticed a week or two ago, have been reduced by 10 per cent.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, APRIL 25

Bowes Park and Dist. Phot. Soc. "Pictorial Ideals." M. O. Dell.
Cripplegate Phot. Soc. "A Roam about Rome." W. Sanderson.
Willesden Photographic Society. Annual General Meeting.

TUESDAY, APRIL 26.

Exeter C.C. "Amateur Photographer" Prize Lantern Slides.
Leith Amateur Photographic Association. "Photography: Its Present-day Importance and Power." A. Dordan-Pyke.
Manchester Amateur Phot. Soc. Show of Prints. L. & C.P.U. Folio.
Portsmouth Camera Club. General Request Night. Ten Minutes' Lectures.
Walthamstow and District Phot. Soc. "Second Chat on Pictorial Photography."

WEDNESDAY, APRIL 27.

Borough Polytechnic Phot. Soc. Rummage Sale.
Ilford Photographic Society. Annual General Meeting.
Partick Camera Club. Annual Meeting.
Photo-micrographic Society. Members' Evening.

THURSDAY, APRIL 28

Gateshead and District Camera Club. "Amateur Photographer" Prize Lantern Slides.
Hammersmith (Hampshire House) Photographic Society. "A Ramble in the English Lake District." A. J. Linford, B.Sc.
Kryn and Lahy (Letchworth) Phot., etc., Soc. 1917 Competition Prints, R.P.S.
Kinning Park Co-op. Soc. C.C. "Colour Screens." R.A. Burr.

FRIDAY, APRIL 29.

Bedford Camera Club. General Meeting.

SATURDAY, APRIL 30.

Kinning Park Co-op. Soc. C.C. Outing—Milngavie to Blanefield.
Manchester Amateur Phot. Soc. Outing to Stalybridge—Walker Wood Reservoirs, North Britain, Shaw Moor and Stalybridge.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, April 19 the president, Dr. G. H. Rodman, in the chair.

The President drew special attention to the fact, which he considered to be an event in the history of the Society, that the paper which they were to hear read that evening would be illustrated by the projection of a cinematograph film. It was the first occasion on which the cinematograph projector had been used in the Society's lecture room, and he looked forward to other communications being illustrated from time to time in this manner.

Mr. A. Pereira delivered a lecture, "From Camera to Cinema," dealing with the printing and preparation for exhibition of cinematograph films. He exhibited, in actual working, a film printer, and demonstrated its mechanism, and proceeded to describe the appliances by which the film was tank-developed, fixed, washed, toned or tinted (or both) and dried. In cinematograph practice the standard developer was metol-hydroquinone containing a large proportion of hydroquinone. For toning, the copper toner of Mr. W. B. Ferguson was very largely used. Methods of dye-toning, such as those of Ives, were much more largely used in America than here at the present time. While the results possessed a transparency and brilliance which were not yielded by the methods of toning with metal salts, the dye toning processes required more expert supervision, and on that account had no doubt been slower in coming into general use.

Mr. Pereira then exhibited a film showing the actual processes he had described. It covered the whole process of producing the positive film. He also exhibited a film of a mirage in an African desert, the projected pictures showing with astonishing clearness a panorama of sea coast many miles away from the scene of the photograph.

In the discussion which followed, Mr. Colin M. Williamson asked for the lecturer's opinion on the origin of the dust which collected on sensitive films during printing.

Mr. Pereira briefly described experiments he had made which indicated that the greater proportion of the dust consisted of gelatine emulsion. The dust evidently contained a proportion of celluloid, but not more, he should think, than one part in eight.

Mr. Williamson referred to systems of printing mechanism, and suggested that a method of printing by optical projection was one which was deserving of attention as a means of avoiding many of the difficulties which occurred in the contact handling of the cinematograph negative and positive film.

In reply to a question by Mr. King, Mr. Pereira said that on the whole, he thought the four-punch type of perforator was the most satisfactory in practice.

On the proposition of the Chairman a most hearty vote of thanks was signified by acclamation to Mr. Pereira for a highly informative lecture, and for the very great trouble which he had taken in providing the exhibits of equipment and the projecting machine.

News and Notes.

A GRADUATE DRAINER. Messrs. Rycott and Dixon inform us, in reference to the notice last week of their draining rack for glass measures, that Messrs. Kodak, Ltd., are the sole wholesale agents for the supply of these to chemists and professional photographers.

HOUGHTONS' BULLETIN for professional photographers describes in its current issue reductions in the prices of plate-sunk mounts and negative bags and envelopes, and gives particulars of some items of professional equipment, such as paper storage boxes trimming desks and cascade washers.

NOTICE TO DEALERS. Messrs. Jonathan Fallowfield advise us that three pairs of Kershaw prism binoculars, X 6, engraved "Fallowfield, London," and numbered 1160, 1163, and 1164, were taken from their premises last week. If the instruments are offered to any dealer, the latter is requested to take such steps as may be necessary to detain the person offering them.

THE GENERAL ELECTRIC COMPANY announce the removal of their stores and offices to the new building, Kingsway, London, W.C.2, in which, after very great delay occasioned by the war, their many activities are to be centralised in one large building. Their address is Magnet House, situated at the corner of Kemble Street and Kingsway, and occupying a site of large frontage on the latter thoroughfare.

MR. ROBERT BALLANTINE, 103½, St. Vincent Street, Glasgow, has just issued a 32 page price list of second-hand apparatus, any items of which are offered on seven days' approval against remittance. The cameras, lenses, etc., in this list are all those of a high grade, and Mr. Ballantine informs us that all goods are examined and passed by himself personally before being sent out. A copy of the list will gladly be sent on receipt of a postcard.

TORONTO CAMERA CLUB.—The 30th annual salon of the Toronto Camera Club will be held from August 27 to September 10, again as part of the Canadian National Exhibition. Our Canadian friends will be very pleased to receive once more entries of pictorial work from those in the Mother Country. The prospectus and entry form are obtainable from the secretary of the exhibition committee, Mr. J. R. Lisson, Toronto Camera Club, 2, Gould Street, Toronto, Canada.

THE ES OF MEES. A facetious correspondent, who is an admirer of the well-known physicist, Dr. C. E. K. Mees, Director of the Research Laboratory of the Eastman Kodak Company, writes to ask "Photo Era" whether Dr. Mees was born in the shadow of the Eastman Kodak Company, because he assumes that his middle initials stand for Eastman Kodak. Although this is a pleasantry at which Dr. Mees will smile, it may, nevertheless, be stated that in the Meesian expression E. K. is a constant denoting Edward Kenneth.

MESSRS. WARREN JEPSON AND CO., the well-known Leeds firm of enlargers and colourists, are exhibitors at the Photographic Fair, whose display, unfortunately, we were unable to include in our series of advance notices last week. We were not aware, until receiving the published catalogue of the Fair, that Messrs. Warren Jepson had a stand there, but we are glad to take this opportunity of directing visitors to this firm's exhibit (Stand No. 51), which will be found near the corner of the hall to the right of the entrance. Messrs. Warren Jepson are showing some exceedingly tasteful examples of enlargements in monochrome and colour, miniatures and commercial photographs.

AUTOTYPE COLOUR CHART.—The Autotype Company have just issued a handsome booklet of artistically mounted prints showing the 32 varieties in which Autotype carbon tissue is made. These include some colours which have not hitherto been shown on the firm's charts. The album is obtainable at the price of 2s. post free. The company has also just published a revised list of its manufactures for the carbon process, including tissues, transfer papers and the necessary chemical preparations. This list is obtainable free on application to 74, New Oxford Street, London, W.C.1.

GEVAERT PLATES AND PAPERS.—Messrs. Gevaert, Ltd., send us a circular of reduced prices of their plates and papers, according to which a dozen quarter-plates are now priced at 2s. 7d.; half-plates. 5s. 8d., and whole-plates, 10s. 11d. The retail price of Gevaert P.O.P. is now 31s. per quire of sheets 24½ × 17 inches, or 12s. per gross of 6 × 4¼ pieces. Net prices of postcards are 54s. per thousand for bromide, gaslight, and P.O.P.; 49s. per thousand for a "professional" grade of bromide, and 60s. per thousand for self-toning, with a reduction for quantities up to 5,000, except in the case of self-toning.

VEST-POCKET PORTRAITS.—If anyone requires a demonstration of the effective use which can be made of the vest-pocket camera he cannot do better than obtain a little book of reproductions of portraits of the players in "The Beggar's Opera," which has just been published at the price of half-a-crown by Mr. Alan Trotter, 36, Ladbroke Square, London, W.11. The 24 portraits were all taken in the dressing rooms at the Lyric Theatre, Hammersmith, by Mr. Trotter with a Vest-Pocket Kodak. While perhaps one or two of them are poor photographically, most of them are technically and pictorially of such fine quality that anyone turning over the pages would assume that they were made with the customary resources of a studio as regards apparatus.

LENSES FOR AERIAL PHOTOGRAPHY.—Messrs. Taylor, Taylor and Hobson send us a reprint of the paper by Mr. W. B. Appleton, read before the Royal Photographic Society in 1919, and describing the firm's improvements in the design of lenses for aerial photography. The paper is interesting for its record of this contribution to the photographic effort in the war, and, moreover, may be commended to the student of optics for the diagrams illustrating the nature of aberrations of oblique rays such as astigmatism and coma. We have no doubt that Messrs. Taylor, Taylor and Hobson will be pleased to send a copy to anyone applying to them at Stoughton Street Works, Leicester.

THE IMPERIAL HANDBOOK.—The 1921 edition of the ever-welcome "Handbook," issued by the Imperial Dry Plate Company, is as full as in previous years of articles and contributions of interest to the amateur worker. The contents lead off with a paper on "High Key Portraiture." Although not ascribed to them, it is evidently the work of Mr. and Mrs. Cadby. The delicate studies against white backgrounds are characteristically theirs, and if one were in any doubt, there is their portrait of Mr. Joseph Conrad. Similarly, we would venture to say that Mr. W. Thomas discourses on other pages of the opportunities for pictorial photography on the sea coast. There is a great fund of practical information in these and in other contributions which deal with orthochromatic photography, exposure for various subjects, the kind of negative required for different printing processes and photography at the Zoo. The many illustrations add to the attractiveness of the publication, a copy of which will be sent to anyone on application to the Imperial Company, Cricklewood, London, N.W.2.

COOKE LENSES.—Messrs. Taylor, Taylor and Hobson have just issued a new and revised edition of their catalogue of Cooke lenses, a publication necessitated by their recent introduction of a number of new types of construction. Among these are lenses for cinema taking and projection, and for astronomical photography of the large apertures of *f*/3.1. These are made in a series of focal lengths from 1 5-8th to 5 inches, the latter covering a plate 2¼ × 2¼. Messrs Taylor, Taylor and Hobson have also in course of construction lenses of 2, 3, 4, and 5 inches focal length of apertures as large as *f*/2.5, *f*/2, and *f*/1.9. Manufacture is not sufficiently advanced for these ultra-fast objectives to be listed in detail, but further information respecting them will be sent on request. The new catalogue also describes a convertible *f*/4.5 lens of new design made in two focal lengths of 6½ and 7½ inches. The front combination supplies a single lens of *f*/11 aperture, and the back element one of *f*/8 aperture, the focal length of the back half lens being thus somewhat shorter than the front element. Particulars are also given of the new Cooke telephoto lens obtainable in a series of focal lengths from 8½ to 20 inches of *f*/5.8 aperture, and requiring a camera extension approximately 60 per cent. of the focal length. Having terminated an arrangement with Messrs. Penrose for the sole distribution by the latter firm of Cooke process lenses, Messrs. Taylor, Taylor and Hobson now include these latter in their price list since they are free to sell them direct. The catalogue usefully makes special reference to the fact that in the choice of an *f*/4.5 lens the amateur purchaser should not cut the focal length too fine, since with these ultra-rapid lenses satisfactory covering power is limited to the size of the plate for which the lens is listed. Messrs. Taylor, Taylor and Hobson give good advice when they emphasise the advantages of lenses of somewhat smaller working aperture in this respect. The list, which throughout contains very full particulars of every Cooke objective, may be had free on application.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

** *We do not undertake responsibility for the opinions expressed by our correspondents.*

A CAMERA ATTACHMENT FOR SMALLER DARK-SLIDES.

To the Editors.

Gentlemen,—An arrangement for using ¼-plate slides in a ½-plate camera was recently described by a correspondent. It was made by sawing a square hole for the ¼-plate reversing-frame in a board cut to fit the ½-plate camera.

Having but few tools, I adopted the following method, which may appeal to others. In my case the fitment had to be 1¼ in. wide. A picture-framer made me a plain oak frame, wider than 1¼ in., with the rebate a close fit for the ¼-plate reversing back, the nails at the corners being well sunk with a nail-punch. I then planed down the outside of the frame until it fitted the ½-plate camera. A few simple brass catches completed the work.—Yours faithfully,

OLD HAND.

A NORTHERN FAIR.

To the Editors.

Gentlemen,—It is certainly interesting to read in the "B.J." about the Photographic Fair in London, but I think the promoters or manufacturers should consider it is not the privilege of those up North to attend. If necessary to hold one in London, could not another be arranged, say, here in Manchester or Liverpool, and so give those in this part of the country an opportunity of seeing the latest and best in photography?—Yours faithfully,

FRED DESBORDES.

33, Arrow Street, Broughton, Manchester.
April 17.

HALATION AND DEVELOPMENT.

To the Editors.

Gentlemen,—The correspondence in your columns on this subject is extremely interesting, and we may hope to get some valuable help from the varied experience of the writers. My own opinion, formed from some years' architectural work, is that the freedom from halation depends more on the quality of the plate than upon the developer. A good many years ago I was using a brand of plate that simply refused to give halation, except under the most difficult conditions. I can recall only one subject which showed it badly. This was the interior of a large barn, and the only light came through slits in the wall, some of which faced the camera. In this the halation went deep down into the film; rubbing down was of little use, and a considerable thickness of the film had to be

scraped away to get rid of the halo. In those days I scoffed at plate backing, as with the plate I was using I did not require it; but, alas, each succeeding batch of plates had less and less of the non-halation quality, till at last the backing with brunswick black varnish failed to stop halation. The only fault of the first few batches of the plates was their slowness, but for landscape and exteriors of buildings they were excellent, and for interiors they were not so slow as to cause any great inconvenience. I found they gave excellent copies of black and white drawings, quite as good as the process plate of to-day, but with far shorter exposures than process plates require. I usually developed them with rodinal, which may be described as a "soft" developer, giving a short time of appearance, but rather a prolonged total time to obtain density. But with this particular plate density was obtained so quickly that I used rodinal to avoid excessive contrast. These plates fixed extremely quickly, and dried very rapidly, and had many characteristics of a process plate, but were much more rapid.

The gelatine film carrying the silver bromide was extremely thin, and the question occurs to me, had this anything to do with the absence of halation? There we had a very thin film of gelatine, containing sufficient silver bromide to provide a brilliant image when using a "soft" developer for a short time. Would this not mean that the grains of silver bromide were packed closely together in a very thin film of gelatine? Would not this state of things prevent the scattering of light among the grains of silver bromide? And would not the reverse conditions, fewer grains of the sensitive salt (requiring a 'harder" developer and longer development), scattered about in a far thicker film of gelatine, allow light to spread through the film, till it reached the glass support, to be reflected back again among the scattered grains of silver bromide?

The diversity of view as to whether slow or rapid developer is better is extraordinary, and greater than I remember to have seen on any other subject. This proves the difficulty of the problem to be solved. I am afraid, myself, that development is not the real solution, but it is probably one step forward. I believe the emulsion plays an important part, and also backing. In using panchromatic plates for copying pictures in colour I find that backing is absolutely necessary, but it will not entirely prevent halation in architectural interiors, as I found when taking a number of negatives of buildings lighted by incandescent gaslight, in which several of the lighted burners appeared on the plate. But the solid black backing on panchromatic plates is most useful in minimising halation, the thin red film so often used on ordinary plates has very little effect, I think.

Non-halation plates, having a stained film under the sensitive one are helpful, but I have had some bad cases of halation on them. Double-coated plates are better, even if they take a long time to fix and wash, but even then they take less time and attention than twenty-seven minutes or two hours to develop. Films are supposed to give less halation than glass plates, but I have not found that there is much difference. I should prefer a well-backed plate myself.

In my former letter on this subject I mentioned a bad case of halation I had just had, from a window in a dark church, over a war memorial, where the halation spread half-way down the plate. But during the exposure some sweeping of floors was going on, which, no doubt, increased the halo. The second attempt was far more successful. I covered up the window on the outside that caused the trouble, after a few minutes' exposure, and gave seven hours, instead of two, and also used a larger stop for the rest of the subject. In most cases, of course, the covering of the window causing the trouble is impossible, but there is no doubt, I think, that full exposure and steady development is likely to reduce the chances of halation.—Yours faithfully,

BIFOCAL.

To the Editors.

Gentlemen,—The letter of Mr. Wilson, in the issue for March 14, on the subject of halation, leads me to give the methods which I use for avoiding trouble of this type. These methods are in common use in America, but may or may not be in England, and, at any rate, may be unknown to some.

It is evident from the remarks that Mr. Wilson made that provided the exposure given the plate is not sufficient to allow the light to reach the back of the plate, there will be no trouble from halation. It is also evident that the more development extends into the body of the emulsion the more the reflected light will make itself evident, and the halation will be more in evidence. On the other hand, if we are able to get sufficient density and contrast by developing the image on the surface rather than in the film, that we can, to a large extent, avoid halation. The following methods are all based on this principle of developing the surface rather than the depth of the film.

A common method which is often used and which is effective is that in which the alkali is reduced below the normal amount. If the amount of carbonate in a pyro-soda developer is reduced to ¼ and ½ of the usual amount, development will take place to a greater extent on the surface than if a full strength solution is used which tends to work down into the film. It would also seem that the surface developers, such as metol, eikonogen, rodinal, etc., would have less tendency to halation than developers, which work more in the film, such as strong pyro, hydroquinone, and glycin. In practice I have found this to be the case, and the following formula, which is taken from the Cramer plate manual, has been my mainstay in the treatment of subjects of extreme contrast for some time, and has proved very satisfactory. The formula which works best on plates that are fully or slightly over-exposed is as follows:—

Water	40 gs.
Metol	50 grs.
Hydroquinone	240 grs.
Sulphite	960 grs.

For use take one part of the above to one part of water. Owing to the absence of carbonate, development will be slow, requiring as much as 20 to 30 minutes at a temperature of about 70 degrees. Do not attempt to use this at a lower temperature than 65 degrees F., as development becomes too slow.

Much depends on the use of the proper plate. Here we favour a double-coated plate to eliminate halation, which it accomplishes by increasing the thickness of the emulsion, and its efficiency is high. Backed plates are more often used in England, I understand; but there are extreme cases in which the contrasts are beyond the range of either the double-coated or the backed plate, and it is in these cases that the formula I have given above will be of value.

Apologising for the length of this letter, which, I hope, will be of benefit to the profession.—I am, yours very truly,

CARROL B. NEBLETTE,
Head Division of Photography,
Pennsylvania State College, PA.

To the Editors.

Gentlemen,—I have not until now had an opportunity of seeing the last few numbers of your Journal, but I note a letter by Mr. Godfrey Wilson on the above subject in your issue of March 11, to which no reply appears to have been given so far. May I state the case as I think it should be given?

The difficulty arises from the fact that development as a factor in the case has not been given due prominence. Figs 1 and 2 (March 11, p. 147) are substantially correct diagrams, assuming that No. 1 represents the position of the developed grains, with normally correct exposure and development, but it is not correct as a record of the locus of the light-action in exposure. The ray of light must have penetrated the film entirely, and was reflected from the back internal surface of the glass, causing true halation.

In those places in the film where the light-action has been strong, normal development is not sufficient to develop the silver grain in the lower strata owing to the fact that the developer diffuses slowly, and in its passage becomes exhausted. Abnormally long development would accomplish this.

In those parts of the film where little or no light-action has taken place the developer can penetrate right through the film with undiminished strength in a normal time of development, and can blacken the silver grains in the lower layers of the film which have been acted upon by the light reflected from the glass. The result is true halation. Any method of development which limits the action of the developer to the upper strata of the film will lessen or prevent true halation, but it will not cure irradiation, which is due to light reflected from particle to particle in the film.

HAROLD HOLCROFT, M.A., F.R.P.S.

Gatcombe, Tettenhall, Staffs.

To the Editors.

Gentlemen,—I am following with considerable interest the correspondence regarding "Halation" in the columns of the "British Journal." As a commercial photographer I am frequently called upon to deal with the difficulties of front lighting, such as photographing objects in front of a window light, the light from an open door, or against the north light window system of factories, etc.

My experience certainly leads me to use the weak solution for developing, and not a concentrated solution. Working usually in size 12 in. × 10 in., I use flat films, give ample exposure, and develop with maker's formula for pyro soda developer, but diluted with at least an equal bulk of water. If necessary, ferricyanide reducer is used locally to clear any portions that may have a tendency to extra density. Printing on soft bromide paper still further reduces any possible harshness, and the result is a print full of detail and without halation.—Yours faithfully,

KENDRICK G. SMITH.

21, Howard St., Loughborough, April 16.

STEREOSCOPIC RELIEF.

To the Editors.

Gentlemen,—Will you allow me space to thank those who have so kindly written to elucidate the points raised in my letter on this subject? I have been very flattered by these expert responses, and have never felt so well informed as I am at present.—Yours truly,

F. C. TILNEY.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

R. C.—Collodion prints require to be glazed by means of enamel collodion, as described on p. 457 of the current "Almanac."

W. B.—So far as we know there is no solution which will change the colour of a sulphide-toned print to a darker shade to any material extent.

F. W.—You should simply apply to the Secretary of the Royal Photographic Society, 35, Russell Square, London, W.C.1, asking for a form of application for membership. If you do not know a member of the Society to act as proposer, we are quite sure that the Secretary would find one for you.

W. P.—We are afraid it is not possible to draw up a list of innocuous chemicals, because things that are harmless to one person are found to affect others acutely, and vice-versa. Generally speaking, so far as developers are concerned, pyro is the least liable to affect the skin. We never heard of skin trouble from developing until the newer developers came out. As regards prints, probably amidol would be without effect upon you, although it affects some people. If you cannot use it, then the best alternative is to use ordinary hydroquinone developer.

L. E.—The dyes which are commonly available have changed so greatly owing to commercial conditions created by the war, that we are afraid most of the current text-books are of very little use except to a chemist familiar with the constitution of the dyes. There are, however, a great many books on dyes, but most of them in German or French. We think your best course would be to go and have a look at all of them in the Library of the Patent Office, 25, Southampton Buildings, W.C., which is open free until 9 o'clock every night, and where the assistants will render every service to a visitor anxious to discover books on a particular subject.

A. W.—(1) A reflex camera can be used on a tripod, but it is very awkward for use in this way owing to the focussing screen being on the horizontal top of the camera. (2) We have published various articles on quantity developing of roll-film, and Messrs. Houghtons issue a very excellent catalogue (Trade Developing), which contains not only full particulars of equipment, but formulæ for developers, fixers, etc. (3) It is rather too much to say that an R.R. lens used on a plate half the size of that for which it is tested will not show astigmatism. Although astigmatism is a property of oblique rays, and therefore is shown in the margin, in the case of the rectilinear it is liable to become evident at a smaller obliquity than is determined by using a whole-plate lens on a half-plate.

T. B.—(1) When using soft focus lenses of the Aldis, Dallmeyer and Cooke types the diffusion must be adjusted before focussing. It is also advisable to set the iris to the aperture it is intended to use at the same time. (2) As a rule, printing-out papers will not keep in good condition for more than a few months. Even if they do not discolour, stale papers will not give satisfactory tones. Bromide papers, if stored carefully, will keep in good condition for a couple of years or more. Some brands keep better than others. Plates vary greatly in their keeping qualities. We have to-day made a good negative on an ordinary plate made in 1908. Very rapid plates are not reliable after a year or so. (3) The choice of a background is entirely a matter of taste, at present very dark backgrounds are popular for bust pictures, but in our opinion a graduated ground is preferable. For full lengths rather dark drapery or a vague cloud effect is generally used.

H. E.—The great diameter and very great focal length of the condenser certainly accounts in part for your long exposures. The condenser should bring the light to a focus in the diaphragm of the lens, but, of course, if you are using a 7-in. lens with a 12-in. condenser the lens has got to be much too near to the condenser, so that the diaphragm, instead of being at the apex of the cone of the rays, is somewhere midway along towards the base of the cone and, therefore, receives only a fraction of the light. There is no ready method of calculating diameter of condenser suitable to focal length of projection lens, but a useful average is a 9-in. lens for an 8½-in. condenser. Of course, the use of ground glass upsets, in a measure, the cone formation of the light from the condenser, but not sufficiently to prevent your deriving a good deal of advantage from having an objective of focal length appropriate to the condenser. Nevertheless, we should have thought that with bromide papers your exposure would be a good deal shorter than four minutes. Perhaps you are using a somewhat slower paper, but that you do not say.

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Contents.

SUMMARY.

A series of reports of last week's Congress of the Professional Photographers' Association occupies the bulk of this issue. It covers the whole proceedings, with the exception of the annual general meeting, the report of which is held over until next week. The reproduction of the group of Congress members with a key to their names will be found on the advertisement pages, Supplement 6 and 7.

Madame Yevonde, in a paper on photographic portraiture from a woman's point of view, emphasised feminine intuition as one of the mental qualities which put the woman photographer at an advantage in comparison with the mere man. She urged women photographers to come together within the membership of the Association, and discoursed on the present position of women as responsible heads of studios in an address which contained some witty sallies. (P. 251.)

Mr. S. H. Greenway, of Northampton, read a paper on canvassing frauds. He described methods which had been successful in combating them, and urged that anti-canvassing literature, in the shape of window bills, etc., should be officially prepared and issued by the Association. (P. 248.)

Following a paper on insurance, discussion ranged round the extra liability incurred by stock of celluloid in any quantity. The consensus of opinion was that the insurance company should be notified of the existence of any floating supply of celluloid, large or small. (P. 247.)

In a lecture on architectural and technical photography, Mr. H. W. Bennett defended the wide-angle lens for the more effective photography of many outdoor subjects, and illustrated the very great pains which it was necessary to take in dealing with difficult subjects. (P. 250.)

Mr. J. H. Pledge, for the Kodak Company, lectured on dark-room illumination, and emphasised the advantages of green safe-lights and semi-transparence (diffusion) of any safelight. He also referred to the economy of indirect lighting of the dark-room by means of an inverted lamp near to the ceiling as a supplement to the ordinary lighting over the work bench. (P. 249.)

Mr. N. E. Luboshez held forth *more suo* on lighting in portraiture. (P. 254.)

Mr. C. P. Crowther lectured on psychology in the studio, and drew from Mr. Marcus Adams a confession of his sub-conscious influence over children. (P. 255.)

Notes on the annual dinner and the excursion to the Kodak Company's works at Harrow will be found on page 256.

A portrait of the new president of the P.P.A., and some notes on his personality and business will be found on page 258.

The programme of the Congress of the Photographic Dealers' Association was unhappily dislocated by the threatened railway strike, but part of it was carried out. (P. 257.)

At the Croydon Camera Club last week Mr. Vivian Jobling had many practical things to say on the mounting of prints, and gave a formula for making dry-mounting tissue. (P. 256.)

The value of a list of lenses giving the makers' numbers in the event of a lens being stolen is the subject of a paragraph on page 245.

EX CATHEDRA.

Soft-Focus Lenses. When using soft-focus lenses in which the diffusion is produced by introducing more or less spherical aberration it is very necessary that the lens should be adjusted with regard to both diffusion and aperture before proceeding to focus, otherwise the resulting negatives are likely to be disappointing. It is well known to all who have studied the subject that when spherical aberration is introduced the focal length of the lens is altered to a slight extent, so that if a certain point in the subject is sharply focussed, and the adjustment then made, a point in another plane comes into as sharp focus as the adjustment will allow. This often quite spoils the effect of the picture. Again, when spherical aberration is present, an alteration in the working aperture causes an alteration in the focal length, again shifting the point of sharpest definition, so that if the precaution we have mentioned is neglected the result is bound to be unsatisfactory. The lens makers generally point this out in their circulars, but, unfortunately, soft-focus lenses are usually handled by artistic folk who do not read instructions. If in addition to spherical, chromatic aberration is present, tests should be made to ascertain what allowance is necessary to get the best average of definition.

* * *

A Wise Precaution. Every photographer knows that all lenses of any value and many cameras are engraved with a serial number by their makers, but probably not one lens owner in fifty keeps a record of such numbers. This means of identification is valuable in the event of a lens being lost or stolen. It is not perhaps generally known that a list of articles which have been reported to the police as stolen is issued at intervals to pawnbrokers and secondhand dealers, and in the case of lenses the number is the only means of distinguishing one from another. We have heard of an ingenious method by which a photographer recovered a stolen lens, which may serve as a hint to others. He immediately advertised under an assumed name for a similar lens and received an offer of one from a dealer. This proved to be his own, and from the description of the person who had sold it he was able to identify the thief. A notification by advertisement or postcard addressed to those who deal in apparatus would often lead to the recovery of the lens, if it did not to the punishment of the offender. A well-known dealer told us that, having an expensive hand camera offered for a mere trifle, he made some pertinent inquiries of the would-be seller, who offered to leave the instrument for inspection but never returned. A little later the owner was discovered. It is scarcely necessary further to point out that a detailed inventory of items of equipment is invaluable in the event of damage to a photographer's premises by fire. Its preparation is, in fact, an ordinary business precaution.

Finishing Prints. Although the practice of using the knife has become universal in negative retouching, comparatively few photographers use this or other method of removing part of the image, such as abrasion, upon their prints. Now that matt surfaces are almost universally used for portrait work this method may often be usefully employed upon contact prints as well as enlargements, with much better effect than can be obtained by using body-colour. As in retouching, the knife must have an extremely fine edge and the gelatine surface must be bone dry. Fine pumice powder applied with a rubber stump is also useful for lightening such portions as need it, either on bromides or carbons, especially for removing any "tint" from the margins of vignettes or the high-lights of the subject. In careful hands a hard typewriter eraser may be used to good purpose. The glass brush erasers are also useful tools, but we have found that the fine particles of spun glass, which break off while working, are apt to find their way into the softer parts of the hands and cause considerable inconvenience.

USING YOUR EYES.

HABIT is a very valuable part of our mental make up; it enables work of any kind to be repeated with the minimum of effort, and makes constant reference to memory unnecessary. But it is not an unmixed blessing. For instance, when one has walked into the same studio day after day for ten years or so, it becomes very difficult to see the place as others, less well acquainted with it, see it. For one fails to notice the "effect" of a studio or reception room when it becomes too well-known. This inability really to "see" their own business premises is a failing, by no means confined to the photographic profession, as visits to many retail shops will show; but it is probably more important in the case of a studio than in any other. There is no easy standard of comparison in the studio business, and you are not likely to attract customers, however good your work, unless your premises are attractive.

To begin with, if your window or show-case does not carry a good effect, you will not get many customers inside at all. If you get them inside and your reception room is unattractive, the chances are, they will not order. And if dressing rooms and studio are not "nice" you will not get many clients returning for more. It would be altogether useless to advise the average studio proprietor to spend some hundreds of pounds on redecoration; that is too drastic, anyhow; it is the way in which things are arranged rather than their quality that makes for "effect." In fact, it is far more likely a business will benefit by the removal of some of its present furniture and odd accessories than by bringing in more. The great thing is to see a place of business as if through the eyes of a customer entering for the first time. This is not so easy as it sounds, and it may be that a few notes on some of the more vital points will be of assistance. They are the outcome of visits to some hundreds of studios, ranging from the humble sticky-back den to the "five guinea a dozen" type of business.

It is very surprising to note in what a large number of businesses the spotting and finishing of prints is still carried out in the reception room. This is bad from at least two points of view; a number of odd prints waiting to be finished or to be packed do not add to the appearance of a room; however carefully they are stacked they will give an untidy impression; and, in the second place, many sitters dislike the idea of their photographs being exposed to the public, especially in a half-finished state, in deshabille, as one might say. Then again, negatives should never be brought into a reception room; they often are, either for sorting or for some other reason. It is a mistake, not because it gives away "trade secrets," but because any evidence of work, except the finished product, looks untidy and slovenly to an outside eye. The vast majority of reception rooms are over-crowded. Let the specimens from which customers will choose be kept in a portfolio or cabinet; a few really good pictures may be displayed in frames, but let them be only a few. Nothing looks less artistic than a heterogeneous collection of prints covering every available inch of wall and table space. It is difficult to stop them accumulating; in fact, the only permanently satisfactory way is to make a rule that for every new print shown an old one must be withdrawn.

With regard to the general arrangement of the reception room, there are two main points. It should be as unlike a retail shop as possible; a few comfortable chairs for the use of customers when waiting are, of course, necessary, but a lot of small chairs stuck all over the room do not look well and are not nearly so restful for sitters as are one or two comfortable armchairs or a settee. If a dealer's business is run in connection with a studio, the two branches should be kept as separate as possible; the shop and the reception room should, whenever possible, be quite distinct. The aim should be to impress the customer that you are not selling photographs as an ironmonger sells tin-tacks, but that you are an artist, taking every case separately and giving it individual attention.

The dressing-room is an apartment not usually so open to criticism as is the reception room, but in many cases it leaves something to be desired in the matter of "freshness." If a brush and comb are provided, as they should be, they must be kept scrupulously clean; cigarette ends or stray strands of ladies' hair must not remain about; and the window must be clean and the room well dusted. All very obvious, of course, but liable to be overlooked in a busy studio.

The arrangement of a studio depends so much on the work done in it, that any drastic alteration is inadvisable unless it is obviously necessary; but there are a number of things of minor importance in themselves which add up to quite a respectable total in the general effect. If newspapers or magazines are provided for the amusement of customers, see that they are kept up-to-date, and are removed before they get to the dog's ear stage; if some of the blinds are out of use, do not neglect them, keep them free from dust and cobwebs and neatly folded or spread as the case may be. A fault, both from the point of view of appearance and of work, is too much furniture. That old accessory and those old backgrounds that you don't use now, but keep in case you may need them—you never will—get rid of them, sell them or use them for firewood; anything to get them out of the way. They collect dust, and however carefully they are stored, look untidy, and, of course, they fill up much space which would be far more useful as extra working room.

To turn from consideration of those parts of premises likely to be seen by customers, while thinking of re-arrangement, it is just as well to see if the workroom accommodation is being used to the fullest advantage. Here, utility will be more studied than appearance, but the same remarks hold good to a great extent, the less disused out-of-date apparatus there to collect dust the better. Plenty of light and fresh air should be available in every room. One often takes the term "dark room" too literally. The more light you can get in it, of the right sort, the better; better for your eyes, better for your work, and better for your breakage bill for dishes

and measures. It is strange what a number of good workers still use "ruby glass" as their dark-room light-filter. One can have twice the light with far less risk by using a scientifically constructed gelatine-film safe-light.

If there is a number of workrooms the work should go from room to room with as short journeys as possible; for instance, the mounting room should, when possible, be next door to the spotting room, and yet one often finds them at opposite ends of a building. It may seem a small matter, but the time wasted in the course of a year in long journeys from room to room must be considerable.

Up-to-date apparatus is the best investment it is possible to make. Labour-saving means money saving in the long run, even if it is a one-man business. Every professional should make a practice of seeing the latest in apparatus at least once a year. There are many high-class firms doing a good business and using apparatus that should have been on the scrap heap years ago; this means waste of labour in any case, and usually it prevents a higher standard of work being attained. It is not so much in the way of cameras and lenses that firms are behind the times, but in the less-considered items—trimming boards, mounting machines, printing boxes, drying cupboards and dozens of other things.

THE P.P.A. CONGRESS.

Mr. Alfred Ellis took the chair on Tuesday afternoon, when the first item on the programme was a demonstration by Mr. A. C. Braham (of the Autotype Company) of the "Carbro" Process. He said that the modifications of formulæ and methods in working the process were due to Mr. F. Garon, of Southend, an amateur, who had devoted ten or eleven years to the study of the subject. Mr. Braham carried the process through in every detail, and his manipulations were followed with keen interest by the large company present, who afterwards accorded him a hearty vote of thanks.

A paper was next to have been given by Mr. A. C. Watts, of Catford, on "Salesmanship in Photographic Business," but the Chairman said that, unfortunately, Mr. Watts's services had been called upon by the Government in connection with the existing industrial situation. It was the only item which had had to be withdrawn from their programme.

PHOTOGRAPHERS' INSURANCE.

Mr. Dunford, representing the Eagle, Star, and British Dominions Insurance Company, read a paper on "Reasons why you should insure through the medium of the P.P.A."

An interesting discussion followed.

Mr. Sarony (Liverpool) raised an important question. Now that films were so popular, what was the position with regard to insurance against fire? Many photographers now stored flat celluloid films.

Mr. Dunford said that he took it this was a recent addition to the photographers' stock, and it would come under the ordinary fire hazard. There was generally a survey in that connection.

Mr. Lang Sims pointed out that instead of using glass many photographers now used films, and probably this would increase the fire premium. It was a point which should be discussed.

A member said that he had raised the question with one company, who had replied that there would be no increase in premium, but that they would carry the risk involved in the change. The company in question was the Fine Art Company.

Mr. Dunford said that the matter could not be decided until a survey had been made. Quite likely the rate might not be increased above the normal. It would depend on the circumstances in each individual case.

Mr. Swan Watson asked whether, when photographers ceased to use glass and took up the use of films, it was necessary to acquaint the insurance company with the fact?

Mr. Dunford replied that certainly he would say that that course was incumbent upon them.

Mr. Swan Watson further asked whether, in the event of a fire, the fact of the change from glass plates to films not having been indicated, the claim could be sustained?

Mr. Dunford replied that if any photographer kept a large quantity of films on his premises, and had no such films when his policy was taken out, he should certainly advise the company.

Mr. Swan Watson said that there might be as much danger in one as in a lot.

Mr. Dunford advised that the photographer should be on the safe side, and tell the company he had so much film on his premises; then a survey could be made if necessary, and it could be ascertained by the company in what condition as to security the films were kept.

Other members remarked that they understood from their insurance company that if the films were safely stored the policy covered the risk.

Mr. Dunford said that he had been twelve years in the insurance world, and he could not think that any company charged the same rate for celluloid as for glass.

A member asked where was the dividing line with regard to the quantity of films stored?

Mr. Dunford said that if they had any quantity it would be best to advise the company.

Mr. Lang Sims thought it would be better if all policies now covered a certain amount of celluloid. The company might arrange premiums according to the amount of celluloid on the premises. A photographer might have a little celluloid in hand one day, and it might be gone the next day or the next week. It would be very hard if such a man had his place burned down and his claim was not met. Far better to have all policies cover a certain amount.

Mr. Dunford said that he quite agreed that some such arrangement as Mr Lang Sims suggested might be made. The matter would receive the attention of his company.

A member said that without some such provision a policy would not be worth the paper it was written on.

Mr Sarony remarked that he did not think they gave sufficient thought to the inflammable nature of celluloid. After 26 years in the cinematograph world, he knew the danger, and he hoped the members of the Association right through the country would make every effort to see that their policy covered this risk, no matter how small the quantity of film might be.

The Chairman said that it was obvious that if a new risk, not previously covered, was introduced, and the company was not notified, the policy might be rendered invalid. He felt sure that the matter having been discussed, Mr. Dunford would go back and consult with his company.

Mr. Dunford agreed to do this.

Mr. Swan Watson asked if there was any policy covering the theft of a lens by a person who came into a studio in a crowd. Was that in the "all-in" policy?

Mr. Dunford: If you take his photograph and he takes your lens—(laughter)—it is covered by the burglary, housebreaking, and larceny policy.

Mr. Dunford was warmly thanked for his paper.

CANVASSING FRAUDS.

Mr. S. H. Greenway (Northampton) read the following paper on "Canvassing frauds, and how to deal with them."

There is probably nothing easier with which to defraud the public, or that section of them which is easily bamboozled, than the photographic enlargement bait.

Since the war, I am told on the authority of the police, the country swarms with canvassers of this kind, whose stock-in-trade is generally two or three passably good bromide specimens, a plausible tongue, and promises of a really high-class enlarged photograph from any original entrusted to them.

I have been on the scent of a worthy couple operating in small towns near Northampton, but not in the county, and victimising some of my own customers.

The *modus operandi* of these slippery humbugs can be taken as typical of many others, who work in pairs, generally of opposite sexes, but not always husband and wife, although nominally so, for the sake of appearances.

In the cases which I have personally investigated, the lady appeared first on the scene, invariably when the man of the house was absent from home, on the plausible plea of providing a fine picture of some dear one, lost in the war, or other relative or friend. The wife or daughter of the house would part with a P.C., or snapshot, and generally a small deposit towards the cost, which I found varied according to the circumstances of the occasion.

This lady canvasser, I use the term "lady" advisedly, was a very loquacious and persistent woman, and the simple country folk she tackled hadn't a ghost of a chance. They were simply talked into parting with, in some cases, a cherished photograph and money before they knew where they were. The canvasser had one or two decoy local specimens supplied free, or fairly cheap (as a guarantee of good faith), and, needless to say, these were *faked* up for the occasion and provided excellent bait.

Within a few days the other partner made his appearance with what he called the proof; merely a bit of bluff to get a further instalment towards the 17s. 6d. charged.

Some held on to this crude and unfinished effect for which 7s. 6d. was demanded, rather than risk further outlay in finishing up a dubious result. I was shown two or three of these precious specimens, cheap and nasty bromides, coarse and over-printed monstrosities about 24 by 19, rough mounted, and already warped into a cylinder shape.

In cases where the victim refused to pay a further instalment the proof was retained by the firm, and nothing further was heard of the deposit or the original. One young man I interviewed, an ex-service fellow, had parted with a brother's photograph and 17s. 6d., the full price charged, and all he held was a worthless receipt minus date or signature.

Eve, in the person of the lady canvasser, tempted him, and he fell a victim to her wiles. I made a test case, and interviewed the Superintendent of the County Police, who explained the difficulties of bringing this class of shady customer to book.

Difficulty 1.—To get any of the victims to prosecute; dislike to advertise the fact they have been sold.

Difficulty 2.—The very thin line between a civil action of process by County Court for breach of contract, as against a proven fraud, *i.e.*, obtaining money and goods by false pretences.

Difficulty 3.—That in most cases the transaction is oral instead of written and signed.

So much for the evil. Now what are the remedies?

This kind of low down business, especially when it exists on a fairly large scale, is about 75 per cent. suspect, as against 25 per cent. genuine and legitimate dealing (I quote official estimates), and injures the whole status of photography as a business. Let a *bona fide* firm send representatives in the wake of these swindlers and see the reception they would get.

Some years ago, when we had a local branch of the P.P.A., we scotched the operations of an outside firm who were canvassing the town under the high-sounding title of some art association. We did that by means of advertising in the local press, and cards displayed in our windows warning the public against parting with photographs or money.

That was the time when the free enlargement stunt, with the compulsory purchase of a cheap German gilt frame, charged at four times its value, was being worked for all its worth.

However, publicity and advice to some of the victims had the desired effect, and the exploiters of trust and credulity cleared out to fresh fields and pastures now.

It is on these lines that the P.P.A. can be of practical service. Any warning notice with the title "P.P.A. of Great Britain" appended would carry far more weight than a local name, and my suggestion is that the Association be asked to supply suitably worded cards for window or showcase display at a small cost, so that the members and the public can be protected when these doubtful agents appear in one's locality.

All genuine firms would hail such procedure with satisfaction.

Some years ago the cynical old sage of Chelsea wrote: "There are 35 millions in Great Britain, mostly fools." I do not know if that proportion still holds good, but it is certainly difficult to understand the mentality of some people we have to deal with.

I put it to these people who were regretting their stupidity and the loss of their money, which, in most cases, they could ill afford—why, with old-established and accredited photographers in their own neighbourhood they entrusted photographs they valued to outsiders and complete strangers without ascertaining their *bona fides*, or even seeing that a proper signature and date was appended to the receipts they held.

You will say this is an exceptional case, and that the natives in this particular place, which, by the way, is *not* Northampton, are pathetically simple. In any case, I did good work in my inquiries, for these specious frauds made a sudden exit, and the likelihood of any return for the sums entrusted to them is very remote.

The annoying part is, however, that all the money they garnered is lost to the legitimate traders, and that so much public confidence is alienated, and photographers as a class are suspect to such people for a long time afterwards.

My advice is: "Do not lightly disregard this spurious kind of competition. Genuine agencies, even if they thrive upon cut prices and slim methods, we have to face; but it is our duty to investigate when doubtful and dishonest means are used, and productions labelled "high class enlargements" are foisted upon the public at ten times their value. Then it is time to act in a corporate capacity for our mutual interests and scotch the game.

Even if our own particular business is not directly affected, we have a duty as members of the P.P.A. to those of our fellow craftsmen to whom this kind of competition is hurtful and exasperating.

S. H. Greenway.

In the course of discussion,

Mr. Lang Sims pointed out that this was no new matter to the Council. Only a short time ago a new member wrote complaining of a similar fraud in his town. The Council replied to the member to the effect that he should put a notice in his window that he had nothing whatever to do with the fradulent canvassers, and that if customers came to him they would be promptly and satisfactorily dealt with. Of course, the great difficulty was to get anyone to prosecute. The Council would welcome any suggestions.

The President (Mr. Frank Brown) said that the police were powerless to act unless private individuals were willing to

prosecute. There had been a similar trouble with regard to painting miniatures, and he had the satisfaction of saving two of his customers £50 by putting them into a position to claim the return of the money they had paid. The only way, it seemed to him, was an extensive issue of warning notices to be placed in photographers' windows. Of course, it was not only a matter of cheap and inferior portraiture, a similar fraud was practised in connection with better work. He had every reason to believe that the Council would be able to stop it in time.

Mr. W. Illingworth (Northampton) said that this was one of the reasons why he had so strongly urged the incorporation of the Association. When they became a registered body they ought to be able to check all this kind of thing much more effectively than at present.

Mr. Greenway, who was accorded a hearty vote of thanks, said, in reply, that he was sure that if the Association issued display notices for the districts affected, for which members would be willing to pay, it would have a pronounced effect in putting a stop to the practices complained of.

DARK-ROOM ILLUMINATION.

Mr. J. H. Pledge, of the Kodak Company, read the following paper on "Dark-room Illumination."

I want to assume that a talk on the subject of dark-room illumination may be of some help to those workers who have not yet had time or opportunity to look closely into this matter. So if to some of you what I have to say may be rather elementary, yet to others I hope there will be some little gain.

For comfortable working in the dark-room we need as much light as is consistent with safety. That is to say, we want to be able to see as well as possible without incurring the risk of fogging the plate or other photo-material we are handling.

The colour and amount of the illumination that it is possible to use therefore depend on two things:—

(1) The sensitiveness of the plate. (2) the sensitiveness of the eye. Both of these factors vary—the eye with the individual, and the plate according to its kind.

It is customary to consider white light as consisting of a mixture of all colours, and if, in fact, we analyse white light with the instrument called the spectroscope, we obtain a band of colour varying from violet through blue, green, or orange to red and deep red—the well-known continuous spectrum.

Without going deeply into the matter, it may be said that, given the same quantity in fair amount of blue, green, red, and violet, to the eye the green and red might look equally bright, but the blue would be darker, and if we wanted the blue to look as bright we should have to take more of it, because the eye is less sensitive to blue than to green and red. But if we reduced very much the quantity of light the result would not be the same. As the quantity of light was reduced the green would appear to lose less than the red, and, finally, when the red had quite disappeared, we should still be able to perceive a faint effect in the middle of the green. This matter has an important bearing on the design of safelights for use with panchromatic plates, about which I want to say a few words presently.

Now, with respect to the sensitiveness of the plate. To daylight, ALL plates have a maximum sensitiveness in the violet blue. This is entirely true of ordinary plates. Orthochromatic plates have an additional sensitiveness in the green, and panchromatic plates are sensitive to the green and red besides the blue, but all are most sensitive to blue. Now although it is quite true to say that an ordinary plate has its maximum of sensitiveness in the blue, it is not entirely insensitive to the other colours, but with sufficient exposure will be fogged by green light and with still more exposure by red light. It is therefore obvious that for dark-room illumination we cannot use blue light. It is, however, possible to use a green light or a red light, or a mixture of green and red, that is, yellow, though it would have to be a very deep yellow, and this could only be used for slow plates and papers. Therefore for the handling of photographic material of ordinary sensitiveness an orange or red light is usually best.

Regarding the standardisation of the various glasses now usually known as safelights (so called, I suppose, because they are not lights, neither are they entirely safe), prior to 1907, when Dr. Mees, of Wratten and Wainwright, made an investigation of the subject. There were no standards, and the photographer bought canary or ruby fabric or glass, and was satisfied so long as he got no fog on his plates. When he did get fog he usually proceeded to decrease the amount of light coming from his dark-room lamp, perhaps by fastening another piece of fabric round it. He did not know whether he was getting as much light as it was possible to have with safety, and, as a matter of fact, Dr. Mees found that, in general, dark-room lights were much darker than they need have been.

The standard of safety adopted by Dr. Mees was that a plate might be exposed for half a minute at 3 ft. from the dark-room lamp without showing a trace of fog, the intensity of illumination being 8 c.p. directly behind the safelight, or 16 c.p. if the light were reflected through the safelight. Of course, development always takes more than ½ min., but it is never necessary to expose the plate directly to the light for a longer total time than ½ min. The developing dish should be covered for the greater part of the time of development, or at least kept in the shade, and the direct light of the lamp not allowed to fall upon the plate. With the growing popularity of tank and stand development these remarks, which apply primarily to dish development, will not be so generally applicable. There is another point which has been frequently overlooked in the design of dark-room lamps. In a dark-room it is necessary to see not only the plate that is being developed, but also the position of the tap, measures, and so on. Now a diffused light is much better for this purpose than a direct light, and a great deal more of the surroundings can then be seen with the same intensity of light falling on the plate, and strain on the eyes is thereby minimised. In point of fact, the safelight itself, 10 by 8 or so in size, should act as the light-source, and must therefore be translucent and not transparent. A ruby or other glass through which one can see the source of light is, of course, transparent, but a safelight, such as those of the Wratten series, which one cannot see through owing to the diffusing medium, is called translucent. The Wratten safelights are all composed of two sheets of glass coated with dyed gelatine. Between these two glasses is placed a diffusing medium, usually paper, and sometimes this is dyed as well. Here a word of caution. A dyed gelatine safelight is preferable to either glass or fabric, because it enables exactly the right colour to be used and of just the right strength. But it is necessary that the lamp should be thoroughly well ventilated, otherwise the coating may be damaged by the heat. Every Wratten safelight box bears this caution, but I am afraid it is not always observed.

The special Wratten dark-room lamps are so designed that a current of cool air is constantly passing over the surface of the safelight all the time the lamp is in use. This applies to all sizes and forms of the Wratten dark-room lamps, and it is impossible in a Wratten lamp to spoil a safelight through overheating, however long a lamp may be running. At our Harrow works we have some safelights in use in lamps lighting dark corridors or exits which are continually alight, and we have not yet had a failure of a safelight through overheating. Their end, when it does occur, is usually a violent one, perhaps by being dropped while cleaning, and even a Wratten safelight will not stand that kind of treatment often.

As the sensitiveness of different photographic materials handled in a dark-room may vary very much, it is obviously desirable, on the ground of comfort and convenience, to be able to control the colour and amount of light in use. For fast ordinary plates we need a deep red light, for slow lantern plates a bright yellow one, and so on. We now list a series of nine varieties of Wratten safelight, covering the whole range of light-sensitive photographic material now available, from the slowest plates and papers to the fastest portrait and most sensitive and rapid panchromatic plates on the market. These

safelights have all been designed with the same margin of safety, and their standard is very rigorously kept up. Generally speaking, we do not recommend daylight as the light-source for dark-room illumination, as it varies so much in intensity, and any given safelight may be unduly dark at one time and far from safe at another. A fairly constant artificial light-source is much better.

We are frequently asked why green is the colour of the safelight recommended for use with panchromatic plates. It is not, of course, that panchromatic plates are insensitive to green, but is due to the fact to which I referred just now, that the average eye is more sensitive to very weak green light than to a similar amount of any other colour. A panchromatic plate is easily fogged by exposure to green light, but given a very weak green and a very weak red light, both of equal visual intensity, the red light would cause fog trouble in a much shorter time than the green. Hence the most useful and safest safelight for panchromatic plates is a dull green light.

During the last few years a form of supplementary lighting of dark rooms has come into use—the indirect lighting system. This usually takes the form of an electric lamp suspended from a whitened ceiling and projecting its light upwards only. It is reflected practically all over the dark-room from the area immediately above the lamp and renders the use of the dark-room very much more easy, most especially when more than one person is using the same room. This method is in practically universal use at our Harrow works, in the coating and packing, developing and printing rooms, and elsewhere. The method is now largely in use in most photographic works and in many professional dark-rooms also. The safelights we recommend for use in such lamps are those in the list now on the screen. To those seeing this method of lighting for the first time the amount of light permissible with safety will probably be a surprise. We do not recommend this as taking the place of the lamp over the work bench or sink, but as an accessory or additional method.

To summarise, for dark-room illumination—

Do not use canary or ruby fabric or glass of an unknown factor of safety.

Use a screen which is translucent and not transparent.

Use a screen which permits the greatest amount of light possible with the particular photographic material in use. From this it follows that more than one screen should be available if plates or papers of widely differing speed or sensitiveness are employed in the same dark-room.

See that your dark-room lamp is properly ventilated so that the safelight does not become unduly heated.

If more than one person is using a dark-room at the same time consider the installation of a Wratten ceiling reflector lamp as an efficient aid which will soon save its cost in reducing breakage of measures and dishes and in preventing collisions between workers who would, of course, usually have a valuable negative in their hands at the time.

J. H. Pledge.

ARCHITECTURAL AND TECHNICAL PHOTOGRAPHY.

Under the presidency of Mr. Frank Brown, a lecture was given on "Architectural and Technical Photography," by Mr. H. W. Bennett, F.R.P.S.

Mr. Bennett said that there was always a large amount of good technical work to be done—architectural, engineering, scientific, including copying. One essential to begin with was that the man who was required to do technical work must have a certain understanding, not merely of his photographic technique, but of the technical qualities of his subject. It was hopeless to expect good animal photographs, for instance, from a man who was not fond of animals, or good photographs showing machinery from one who had no understanding of the purpose and functioning of the machinery. Some years ago a large French engineering firm installed a new system of signalling at a station on the line from Paris to Madrid. A photographer was asked to take about two dozen photographs, and this he did in one day, but, however good they might have been as photographs, when the manager saw them he threw them aside. Then he (the lecturer) was called upon to undertake a series of negatives, and this he did in three days, and from his twenty-four negatives some 700 or 750 prints were ordered, therefore they met the case. In photographing machinery it was essential to understand the working of the machinery. Such a position for the camera must be taken as would show the working parts of the machine.

Mr. Bennett showed one or two pieces of home-made apparatus—one of them an arrangement for preventing the tripod slipping on a slippery floor. It consisted simply of three laths joined together in such a way that they could be extended flat and tripod-fashion on the ground; and having holes to receive the points of the tripod, it effectually prevented a tripod slipping on, say, a glass surface, or making holes in a rich carpet.

For all technical work one must necessarily have a camera with a large range of rising front. At times it was necessary to lift the lens very high in relation to the centre of the plate; this he succeeded in doing in the case of his own camera by means of a panel arrangement on the camera front. With regard to lenses, as an architectural photographer he wanted to defend the wide-angle lens. He had heard many photographers in the past speak strongly against it,, but he regarded it as not only a necessity at certain times, but as an advantage at many other times. There were occasions when he had the opportunity of using either a long focus, a medium focus, or a wide angle, and he chose the wide angle because it gave him the most natural and pleasing result. He would never advocate an excessively wide angle—that is, an excessively short focus—in relation to the plate. As a general rule he preferred to use a lens not shorter than five-sixths of the length of the plate with which he was working. Such a proportion of focus to plate would give, measured on the diagonal of the plate, a capacity of just over 70 deg. Most of his whole-plate work had been done with a lens of just under 7 in. focus; most of his 12 x 10 work with one of 10½ in. focus. His objection to telephotographic work was that the perspective was so slight that in many cases the impression was almost that of a photograph of a model. But if a fairly wide-angle lens were used one got the effect, in the case of a tall building, of looking upward. A photograph of a high building, taken with a lens of moderately short focus relative to the plate, gave in the resulting print this looking-upward impression to a remarkable degree. This was provided, of course, that the photograph was taken from the ground, and he always felt that in architectural work photographs should be taken from the ground, such being the natural and intended point of view. There was just one reservation. When taking very small subjects with a wide-angle lens, the nearest point being very near to the camera, and the floor or foreground was to be included, he found it advisable to place the camera on a lower view-point than usual. The low view-point, of course, had to be selected with discretion.

Mr. Bennett went on to speak about copying, which by some was regarded as very easy work; yet he had been surprised to find comparatively skilled photographers fail at simple copying. It was purely technical work, and to photograph a drawing to scale was quite easy, but absolute accuracy was necessary, and nothing need be left to guesswork. With the help of lantern diagrams Mr. Bennett gave a detailed exposition of his own methods. He insisted that if copying was undertaken in a systematic manner, every copy ought to be a success. He had been surprised to find how little system there was in many establishments for copying; he himself had always regarded systematic exposure as an essential preliminary to success. Some time ago he had a commission to take a number of pictures in the National Gallery, and he found that the conditions of exposure, if represented by 1 on one side of the room, would have to be represented by 4 or 5 on the opposite side. This was simply because, although the room was lighted from the roof, the walls on one side were taken up so as to block the sky-light considerably. There was nothing to equal a

meter for guidance in exposure for copying under all manner of conditions.

In passing Mr. Bennett paid a tribute to the Bolt Court School, whose willingness to help and advise had been so very kind, he said, as sometimes to overwhelm him.

The photographer engaged on technical work should make himself familiar with colour sensitive plates and different screens; even a green screen at times might be exceedingly useful. The photography of machinery was difficult because oftener than not it was so placed in the workshop as to be ill-lighted from the photographer's point of view. In all apparatus taken in the workshop the photographer must be prepared to block out the background in his result. The best thing to use for this purpose he had found was opaque water colour; the most opaque was Indian red, and this, bought in tubes, made an excellent opaque for blocking out backgrounds.

Mr. Bennett dealt more particularly with mechanisms on railways, and described his experiences in signal cabins, when he had to give intermittent exposures. A signal cabin offered in its small space almost every difficulty with which the photographer could be called upon to deal. The windows particularly were always a source of trouble. He illustrated by the most painstaking diagrams and also by photographs how he placed his camera under these circumstances. His plan was usually to learn from the signalman which was the most frequent position for the signals, and to wait and give fragmentary exposures whenever that position recurred. Other unfavourable photographic environments were cathedral crypts and tube tunnels. To photograph in tube tunnels was not very difficult if only plenty of flashpowder were used.

Mr. Bennett went on to speak of photographing in country houses, particularly interior pictures, and illustrated how he managed rooms which were unsuitable either from the lighting or the spacing point of view, and then went on to speak of his cathedrals, showing how at Wells and Ely, for instance, where he had plenty of room to use a lens of longer focus, he deliberately chose the wide-angle lens, and got thereby a more pleasing result. He insisted upon the many advantages which the local photographer had over the visiting photographer, in respect to local knowledge, local access to unaccustomed points of view, and the opportunity to take advantage of seasonal variations.

Unhappily Mr. Bennett's lecture had to be greatly curtailed owing to the approach of the closing hour of the hall, and his slides were rushed through at a speed which did scant justice to their excellence. A hearty vote of thanks was accorded on the motion of Mr. St. George, seconded by Mr. T. C. Turner, who said that the remedy for a failing business was technical ability, and at no time was it so necessary as now for the photographer to be a good technician.

PHOTOGRAPHIC PORTRAITURE FROM A WOMAN'S POINT OF VIEW.

Certainly the most witty, and in some respects the most progressive lecture delivered to the Congress was that by Madame Yevonde on the above subject. The lecture was illustrated with lantern-slides of the work of some contemporary women photographers:—Miss Lena Connell, Mrs. Bertram Park, Miss Alice Hughes, Miss Florence Van Damm, Mrs. Angus Basil, Miss Dorothy Wilding, Mrs. Marion Neilsen, Miss Dora Head, Madame Pestel, of Eastbourne, Madame Genia Reinberg, of Paris, and Madame Yevondo herself. Following the lecture, Mrs. Frank Brown returned the compliment of the previous Monday evening by presenting Madame Yevonde with a bouquet of flowers.

Women have done much to popularise portrait photography. To say definitely how much is something of a problem, as it is always difficult to state accurately where an influence begins or where it ends. But I think we must all agree that portrait photography without women would be a sorry business. In fact, I would almost go so far as to say that it would have languished and died long ago but for the interest of women.

The mothers who wanted portraits of their sons; the daughters who must have pictures to give their affianced; the society beauties who must have a new photograph every time they buy a new hat, and last, but not least, the charming actress who must be photographed often and always. One could go on indefinitely with examples.

In fact, when we look round us and think how much our profession is influenced by feminine feeling, it is rather surprising that portrait photography is not considered almost entirely a woman's profession.

Women seem to possess all the natural gifts essential to a good portraitist, I mean the natural personal gifts, such as personality, tact, patience and intuition.

I was very glad on Monday night to hear our President, Mr. Frank Brown, make such a point of the necessity for right environment in taking the sitter. Atmosphere is a very strong factor, and one that most mere photographers have more or less ignored.

To my mind the sitter ought to be the predominating factor in a successful portrait. Men portraitists are often apt to forget this; they are inclined to lose the sitter in a maze of technique, and luxuriating in their cleverness and the beauty of their medium, they fail to remember that the living, breathing sitter is of equal importance, in my opinion slightly more so. As to the sitter's opinion (I can only guess at it), I should just like to ask you all how many times, in submitting a batch of proofs, has your technically perfect work been turned down; while some wretched under-exposed negative, a thing that makes you blush with shame, is acclaimed a masterpiece, because—"You have caught my expression; it is absolutely life-like; all my friends deeply love it." You groan in anguish as you write down the order for three dozen. And this truism is again brought brutally home "that the public does not care a rap about its prints as long as it gets a likeness." Now, we must not, of course, pander to the public in this respect; but, on the other hand, we must be equally careful not to forget them. And it is for this reason that I put the personality of the photographer as an important point.

A pleasant personality goes further towards the making of a successful portrait than a perfect print. The sitter must come first, and everything must be done to make him or her, and particularly her, as happy and comfortable in the studio as possible, or the odds are very much against a life-like portrait. A woman, to my mind, is much more likely to create this atmosphere than a man. Her tact and sympathy are acknowledged facts, and she ought to possess in a marked degree the power of putting the sitter at his ease.

Talking of that, I feel I must tell you a little story that Miss Lena Connell told me the other day, although it rather disproves my point about the tact, with a capital T, of the woman photographer, as she herself admitted, but it is too good to miss.

Miss Connell was photographing a very stiff, nervous man, who proved himself a most touchy and fractious sitter. After trying in vain to put him at his ease by conversation and cigarettes (although I am not sure about the cigarettes; I only guess at those) she at last lost patience with him, and said to him:—

"Why do you not go and get photographed by a man, as you appear so ill at ease, and foolish before a woman?" He became still more confused, of course, at that, and said:—

"Well, you see, it's like this, Miss Connell, I should look a silly ass any way in a studio being photographed, and I would much rather look a silly ass before a woman than before one of my own sex."

You might almost say here is another case for the woman photographer. If there are many sitters of the outlook of that gentleman, it is all to the woman photographer's advantage, even though it is not very complimentary to her.

The quickness with which a woman's brain works is an enormous help to her in dealing with sitters. Scientists tell

us that it tires more easily than a man's, but it acts spontaneously and with greater rapidity, which is a tremendous advantage in the studio, especially when dealing with children and difficult sitters. Our intuition here is of more value than man's much-prized logic.

Take the case of the sitter, and a very tiresome person she is too. Sometimes she is too thin, but, for argument's sake, we will pretend she is too fat. She insists on having full lengths, and has decided views on how she wishes to be posed, and she is quite sure that she does not want any of what she calls "touching up."

"Now, remember," is her parting instruction, "I want a photograph as I really am; I do not want to be made beautiful! I don't want to be touched up at all." Now, if you are foolish or only a little wise, or if you possess a cruel and over-developed sense of humour, you submit her rough unretouched proofs, and, of course, never see her again. If, however, you have a certain knowledge of human nature, you remove three chins, and show a slightly defined waist line and the suspicion of an ankle, and you send out proofs and hope for the best.

Back she comes in a very indignant mood. None of her friends will look at them—you have made her too fat; she knows she is rather plump, but not to this extent—why, you have given her a double chin: and see how broad you have made her across the face.

You sigh resignedly, and prepare for the unhappy business of photographing her all over again. This time you are very wise. You issue stringent instructions. All the superfluous chins must be removed; your retoucher asserts her skill and cunning in reducing hips, waist line, and ankle to at least normal proportions. Result—delight on the part of the sitter. Relief for the photographer.

Now, ladies and gentlemen, my point is that for nine women out of ten who come in and insist, as that sitter insisted on their desires for an untouched portrait, to look, in fact, exactly as they are, and not as they imagine they look—you may retouch as much as you like—reduce and beautify with all the skill of lead and knife—but the tenth woman really means what she says, and honestly wishes for a portrait with all her characters in.

Oliver Cromwell, you will, no doubt, remember, was a sitter of this nature. He was one of those, I am afraid, rare people entirely immune to the subtle art of flattery. "Warts and all," he commanded, the famous artist to whom he sat for his portrait. But the artist, thinking he would please Cromwell, forgot the warts. He did not know his man. "Either my true likeness or nothing at all," exclaimed Cromwell. And the next time the artist presented the picture the warts were painted in complete.

We do not get many female sitters of the type of Oliver Cromwell (and, incidentally, I might even add not many male); but we must be always on our guard, and for a woman with intuition it is by no means easy to spot the candid sitter. For a man I should think it would be an impossible, difficult task.

With children, women are at a great advantage over men. Many little sitters, on coming into a strange place, are naturally shy and a little suspicious of a man with ferocious whiskers perhaps (and quite a number of you men do wear ferocious whiskers). This alarms children—and then there are tears and sobs, and loud lamentations and expostulations. With only women in the studio the embarrassment of the child is not nearly so great.

This point is rather emphasised [illegible], which I believe is correct, that one of our foremost child photographers (a man) keeps entirely away from his [illegible]; he employs a woman assistant to talk to the child and keep them amused, while he watches unseen for the moment to expose his plate.

It seems, then, that the art of keeping the sitter—man, woman, or child—happy and interested [illegible] studio is a very important point in the production of real life-like portraits.

A fellow camera man told me once that he always wished he could study his sitters for half an hour in silence before starting to expose plates; and he regretted that this method was not possible owing to the fact that people would think him rude.

And I replied that even if his sitters excused his lack of manners, he would be dissatisfied with the method he was employing, as he would find that he had only been photographing a mere exterior; that after the lengthy contemplation he might and doubtless would and certainly ought to discover the best side of her face, the correct angle of her head, or whether she looked best looking up or looking down; but all the animation and sparkle of the sitter's personality would be lost in a fog of unhappy self-consciousness.

It ought not to take the photographer half an hour to make up his mind which is the better side of the sitter's face. Personally, I find it a good plan to ask the sitters themselves, and I nearly always get a correct answer. We most of us know our little peculiarities and blemishes only too well—incidentally we have a shrewd suspicion of our good points also, and sitters rather like to be asked, they think it is a good joke, and it starts a subject of conversation in which you interest them in the theory that in 99 cases out of a 100 the left side is more beautiful owing to the fact that careful mothers, when we are babies, put us to sleep on the right side, and the bones of the face being soft and unformed suffer accordingly.

I do not to-night intend to dwell for any length of time on the vexed question of the man v. woman assistant, as it does not seem to serve any very great purpose—further, the subject only a short while ago was well thrashed out by many able pens in a series of lively correspondence in the "British Journal." Personally, of course, I infinitely prefer the woman assistant; but, then, doubtless, I am rather prejudiced in her favour for obvious reasons.

The fact remains that she has grown steadily in numbers and efficiency with the growth of photography, and this, of course, is not a factor induced altogether by the war, as in pre-war days her popularity was just as noticeable.

In the reception room, of course, she has always reigned supreme. However much a man is master in his own studio, he invariably bows to the superiority of the woman receptionist. I don't believe there has even been a man receptionist—if ever there was one he must have been a very single failure, for no one has heard of him or followed his example.

But this question of the woman assistant is entirely a personal one—to be dealt with by individual photographers.

Now let us turn our eyes and see what the women photographers in other lands are doing. I had hoped to be able to procure a lot of information about them. And with this aim in view I light-heartedly set about collecting that information. I find, however, that the women abroad have not taken up portrait photography nearly so extensively as over here, with the exception, perhaps, of America, where numbers of good women portraitists abound, many of whom exhibit frequently at the salons and other exhibitions in this country, and whose work is doubtless familiar to some of you. Names, such as Mrs. Kasebier, Miss Charlotte Fairchild, Miss Mathilde Weil, and Miss Helen M. Murdoch spring at once to mind.

Apart, I repeat, from the United States, the woman portraitist does not seem to have made herself noticeable either by her numbers or the quality of her work—with the exception of isolated cases. This is very likely due to the fact that women abroad have not had the opportunity for self-expression and development that we have here now and that is possessed by women in America to an equal degree. This is a very important factor, which people sometimes forget in judging women's creative work in art. Isolated and exceptional women have always broken through the artificial sex barrier. That barrier makes it the exception always, rather than the rule, for woman to express herself any other way than through the traditional medium of the domestic circle. The dreams and aspirations of the majority of women found no means of direct self-expression at all.

In England, where women have so much freedom now, we find the best photographs. Abroad, in the countries where women are not so free, good women photographers are more rare. I told you just now that when I started collecting my facts I light-heartedly set out to search the world for the woman photographer. I am afraid I did not get very far. First, I tackled China, the most artistic nation in the world, and after inquiring from all sorts of people who had lived in China, or were reputed to have extensive knowledge on these matters, and getting nothing very satisfactory, I wrote to Mr. Tong, of the Chinese Legation but he could not say if there were women professional photographers.

In fact that never-failing fount of information our good friend Mr. Crowther, tells me that women have already started; but, like all beginners, they have much to learn, and their work is not of a high quality. In Australia there are numbers of excellent women photographers. In France the woman portraitist has not yet come into her own. I am greatly indebted to M. L. P. Clerc for the information I have to give you on the subject. He has taken a great deal of trouble in this matter. His "Paris Notes" are an interesting feature of the "British Journal" just now. He tells, for instance, this week, in a paragraph which is really the outcome of my inquiries, that although there are many talented amateurs, it is scarcely "possible to name half a dozen professional studios for portrait photography which are managed in Paris by women, and of this number barely half of them are run by Frenchwomen." This seems rather extraordinary when we consider how advanced France is in lots of ways. He also raises a point when he says that there are very few women retouchers (and all the best ones are foreigners). Perhaps the French temperament is not conducive to good retouching. But he mentions one woman, Madam Genia Reinberg, who kindly sent me some specimens of her work, which I will show you later on.

In Sweden and Norway the woman photograher is not so rare, and the two young daughters of that famous portraitist, Mr. Ferdinand Flodin, of Stockholm, are already beginning to carve out successful careers for themselves as portraitists.

So much for the woman photographer abroad. Here in England, while women have only just been privileged to sit on juries and in Parliament, we find that they have been closely connected with photography almost since its birth. They have, in fact, contributed largely to the rearing of and caring for the precious infant—both in the capacity of assistants and operators.

Mrs. Cameron, for one, was doing splendid work as far back as the sixties. She was a brilliant pioneer of whom we should all be very proud. Much of her work consisted of illustrating Tennyson's poems. Illustration by photographs had a tremendous vogue in those days, and there are signs that it may be coming back. So those of you who wish to be in the van of things—get busy! But to return to Mrs. Cameron. She photographed nearly all the eminent men and women of her day, and I am fortunate enough to be able to show you some slides of her work, including Tennyson, Browning, Carlyle and Darwin. I now want to read you a letter to Mrs. Cameron from a lady who wished for an appointment. My thanks are due to Mr. Crowther for procuring a copy of this letter to-night:—

"Miss Lydia Louisa Summerhouse Donkins informs Mrs. Cameron that she wishes to sit for her photograph. Miss Lydia Louisa Summerhouse Donkins is a carriage person, and therefore could assure Mrs. Cameron that she would arrive with her dress uncrumpled.

"Should Miss Lydia Louisa Summerhouse Donkins be satisfied with her picture, Miss Lydia Louisa Summerhouse Donkins has a friend who *is also* a carriage person, who would also like to have her likeness taken."

Other pioneer women whose names are almost household words—although they were working many years afterwards, of course—are Miss Alice Hughes, who is still going strong, and the late Madame Lallie Charles.

Miss Hughes's father was an artist, and she started her career about thirty ago by photographing his pictures when only a very young girl in her teens. Then she tried her hand at portraiture, and met with almost instantaneous success. People flocked to her studio, and she was easily the most popular photographer of her day. While still a girl, she was employing as many as sixty assistants, and averaging over sixteen sitters a day. She was the first to use the painted Romney background, which afterwards became so fashionable, and with it, of course, came the photographing of children with women in evening dress, at the time considered a great innovation.

The late Madame Lallie Charles attained a huge success. With characteristic boldness, she swept away all preconceived notions in portrait photography, and won fame by placing her sitters against a plain white background softly vignetted. This also had never been done before with any notable success. She was the possessor of a very brilliant personality, which must have contributed largely and aided her considerably in the accomplishing of her work

We have seen in the many exhibitions that are held up and down the country at various times, and more particularly in the beautiful examples on show at this present most successful exhibition of professional portraiture, that women possesses both originality and the creative feeling in the work. But we must also admit that she has her faults—and she has shown a certain weakness by falling too easily into the rut of the one idea. It is a failing all artists are prone to, and women more than men. I believe that this is due to the fact that we delight too much in keeping ourselves to ourselves.

Personally, this has been a great fault of mine in the past, I know. I had no idea what other people were doing, and it is only since I have come out a little that I have at all realised what an indifferent photographer I am. And that is a step forward, because until we realise that we have something to learn we can never progress. There are any number of women photographers who shut themselves up, as I have shut myself up, and refuse to join the Association or mingle in any way with the members of their profession. One woman openly boasted to me the other day that she had never in her life met another photographer before she met me. Now that is all wrong. We must come out and meet one another; we must join the Association; we must see one another's work and criticise, and, more important still, receive criticism; or we shall never improve. It is impossible to avoid becoming narrow and self-centred in our work if we barricade ourselves behind our camera and pretend that there are no other photographers in the world. Miss Dora Head said to me the other day: "It is so easy to descend to the sitter's level." I am afraid we inevitably descend to the sitter's level if, sooner of later, we do not take steps and watch ourselves very carefully. We must realise that perfection is not creation. That although we may have won fame by some special style or thought, to repeat ourselves indefinitely in this particular manner is not only non-creative and purely mechanical, but must eventually lead, if not to complete destruction, at least serious deterioration of our business.

The way of the photographer is full of pitfalls. It is different from any other profession in that there are so many high roads to success. One may find fame by beautiful quality of prints, another by the happy, natural expression and posing of the sitters, a third by an original scheme of lighting, a fourth by commercial ability and sound business training, and so on. It may puzzle the beginner to decide which of these roads to tackle. My advice is—tackle the lot. Find out your weak points, and see that they become your strong ones.

I have tried to show that personality, tact, patience and intuition are all very valuable to the portrait photographer; that women possess them to a far greater degree than men; that they are better with children, and that, of course, their inherent knowledge of clothes and eye for detail is a great asset in a profession in which these two play so important a part.

We know that there have been great women photographers; there will be still greater as women's mentality expands and improves with greater freedom and opportunity.

Her competition with men should prove helpful and invigorating to both sexes.

We also realise that she is liable to grave weaknesses; that she is often untrained; that having attained a certain amount of success, she does not bother to persevere and improve. She climbs to the top of the tree perhaps without much trouble, and then she shows a tendency to recline in comfort, never realising that there are other higher and perhaps more beautiful trees to be tackled, and that if she is not careful and refrains from further climbing, she may, after all, find that she has been left in the shade.

In conclusion, I should like to thank you all for listening so patiently. And particularly I thank the men for the kind manner in which they have endured this long discourse by a woman on how clever and altogether brilliant is her sex.

Further, I think I may say, and I am sure the ladies will back me up, that if any gentleman present would like to get up and say a few words on how clever is he and his sex, I am sure we will listen with enjoyment, although, mark you, there will not be any novelty in it, will there, ladies?

PHILONIE YEVONDE.

At the close of the lecture many graceful compliments were paid to Madame Yevonde by Mr. Speaight, Mr. Marcus Adams (who was thankful he was not a ferocious, whiskered man), and Mr. Herbert Lambert, who said that a cloud was upon him because he felt that photography, like other artistic pursuits, would in the long run pass out of men's province altogether. Still, he believed that co-operation and not rivalry between the sexes was the thing to be sought after. Mr. Frank Brown, who urged that ladies should be introduced on to the Council of the P.P.A., with Madame Yevonde as the first lady member, protested that he had been misunderstood about the flowers. It was too much that he should be accused of having spoken slightingly of flowers—he who had left his bed at one o'clock on a cold and frosty morning to bring six and twenty chrysanthemum plants into the greenhouse!

A vote of thanks was carried with much acclamation, and Madame Yevonde briefly replied.

A LUBOSHEY NIGHT.

On Thursday evening Mr. Swan Watson presided over a crowded Congress Hall. Mr. N. E. Luboshey had been announced to give a talk about Continental studios and methods, but he began by saying in his vivacious way that he had been given *carte blanche*, and that slides had been suddenly demanded, so that at the last moment he had procured some mixed slides, which he had only exhibited once in his life, and that for the purpose of giving a demonstration of the effects of plain lighting.

Mr. Luboshey proceeded to show a most interesting series of photographs of well-known gentlemen taken at a meeting of the Royal Photographic Society without any of the paraphernalia of the modern portrait studio. He created much amusement when specimens of fancy lighting were thrown on the screen by remaking, "I was asked to do it, but I don't want to look at it." What he believed in was straightforward, honest photography. He showed what could be done without any manipulation of the light whatever, simply by changing the position of the sitter in relation to the lens and the light. He took 27 negatives of one lady, all on the same day, and not one was anything like the sitter! Mr. Luboshey added that every time he had the opportunity he emphasised the necessity of providing direct and simple lighting. Among his results he exhibited a stage scene, taken by ordinary stage lighting, and said that the difficulty of doing this sort of thing simply did not exist. Some beautiful Greek tableaux photographed in Russia came next, and in one of these examples Mr. Luboshey had combined half-a-dozen negatives, so that the same performers were repeated in the one tableau. This, he said, was a branch of photography little touched on, but with a great deal of business in it if done well. The exposures were made by means of an electric lamp which he held in his hand while standing on a ladder, and were quite short. The secret of the whole thing was to get the sitter to work with the photographer, and also to have enough light and to know where to place it.

One of Mr. Luboshey's group photographs showed a crowded meeting of the Royal Photographic Society, taken by the ordinary lights of the room. The room contained eight 300 c.p. half-watt lamps. Portraits of individuals were also projected, attention being drawn to the sparkle of the eye. Referring to his experiences abroad, Mr. Luboshey had much to say with regard to the fine work done in Scandinavia by pioneers who upheld the highest ideals of the profession. With his usual enthusiasm he insisted on straightforward work and the folly of straining after artificial effects. He did not think that artistic portraiture, great as had been the progress in technique, was up to the level of thirty or forty years ago, and this was due to the defection of so many from the straight path.

The Chairman remarked that they had yet another treat in store, for Mr. Flodin, the most prominent photographer in Sweden, to whose work Mr. Luboshey had referred, was attending the Congress, and would speak to them.

Mr. Ferdinand Flodin, who was introduced by Mr. Luboshey as a professional photographer who never failed to study every new method and to bring every discovery to the notice of his brethren, was enthusiastically received. He spoke in excellent English, though he said he had never in his life before stood before an English audience. He had come to England solely for the purpose of assimilating new ideas. He had been on the same platform with Mr. Luboshey on several occasions. Once, in a certain town in Sweden, Mr. Luboshey started at nine o'clock, and was still talking at two o'clock in the morning without being tired in the least. Their brilliant lady lecturer on the previous evening (Madame Yevonde) had mentioned his (the speaker's) daughters. One of them had fallen—quite willingly—into the matrimonial trap, but the other was still at home, trying to beat her father's work. The work of the photographic societies in the various countries was very much the same as in England, though here, of course, it was on a much larger scale. In Sweden they had a comparatively big Association—the Svenska Fotografernas Forbund—which had been in existence for 25 years, and last year, to celebrate that anniversary, a very good exhibition was held at Stockholm, representing the work not only of Sweden, but of Norway and Denmark, and including not only a professional section, but an amateur section, a historical section, and a scientific section. A selection was made from the artistic work shown there, and the pictures were exhibited in turn at Copenhagen and Christiana. He thought it would be a very good thing if people from other lands had the opportunity of coming to Congresses of this kind, so that they could study the latest improvements and select what was best. In a little land like Sweden naturally they had no factories, and almost all their materials came from foreign lands. A good quantity came from England, but some English articles were not so well known as they should be. Perhaps some English manufacturers did not think it necessary to spread new knowledge in these small countries, but it might be a good thing for them to do so. The name of England had been made famous in the photographic world by the work of many, and to the pioneers he paid homage. He added that he would try to

take back to his professional brethren the valuable information he had obtained at the Congress, and on another occasion he would try to bring some of his confrères.

Mr. Luboshey, having been warmly thanked for his lecture, said that he owed all he knew to what he had picked up in his travels from the famous photographers whom he had been privileged to meet. Unfortunately, he was not now in touch with professional photographers as formerly, because he had devoted his attention to the scientific side, and more particularly to X-ray work. "We are always thinking," added Mr. Luboshoy, "that we are great artists, and we certainly want to be: but I can assure you that to be an artist is about as far from being a photographer as heaven is from earth. I started as an artist, and I have given it up. Twenty lives like mine would not make one artist. But I did find that if you studied æsthetics and trained your eyes to all that was beautiful, you might become an excellent professional photographer, and exhibit such real art as to put the painter in the corner for shame. In the countries in which I have travelled there is not one photographer or assistant who has not studied drawing from life or who has not passed through a drawing school. There is not even one retoucher who has not done so. When I was a child I studied drawing, my teacher being a Bohemian, and I have always believed that even if a shoemaker knows drawing, he can make better boots." (Applause.)

PSYCHOLOGY IN THE STUDIO.

Mr. C. P. Crowther, F.R.P.S., gave an exceedingly interesting lecture on "Psychology in the Studio," Mr. Marcus Adams occupying the chair.

In introducing the subject, Mr. Crowther said that the whole point of his lecture to them that day was that the things we did unconsciously we did better than the things we did consciously. That was a sound paradox. The small child began by walking consciously and made a poor thing of it, but when it could walk and run well its movement was unconscious. When a photographer posed a sitter in the old-fashioned way in a chair, saying, "One moment, please—steady—steady!" and so on, the sitter became painfully self-conscious, and very probably complained of the result afterwards, though an exact likeness as he appeared then might have been produced. It was certainly better to follow the example set by Mr. Luboshey in his lecture the previous evening, and move freely about, without indulging in too much careful analysis and measurement. People said, "But you must be thinking." Well, a man might read any amount of books about golf, but he did not think of them when he was on the links. A pianist who was giving a wonderful recital did not analyse the millions of notes he played. When an artist was painting he might destroy the very soul of his picture by over-much daubing and touching and changing.

Mr. Crowther believed that psychology in the studio might be so developed that the sitters could be got into the required mood which would reveal their very characters. When in the East he had the privilege of a sitting from Sir Rabindranath Tagore, the Indian poet, and the latter readily agreed to sit in meditation, doing this quite naturally, so that very nice pictures were secured. It might be said that this was conscious, but this he would not admit. There was a soul in every sitter which they must all try to catch, and there should be no unnecessary intrusion of artificialities to annoy or disturb the sitter. For his thought and trouble the photographer might not always be recompensed in money, but he would receive honour, and he would have the pleasure of knowing that his work was appreciated, which was, after all, far more important than the shekels.

Mr. Crowther proceeded to relate one of O. Henry's famous stories about a great painter who was able to depict the character of his sitters so vividly that those who saw the portraits instinctively trusted or mistrusted the subjects. It was difficult, of course, and it need not be said that no one would think of dealing with an æsthetic lady in the same way as with a butcher. But the great thing was to have sympathy with the sitter and to depict the character as well as possible. If this was to be achieved, one must not depend overmuch on the retoucher. The aim should never be to do things as quickly as possible and get the sitter out of the place. It must be acknowledged that the status of the photographic studio owed not a little to amateur workers who did their work with leisure and freedom, and who had had a certain education both in art and in social matters, so that they produced a class of picture which received the stamp of recognition from the people best able to pay a good price.

Mr. Crowther, in further harmony with much that Mr. Luboshey had said the previous evening, proceeded to read the following sonnet, "To a Photographer," by Barton Braley, the sentiment of which was heartily applauded:—

> I have known joy and woe, and toil and fight;
> I have lived largely, I have dreamed and planned,
> And Time, the Sculptor, with a master hand
> Upon my face has wrought for all men's sight
> The lines and seams of life, of growth and blight,
> Of struggle and of service and command;
> And now you show me This—this waxen, bland,
> And placid face—unlined, untroubled, white!
> This is not I—this fatuous face you show,
> Retouched and prettified and smoothed to please.
> Put back the wrinkles and the line I know
> I have spent blood and brain achieving these
> Out of the pain, the sorrow, and the wrack.
> They are my scars of battle—Put Them Back!

Mr. Crowther proceeded to show about fifty slides, contributed by members of the profession, most of which were heartily applauded. They included some very beautiful child studies. In several of the examples Mr. Crowther pointed out a defect in that the sitter's hand, raised to the face, was far too large and prominent, detracting from the character in the face, which should be the important point. He also showed some striking examples of combination work, and of the fancy lighting so much detested by Mr. Luboshey, and concluded with his own interesting studies of Sir Rabindranath Tagore.

Mr. Marcus Adams said that the psychological aspect was important, but it was not everything. It was possible to be such an enthusiast for psychology as to forget to put in the plate or squeeze the bulb. With the power of which Mr. Crowther had spoken there must be practised all the time a certain restraint. It was necessary to do more than get the just-right negative; it was necessary to produce the print. Success could only be attained by perseverance, and personally he had learned more from his failures than from his successes. Little details of environment had a good deal to do with the result. In dealing with children, for example, a dusty camera or a dusty toy would upset his equilibrium. Only the best should be placed before a child. A child was not necessarily frightened by a photographer's ferocious whiskers or bushy hair, but looked right into one's character to a far greater extent perhaps than the photographer realised. Some years ago he found that he himself possessed this psychological power with children. No praise was due to himself; it was a God-given endowment, and it was only his duty to use it. That was his principle in his profession.

Mr. T. C. Turner remarked that it was of the highest importance that personality should be studied. The man or woman who studied merely the physical appearance was bound to come to grief. Incidentally, he believed in studying the great portraits in the Wallace Collection and other galleries, in addition to photographic exhibitions. While there must be a likeness, no little of the success of professional photography depended upon dexterity with brush and

pencil. He agreed heartily with Mr. Crowther in deprecating as a crippling influence the pursuit of one's profession for the sake of money.

Mr. Crowther, who was cordially thanked for his lecture, said, in reply, that he hoped they would all strive to do something better beyond the ordinary "bread and cheese stuff," so that they might have the joy of hearing others say, "How beautiful!"

THE ANNUAL DINNER.

A large company, including officers and members of the Association and many leading people in the photographic trade dined together at Gatti's Restaurant on Friday of last week, Mr. Frank Brown, president in the chair. Following the toast of "The King," that of "The Professional Photographers' Association" was proposed by Dr. G. H. Rodman, President of the Royal Photographic Society, who alluded to the growth in membership and financial stability of the P.P.A., and expressed his pleasure at the closer association between the P.P.A. and the R.P.S. That closer bond was signified by the election of Mr. Lang Sims to a place on the Council of the Royal Photographic Society, an appointment which, he thought, would be of mutual benefit to the two societies.

Mr. Frank Brown, in replying, expressed his firm belief in the future of the Association It had done a great deal during its twenty years of life, and particularly during the past four or five years. He looked forward to an extension of their personal relationships with professional photographers in America. He thought a delegation might take part in the great congresses which were held in the States; and he also welcomed the idea of exchange of sentiments and experience with their professional confrères in France.

Mr. George Hana had some characteristically nice things to say in proposing the composite toast of "The Ladies and the Visitors."

Madame Yevonde made a neat little speech in replying for the ladies. She deplored the absence of a woman from the Council of the P.P.A. But for that, the horrible congress button or badge would not have been issued. The women members could not possibly attach it to their garments. It was not a thing they would care to use as an article of dress, and she had purposely lost hers.

Mr. F. C. Mattison, in replying for the visitors, said that as head of an industrial undertaking dealing with photographic supplies, he was glad to witness the continued prosperity of the P.P.A. He would not conceal the view that the welfare of firms which supplied a considerable part of their outputs to portrait photographers had in that measure a common interest in the prosperity of the latter; and simply for that material reason manufacturers were glad of the opportunity of forwarding the interests of the Professional Photographers' Association.

Mr. Arthur C. Brookes also responded for the visitors, and expressed his pleasure at being present.

The toast of the officers and council of the P.P.A. was proposed by Mr. E. Drummond Young, who coupled with it the name of the secretary, Mr. Lang Sims, who, in his reply, outlined possibilities of congresses on a larger scale in future years.

Mr. H. A. St. George, in proposing the toast of "The President," dwelt very happily upon the qualities which had endeared Mr. Frank Brown to his fellow members during his year of office and the Congress week. He asked his acceptance of the replica of his badge of office, and of an address thanking him for his many services.

Mr. Frank Brown, in return, expressed his happiness in the position he had occupied, and then proceeded to transfer his badge of office to Mr. A. Swan Watson, whose acknowledgments of the honour done him in his election brought the proceedings to a close.

Excursions.

Despite the curtailment of railway facilities the Kodak Company arranged for members of the Congress to reach the Harrow Works in scheduled time, conveying them thither by a number of chars-à-banc. At Harrow the visitors were royally entertained to luncheon, and were then taken in parties through sections of the works under the guidance of heads of departments at Harrow and Kingsway. The group of members was photographed during the visit by Messrs. Panora, Ltd., and groups of the Council were also taken by members of the Kodak staff. Negatives were immediately developed in the Kodak workrooms, and a team of Eastman projection printers put into use for the rapid production of prints.

The large group, made with a "Cirkut" camera, is reproduced on another page in this issue, where, however, owing to the large claims upon our space by other proceedings of the Congress, it is placed in an advertisement section.

The visit to the Guildhall on the previous day was the occasion of a considerable gathering of Congress members, who, under the guidance of Alderman Sir Louis Newton, inspected the historic building.

PRINCIPLES AND MECHANICS OF MOUNTING.

(Report of a lecture before the Croydon Camera Club by Mr. Vivian Jobling.)

The club is fortunate in having among its members many of mechanical bent, for photographic societies cannot live alone on the eternal cycle of pictorial dissertations without surfeit, or mainly on lantern-shows without atrophy; stock demonstrations for the beginner must necessarily be limited; scientific papers are Greek to the majority, and new processes and procedures rival total eclipses in their frequency. Almost equally rare is the scientist who can, or will, deign to descend to the level of the ordinary run with popular expositions of the recondite. But the mechanical man introduces variety in many directions, usually having a host of things up his sleeve either directly or indirectly connected with photography, and, moreover, can show "how it is done," ever of interest, even if one cannot hope to go and do likewise.

Of this sort is Mr. Vivian Jobling, who recently highly interested all with a capital lecture-demonstration on "The Mounting of Photographic Prints," a model of orderly sequence. The purpose of mounting, he said, is to separate the print from its surroundings, to provide an appropriate setting, to bring out by emphasis its good qualities, or minimise any imperfections. Simplicity is to be aimed at, and consequently the mount should never compete with the print for first attention by being too ornate or elaborate, or overpower it by being too heavy. In most cases the mount

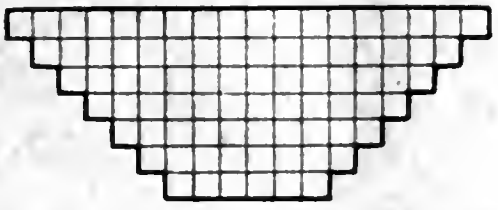
should harmonise with the tint of the picture, unless colour contrast is desired to emphasise its tone. Generally speaking, the mount should not be lighter than the highest lights, nor darker than the deepest shadows. There are, however, cases when it is advantageous to lower the former by using a lighter mount or to lighten the latter by employing a darker.

A perfect print of steel-engraving quality can be placed on mounts ranging from white to black without error, other conditions being favourable, but few photographic prints can stand either extremes; also, a mount of the same prevailing tone as the picture is rarely effective. Finally, he said, never do a thing merely because it is the fashion, for such a course is fatuous. The present-day almost unlimited choice of mounts is sufficient to satisfy all needs. Very suitable for the rough usage prints are subjected to in circulating portfolios are hand-made mounts.

The adoption of a standard size will be found useful for storing in portfolios or substituting prints in frames, especially so if the ratio 1 to $\sqrt{2}$ is employed, as suggested by Mr. Watkins for dry-plates, for the mounts can then be halved without altering the relative proportions of length to breadth. Music size (14 × 10) fulfils this condition, and corresponds with commercial cases and portfolios.

When placing a print on a mount more margin should be allowed at the bottom to prevent the familiar "dropping" effect—considerably more when it is desired to suggest space below, as in a bust portrait or large head. To emphasise a panel effect allow less at the sides than the top. Lateral decentering is generally undesirable, though in the case of unbalanced prints, or to break too even symmetry, the device can occasionally be employed.

An ingenious and easily-constructed contrivance, devised by the lecturer, for correctly placing prints on drawing mounts was shown, and is indicated in the figure. A drawing, slightly longer than the largest mount in use, is made on squared paper and cut out. It is laid close to the top of the mount and parallel with it and centered laterally, which is effected



at a glance. The print is then adjusted to the guide, the latter slipped from under, and two pencil dots made at the upper corners of the print, so that after the adhesive is applied it can be laid down again in identical position. Mr. Jobling's guide was much longer, and had many more and shallower steps than shown in the figure, which, however, sufficiently illustrates the principle.

Border-tints, he said, should only be used for a definite purpose, the over-ornate being carefully avoided. They have value when the mount chosen is of the predominant tone of the picture, for here a lighter or darker border-tint separates print from mount and prevents one merging into the other. Also, a darker border-tint will brighten the high-lights without suggesting the heaviness which a mount of the same depth may introduce. Similarly, a light border-tint can be used to lower the high-lights when a light mount may be too powerful. A slight variation of colour in the border is also often useful to counteract or emphasise the colour of the print.

Mr. Jobling then passed on to a review of the various methods and adhesives employed in mounting, favouring attachment at the top edge of the print. Dry-mounting was, of course, ideal, and, in the absence of a press, a flat-iron—the heavier the better—may be employed. Personally, he had not been very successful when using a flat-iron with commercial tissues, and made his own, which never failed. He employed a formula given some years ago in the "Photographic Annual," but with modifications which meant all the difference between success and failure. The amended formula is as follows:—

A.

Orange shellac	4 ozs.
Methylated spirits	6 ,, (fl.)

B.

Gum Elemi	1 oz.
Canada balsam	1 ,,
Methylated spirits	8 ozs. (fl.)

Dissolve separately and mix, when the solutions will be found to bulk to about 18 ozs. The Canada balsam is the thick solution (of greater viscosity than golden syrup) stocked and supplied by chemists.

Japanese tissue, obtainable in sheets 11 × 8½, is dipped sheet by sheet in the mixture, surface liquid removed by dragging the sheet against the edge of the dish, and hung up to dry. A convenient way of doing this is to cut some narrow strips of common strawboard and range them one over the other in narrow staircase fashion. Adhesive is applied to the "stairs" with a brush, when each strip will readily pick up a piece of the tissue. In answer to a question, he said the tissue is sold by most stationers for copying letters, the pre-war cost being 2s. a ream; that of the solution 1d. an oz.

In the discussion Mr. H. P. C. Harpur modestly intimated that he was content to take a back seat in the mechanical line when Mr. Jobling was concerned, and then as a corrective immediately superimposed himself on lecturer and audience on various art aspects. He insisted that fashion is a most powerful asset in the art business. It powerfully governs the tonality, shape, and size of pictures, mounts, frames, collars, neckties, jumpers, and strikes; in fact, he said, fashion is so powerfully powerful that all are powerless to avoid it. Mr. E. A. Salt, whilst recognising the great improvement effected in recent years in mounts, had never come across any of a really neutral grey of British make, though he had seen some hailing from the other side of the Herring-pond. Mr. L. J. Hibbert, from a scientific standpoint, reproved Mr. Jobling for not having spectroscopically examined the light reflected by mounts, and was in turn chided by Mr. J. W. Purkis for overlooking sources of variability. The chairman, Mr. A. F. Catharine, after some terse allusions to these scientists, proposed a hearty vote of thanks to the lecturer, which was carried most heartily.

PHOTOGRAPHIC DEALERS' ASSOCIATION.

The annual meeting of members was held in the Congress Room at the Photographic Fair on Monday, April 18, 1921.

The honorary secretary, Mr. A. Oglesby, in presenting his report of the year's work, stated that there had been a considerable increase in the membership of the Association during the past year.

During the year, the Association has dealt with complaints of dealers allowing members of photographic societies and others discounts off their purchases, and has in all cases succeeded, with the assistance of manufacturers, in getting the offending dealers to withdraw the concession and give a written undertaking that the practice would be permanently discontinued.

As a result of representations to the principal manufacturers that a maximum discount off apparatus and accessories should only be allowed to *bona fide* dealers, and a lower rate of discount to professional photographers and other firms using photography for trade purposes, a schedule of traders to whom discount should be allowed has been agreed upon.

The minimum scale of developing and printing prices recommended by the Association has, with few exceptions, been adopted throughout the trade.

The possibility of co-operative societies opening departments for the sale of photographic apparatus and accessories has been brought to the notice of the executive committee. In view of the importance of this question, it was decided to bring the matter forward for discussion during the annual Congress.

Other questions of importance to retail dealers have been con-

sidered during the past year, and steps taken to remove the causes of discontent.

It was suggested that the members' subscription be raised to £1 1s. per annum, but after considerable discussion, it was decided not to recommend any alteration for the time being. It was, however, agreed that the executive committee should consider the possibility of submitting to members a scheme for trade and associate members, the latter to include chemists etc., who only handle photographic supplies as a side line.

It was decided that the thanks of the Association be tendered to Messrs. W. Butcher and Sons, Ltd., for placing space in their "Camera House Journal" at the disposal of the Association.

The following were elected officers of the Association for the ensuing year :—

President, A. Oglesby (Sands, Hunter and Co., Ltd.).
Vice-President, W. E. Heaton (Wallace E. Heaton, Ltd.).
Hon Treasurer, J. E. Hodd (Westminster Photographic Exchange, Ltd.).
Hon. Secretary, E. H. Ayling (Horne's Camera Exchange).
Council, J. A. Sinclair, G. W. Mann, A. J. Leather, G. F. Horne, London members.
Provincial members, J. Ireland, Chester; F. V. A. Lleyd, Liverpool; A. E. Briggs, Manchester; C. R. Pinchbeck, Hull; G. W. McIntosh, Sheffield; F. W. Doughty, Hull; V. E. F Walker, Brighton: Halksworth Wheeler, Folkestone.

A Congress of Dealers was held on Wednesday, April 20.

Several members spoke strongly against the principal camera manufacturers opening fresh accounts with small retail traders in districts already well served by established dealers, the general feeling of the members being that by so doing, the manufacturers are not doing justice to their established customers, and in some cases their goods are not being sold under conditions which are likely to prove beneficial to the industry as a whole. It was suggested that manufacturers should consider the desirability of ensuring that new accounts should not be opened unless persons fully qualified to explain photographic apparatus and manipulations to prospective purchasers be placed in charge.

The question of co-operative societies being recognised as dealers, created a lively discussion. Many members complained that although comparatively few co-operative societies are yet handling apparatus, they are supplying plates, papers, etc., on which members get a dividend on their purchases. The following resolution was passed, and the secretary was instructed to forward a copy to the British Manufacturers' Association :—

> "This meeting of members of the Photographic Dealers' Association protests against co-operative societies being supplied with photographic apparatus and accessories, plates, papers, etc., and all price-protected goods, to co-operative societies, except on the terms stipulated by the Proprietary Articles Trade Association."

On Friday, April 22, a well-attended lecture on "Window Dressing as a Selling Force, and its Application to the Photographic Trade," was given by Mr. E. Willson, of Messrs. Kodak, Ltd., and winner of the £100 prize in the National Window Dressing Competition at the Advertising Exhibition, 1921.

It was unfortunate that owing to the threatened strike of railway workers, some of the most interesting events of the Congress had to be abandoned, and in view of the outlook a day or two prior to the opening of the Photographic Fair, the executive committee thought it would be unfair to the Houghton-Butcher Manufacturing Co. and Messrs. Ross, Ltd., to proceed with their arrangements, as no guarantee could be given of the number of dealers likely to be present.

For the same reason, the annual dinner of the Association had to be cancelled, much to the regret of the dealers present at the Congress and the trade generally.

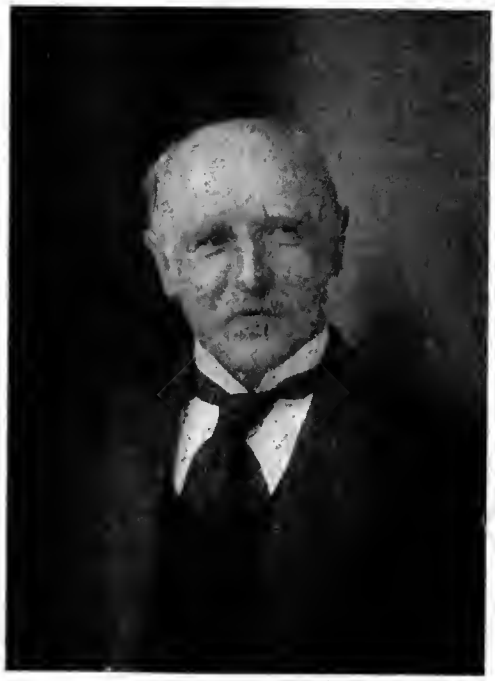
PIVOTAL POINTS.—Under this title Messrs. Burroughs Wellcome have just issued a very instructive 24-page booklet for the amateur worker dealing with exposure, development, and printing. It describes the use of the Wellcome exposure calculator, time methods for development with "Tabloid" chemicals, and the merits of "Tabloid" toning and other preparations as regards certainty of effect. The booklet may be had free on application to Messrs. Burroughs Wellcome, Snow Hill Buildings, London, E.C.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

THE NEW PRESIDENT.

To Mr. Swan Watson, who attended the Congress as president-elect of the P.P.A., must be ascribed the *bon mot* of the proceedings of the week. Alluding, at the annual dinner, to the handicap which the distance from Edinburgh to London placed upon his taking a share in the counsels of the Association, he said that he thought the distance from London to Edinburgh must be a good deal less, judging from the visits paid to it by photographers in the southern metropolis. This humorous thrust at the occasional invasion of Edinburgh by photographic firms offering "free sittings" scarcely evoked the oral appreciation it deserved.

Mr. Swan Watson has been in business in Edinburgh as a professional photographer for nearly 30 years, and has largely been a photographer of men. The Scottish capital, rich in its society of learned professors, surgeons, and doctors, solemn Presbyters, and leaders of industry, has provided him with plenty of subjects, and has developed in him an art of masculine portraiture which owes nothing to freak effects, but is based on a shrewd reading of character and a sense of the qualities which go to make an effective portrait of a man. The war, by removing many of the Edinburgh men folk from the city, sent, in compensation, their wives and



Portrait by Alexander Corbett.

MR. A. SWAN WATSON, PRESIDENT, P.P.A., 1921-1922.

daughters to Mr. Swan Watson's studio, and gave him the opportunity of showing his art in a lighter and very delightful vein.

The new president of the P.P.A. is a strong believer in the apprenticeship system. He was apprenticed himself, and in his own business makes it a custom to allocate the four years served by an apprentice, two of them to the learning of lighting, posing, etc., in the studio under his own direction, and the other half of the time about equally betweeen carbon printing, Platinotype or Kodura printing, and retouching and finishing. He holds strongly to the view that the present difficulty of getting thoroughly qualified assistants has its cause in the fact that many have not served a proper apprenticeship.

Continental travel has been one of the æsthetic influences in Mr. Swan Watson's life. For many years he has spent a vacation, chiefly in Italy, and there, particularly in the study of art collections in Rome and Florence. His lectures on Italian art have been delivered to many educational and literary societies. His other hobbies are music and trout fishing. A president of parts, whose contributions to next year's Congress may be expected to be substantial.

We are much indebted to Mr. Alexander Corbett, of Baker Street, for the accompanying portrait of Mr. Swan Watson, taken a few days ago.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, MAY 1.

Hammersmith (Hampshire House) Phot. Soc. Outing to Egham.

TUESDAY, MAY 3.

Royal Photographic Society Colour Photography. H. S. Watkins.
Manchester Amateur Phot. Soc "Development Methods I have Tried." E. N. R. Hurt.
Portsmouth Camera Club. Affiliation Portfolio of Prize Competition Prints, 1919.
Scottish C.W.S.C.C. (Glasgow). "Portraiture." R. Chalmers.

WEDNESDAY, MAY 4.

Accrington Camera Club. "Photography: Its Present-day Importance and Power." A. Dordan Pyke.
Croydon Camera Club. Lecture. W. L. F. Wastell.
Edinburgh Photographic Society. Leicester and Leicestershire Photographic Society Portfolio.
Rotherham Phot. Soc. "Marine Photography." F. J. Mortimer.

THURSDAY, MAY 5.

Hammersmith (Hampshire House) Photographic Society "Personal Practice in Pictorial Printing." E. C. Perry.
Kryn and Lahy (Letchworth) Phot., etc., Soc. "The Manufacture of Anastigmat Lenses."

FRIDAY, MAY 6.

R.P.S. Pictorial Group. "Rendering of Sunlight." Miss Warburg.

SATURDAY, MAY 7.

Bradford P.S. Excursion to Hewenden, Harden, and Goitstock.
Hammersmith (Hampshire House) Phot. Soc. Outing to Wimbledon Common.
Scottish C.W.S.C.C. (Glasgow). Outing to Bridge of Weir.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, April 26.

The occasion was a lecture on the life and work of Sir Wm. Abney by Mr. Chapman Jones, and the President, Dr. G. H. Rodman, said he felt it would be the wish of members that the chair should be occupied by Mr. W. B. Ferguson, whose investigations had been in the same field.

Mr. Ferguson, in accordingly taking the chair, explained that the Council had been unanimous in asking Mr. Chapman Jones to undertake the important and difficult task of reviewing the work of their former president.

Mr. Chapman Jones first sketched the official life of Abney, and indicated the great services rendered by him in the improvement of methods of teaching science. He outlined his purely scientific investigations, and considered in greater detail his contributions to progress in photography. He emphasised the fact that Abney stood alone among scientific men in having devoted himself to photography as a science at a time when everybody looked down on science and science looked down on photography.

The continuing action of light in bichromate printing was not discovered by Abney, but he made useful what was considered a bugbear of the carbon process. In the course of his work on emulsions, he discovered gelatino-citro-chloride or P.O.P. paper. In adding hydroquinone to photographic developers, he provided one which could be used without a restrainer; another also due to him was ferrous citro-oxalate.

Abney's studies of the failure of the time-intensity law, including that of intermittency, in the action of light on photo-sensitive materials were brought before the R.P.S. in 1893. His researches on the measurement of the speed and efficiency of shutters were pioneer work which found expression also in his experiments in direct heliochromy and in three-colour photography.

His greatest self-contained work was his preparation of emulsions sensitive to infra-red, done a few months after Vogel's discovery of orthochromatism, and bringing to light the behaviour of numerous colourless colour-sensitisers, and even the production of infra-red sensitiveness without a sensitiser. The results were collected in the Bakerian lecture at the Royal Society in 1880.

Declaring Abney to be the "father of quantitative photography," Mr. Chapman Jones described his instruments for the measurement of opacity and other properties of negatives and plates, and dwelt upon his early use of graduated wedges in sensitometry.

Mr. Ferguson, in proposing a vote of thanks to the lecturer, alluded to the discourse as "a great lecture on the great work of a great man," and the audience, which included Lady Abney, endorsed his opinion by acclamation.

Commercial & Legal Intelligence.

NEW COMPANIES.

KINEMATOGRAPH INVENTIONS, LTD. — This private company was registered on April 21, with a capital of £10,000 in £1 shares. Objects: To acquire all the patent rights of H. Workman in certain inventions relating to cinematograph and photographic work, and to carry on the business of manufacturers of and dealers in all kinds of cinematograph machines and appliances for the production of moving pictures, etc. The first directors are: W. S. Workman, 75, Bothwell Street, Glasgow; W. O. Workman, 5, Crown Terrace, Glasgow; G. A. Workman, 75, Bothwell Street, Glasgow. Secretary: R. McNair. Registered office: 21, Ironmonger Lane, E.C.2.

News and Notes.

A RECORD YEAR FOR PATENTS.—The work of the Patent Office last year (1920) was a record for any twelve months since the institution of that office. It is stated officially that the great increase in the work of the office was caused, to a considerable extent, by the filing of a large number of applications from abroad under the provisions of the Treaties of Peace. The total number of applications for the year was 36,672—over a hundred per day—by far the largest number received in any one year, and an increase of 3,819 as compared with the previous year. Women inventors sent in 311 applications, an increase of five on the previous year (1919).

PHOTOGRAPHS OF DOGS.—The National Canine Defence League, of 27, Regent Street, London, S.W.1, is anxious to have good photographs of dogs for illustrating its publications, and offers five guineas for the best photographs sent in before the end of June, 1921. The quality most desired in the picture is that of expression. For this reason the pictures should be taken "close up." Groups of dogs are eligible, but those typifying the qualities of faithfulness will be most welcome. Winning pictures become the property of the League, whose decision will be final. Those desiring the return of their prints must enclose stamped addressed envelopes.

WASHING PRINTS.—Mr. C. S. Baynton, Exchange Buildings, New Street, Birmingham, writes: "You published an article in the 'B.J.' last week, on washing prints, written by Mr. A. G. Willis, who appears to be rather behind the times, in so far as apparatus is concerned. He apparently has not been to the Photographic Fair or heard of Baynton's 'Turbine' print washer, for he says there is no mechanical print washer that will separate the prints and wash them thoroughly. In this he is wrong, and I shall be very pleased to send him one to try if he will kindly write to me. His suggestion that it saves time and labour to use sinks and tanks also is wrong, as it requires labour to do it, and my washer requires no attention at all."

GRABER PRINTING MACHINES.—Mr. Ellis Graber, of Tunbridge Wells, has just published a large new illustrated catalogue of the machines and installations made by him for quantity production of photographic prints as regards exposure, development, fixing, washing, and drying. These machines are of various types, according to the requirements of the user, and provide the means of a very rapid output of prints by the thousand or million. Having

had several opportunities of seeing for ourselves the excellence of their design and workmanship. we are not surprised to observe in the catalogue the many testimonials from firms and institutions employing them, and to notice that they have been supplied to the British. American, and Italian Governments.

THE PICTURE POSTCARD INDUSTRY IN GERMANY.—Conditions in the German picture postcard industry do not appear to be particularly encouraging, this branch of trade probably having suffered more from the general increase in prices than any other German industry. One concern after another has been forced to discontinue that line of business. The situation is traceable, writes the representative at Berlin of the U.S. Department of Commerce (in the Journal of the Royal Society of Arts), not so much to increased wages and cost of raw material as to the Government's increase of postage on postcards from 5 to 30 pfennigs, with the resultant decreased demand for the cards.

Prior to the war, the monthly average of picture postcards manufactured in Germany under the phototype process was 32,000,000. By the end of 1920 the average was around 7,000,000. The selling price of picture postcards in Germany has increased from 200 to 300 per cent. over the pre-war prices, while postage, as mentioned above, has increased sixfold. The greater number of postcards being marketed in Germany to-day originate from old stocks. According to the technical bureau of the Association of Lithographers in Leipzig, there were manufactured in that city by 25 plants, large and small, during the first six months of 1913, a total of 241,308,615 picture postcards. During the first six months of 1920 these same plants produced a total of 15,838,220 cards. The 65 factories in Berlin, during the period of May to July, 1914, reported a total output of 265,000,000 cards, while during the same period for 1920 the total was only 24,000,000 cards.

These Berlin plants during the same period of 1914 employed a total of 14,800 workmen, as against 5,200 during the corresponding period for 1920—a shrinkage of almost one-third. It should be explained, furthermore, that of these 5,000 many could readily have been dispensed with, but were retained only because the Tarifamt (Wage Bureau) effected a reduction in working hours in order to avoid further increase in the number of unemployed. Until a short time ago, some 100,000 persons in Germany had derived their living from the manufacture and sale of picture postcards.

The direct effect of the depression on such an extensive industry is obvious. As an indirect effect the paper mills have suffered heavily through lessened demand for their materials—a demand which has shrunk to the minimum.

Correspondence.

****Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

"PHOTOGRAPHY NOT A MAN'S JOB."

To the Editors,

Gentlemen,—Nowadays one is accustomed to see sensational headlines in that section of the Press dealing with hair-raising matters, but I must confess that I was very much surprised to find in the sober-minded "Daily Chronicle" some rather sensational news under the above heading. Since when has photography ceased to be a man's job? It was a man's job sure enough when the old silver bath and perambulator dark rooms were the order of the day, and likewise when dry plates and the pyro-ammonia developer came along, and I was under the impression that it was still a man's job. However, the "Daily Chronicle," in dealing with the subject on Thursday and Friday of last week, leads us to believe that it is not.

As all your readers may not have seen the newspaper reports referred to, I may perhaps be permitted to make a few extracts. The notes referred to a lecture given by a woman photographer, Mdme. Yevonde, at the P.P.A. Congress, and we are told—and no doubt rightly—that it was the first occasion that a lady had addressed a gathering of professional workers, and also that no fewer than one hundred women photographers are now directing their own studios in London and the provinces!

According to the report, the lady, who is a well-known portrait photographer, said there have been famous women photographers for 50 years. The business of one, a girl of 19, in the early eighties, prospered to such an extent that in time she had 60 assistants. The photographs of another, Mrs. Cameron, were used to illustrate the first edition of Tennyson's poems. Lord Reading, sitting to Mdme. Yevonde before leaving for India, told her that he "preferred being photographed by a woman because she usually took less time than a man." And she added, in relating this incident, when she asked him which side of his face he desired to have photographed, he immediately replied, "The left." It is well known among photographers that the left is more symmetrical than the right side of the face, she remarked. Photography is, she claimed, essentially a profession for a woman. Her intuition and tact always place her at an advantage. She is quick to understand the temperament of her sitter, and she realises that it is infinitely more desirable to obtain a characteristic likeness than an artificial pose.

The above was in Thursday's issue of the paper, and on Friday the reporter returned to the subject, and we read: "Do women make the best photographers? Their male rivals admit that they do. Mdme. Yevonde, lecturing at the Photographic Fair (as reported in these columns yesterday), claimed that camera work is essentially woman's work, and a well-known man photographer told a 'Daily Chronicle' representative yesterday that he agreed with her.

"'I don't think photography is a man's job,' he said. 'I used to think so before the war, but in my absence the business was carried on entirely by women. They made such a success of it that when I came back I decided not to operate, and within the last few years I have done so only on rare occasions.' The name of this photographer is on hundreds of portraits of well-known men and women, but the actual taking of the photographs and all the subsequent processes are carried out by women."

I wonder who this "well-known man photographer" can be, and why he shirked the opportunity of having a free advertisement?

The above may be good and up-to-date journalism, but is it wise, even if true? Our ranks to-day are terribly overcrowded, and the reports quoted are likely to turn the attention of many women—who are in search of something to do and care little or nothing as to what it is—to photography, in which calling there are now too many of them, few of whom are of any real use or ornament to our man-founded profession.—Yours faithfully,

A MERE MAN.

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THE BRITISH

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Contents.

SUMMARY

At the annual general meeting of the Professional Photographers' Association, held during the recent Congress, the proposal to make the Association an incorporated body under the Companies Acts was unanimously adopted. The title proposed for the incorporated body was "The Professional Photographers' Association of Great Britain." Subject to the approval of the Board of Trade, it was further proposed to add the words "and of Ireland." (P. 265.)

Mr. Frank Brown, ex-president of the P.P.A., makes a strong appeal for wider support of the Association. (P. 271.)

Portrait photographers are asked to take part in a forthcoming discussion on studio lighting at the Royal Photographic Society on May 24. (P. 261.)

A soft working hydroquinone developer, owing this property to addition of pheno-safranine and thereby also desensitising plates, has been worked out by Dr. Lüppo-Cramer. (P. 261.)

Mr. Walter Thomas, in the course of some notes on the Dallmeyer-Bergheim lens, emphasises the pictorial merits of this objective and the convenience in use of the later model. (P. 264.)

Mr. A. Lockett describes a simple optical device for testing the efficiency of plate backings. (P. 263.)

Camera masks for the making of passport and similar photographs in quantity are described in an article on page 268.

Progress in the speed of both lenses and emulsions prompts the thought that in emulsion making, despite the possibilities of desensitising, the problem of the future is to obtain such selective insensitiveness as will permit of the handling of plates by maker and user. (P. 262.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT

In a contributed article, Mr. R. M. Fanstone deals with some of the practical matters neglect of which is liable to affect truth of colour rendering in screen plate processes. He specially emphasises the effect of coloured objects in the near neighbourhood of the subject, also the advantage of hooding the lens, protecting the colour-filter from light and observing discretion in exposure to the safelight during development of the plate. (P. 17.)

The Prizma process of colour cinematography, recently demonstrated in London, is the first commercial success in the printing of ready-to-show cinema colour films. Its complete solution of the difficulties of colour cinematography would appear to depend upon the simultaneous making of the negative images which, as positives, have afterwards to be registered. (P. 18.)

Mr. Colin Bennett, in some recent notes in the "Kinematograph Weekly," has put the distinguishing features of additive and subtractive colour processes in a particularly clear way. (P. 19.)

At the Royal Photographic Society last Tuesday evening some most ingenious lantern diagrams for the same purpose were shown by Mr. H. S. Watkins. (P. 18.)

Some scanty particulars of a new colour process, "Triadochrome," are contained in a London local newspaper. (P. 20.)

EX CATHEDRA.

S.Q. v. M.Q. The remarkable effect of the desensitising pheno-safranine dye upon the behaviour of hydroquinone developer was referred to in the article of Mr. Raymond Crowther which appeared in our issue of April 22 last. It was there pointed out that Dr. Lüppo-Cramer has found that the pheno-safranine dye converts hydroquinone from a hard-working short-factor developer into one of long-factor, such as metol. Dr. Lüppo-Cramer has perceived the usefulness of this property in permitting the preparation of a developer similar in its properties to M.Q., although metol does not enter into its composition. A very small quantity of safranine is the new constituent of a developing formula which we may denote by S.Q. in order to mark its composition. Dr. Lüppo-Cramer has given the following formula:—

A.	Soda sulphite cryst	100 gms.
	Hydroquinone	12 gms.
	Potass bromide	1 gm
	Water	1,000 c.c.s.
B.	Potass carbonate	50 g.s.
	Pheno-safranine 1:2,000	200 c.c.s.
	Water to make	1,000 c.c.s.

The working developer is prepared by mixing equal volumes of A and B at the time of use. It is claimed for the formula that it is very similar to M.Q. in its developing properties; at the same time it is much cheaper and also permits of the development of the plates in a bright light.

* * *

Studio Technics. A meeting of the Scientific and Technical Group of the R.P.S., which has been fixed for May 24, will, it is hoped, be attended by leading portrait photographers in London. The subject is "Studio Lighting," with special reference to the distribution and efficiency of light and to the colour composition of different lights. The Group has arranged for speakers from the scientific standpoint in the persons of Mr. Leon Gaster, Mr. T. G. Priest, Mr. J. C. Elvy and others. In one respect or another, the above are entitled to speak on the subject, but we don't think any of them professes to be an expert in the use and control of light for the purposes of photographic portraiture. It will therefore be very greatly to the benefit of the subject if portrait photographers of experience will come to this meeting. They will probably learn something of the fundamentals of lighting from the scientific people, and the latter in turn will hardly escape learning something from them of the conditions of actual work. Both together, by a blend of their different kinds of knowledge, should accomplish something in the way of creating new ideas of the methods by which studio lighting may be made more efficient and brought more precisely under

control for particular effects. The artist's eye can do with help from the measurements of the scientific man, and the latter, we are confident, can benefit by being better informed of what are desiderata in the lighting of photographic studios. It need hardly be said that, without any formality, professional visitors will be welcomed at the meeting, which is held at 35, Russell Square, at 7 p.m.

* * *

Opal Pictures. It has been said that there is nothing new under the sun except that which has been forgotten, and portraits upon opal glass have been out of fashion for so long that it is possible that the present generation would regard them as a novelty. A quarter of a century ago many photographers did a fair amount of business in carbon prints upon opal, finished either in monochrome or colour and mounted in ormolu frames. These were usually supplied in addition to the original order, and formed a very remunerative side line. There was also a good sale for bromide opal enlargements in sizes from 12 x 10 to 18 x 16, the latter size fetching any price up to ten guineas. We do not know if any maker now lists bromide opal plates, but they could doubtless be obtained to order. Sepia toning was not practiced when opal bromides were the vogue, so that all sepia enlargements had then to be made in carbon, but now large sepias are as easily produced as black and white. In the smaller sizes carbon is greatly superior, and the range of colours, especially in the reds and warm sepias, is particularly attractive.

SPEED LIMITS.

In Jules Verne's book "From the Earth to the Moon" a happy description is given of the old-time rivalry between makers of big guns and makers of armour-plates. As soon as a gun capable of shattering any existing armour-plate came into being, inventors set to work to produce armour that laughed at the new monster's projectiles. This armour having been installed, only a short interval would elapse before the appearance of another and more formidable gun capable of penetrating the improved plates as if they were made of cheese. Fortunately, the emulation among lens-makers and plate-makers in the direction of attaining the highest possible speeds is on a different basis. While their efforts can hardly be said to be co-ordinated they are both striving for the common good of those for whom they cater, and the success of one does not necessarily prejudice the success of the other. At the same time it is a pertinent reflection that possessors of very rapid lenses can, as a rule, afford to ignore the introduction of ultra-rapid plates, while many will be inclined to welcome plates of extreme sensitiveness chiefly because by using them they will be spared the necessity of buying costly wide-aperture lenses.

Within limits, progress, whether competitive or not, in both these connections is heartily to be approved. Quite apart from what is mere freak photography there are several branches in which a combination of great lens-speed with great plate-speed is eminently desirable. Press photography has become part of our daily life, and for the Press photographer no lens or plate can be too rapid, provided that decent results can be obtained without adding prohibitively to the weight or bulk of the apparatus carried, or detracting prohibitively from the ease and quickness of the operations subsequent to exposure. Lenses and plates enabling high shutter speeds to be used on a winter afternoon are distinct desiderata. Instantaneous photography by artificial light can still do with further assistance from the optician and emulsion maker. Recent introductions point to the possibility that before long snapshots of scenes on the stage may be taken with ordinary theatre lighting. An attempt in that direction was made, it may be remembered, a good many years ago by Dr. Grün, who invented and put on the market a lens working, more or less inefficiently, at $f/2$. But the result was extremely poor. Indeed, in this case, it is obviously to increased plate speed rather than to increased lens speed we must look for satisfactory progress, for no picture of a stage scene taken at a larger aperture than $f/8$ is likely to be really pleasing.

The limitations of lens speed are pretty clearly defined and familiar to most photographers. Lenses of excessive rapidity have long been available for those who required them for special work. In addition to the Grün lens just mentioned an $f/2$ portrait lens was formerly made by Dallmeyer, and is still sometimes met with in secondhand catalogues. If we remember rightly it was known as the 3c, had a focal length of about 12 ins., and was intended mainly for cabinet pictures of children. Such an objective was necessarily both bulky and costly, and its popularity was therefore limited. For particular purposes, where only a very small picture was required, it was possible years ago to put together a lens working at $f/1.5$ by combining two of the old Zeiss single telepositives, which worked at $f/3$ and had a focal length of $8\frac{1}{4}$ ins. But few, we imagine, went to the length of buying two of these objectives, which cost £20 apiece, in order to produce a combination with a focal length of only a trifle over 4 ins. Nowadays there are several $f/3$ lenses on the market, other than those employed for cinematography, and one firm has in hand an anastigmat of focal lengths up to 12 ins. with an aperture of $f/2.9$. A 12-in. lens of this type has actually been made which is said to cover a half-plate satisfactorily.

It goes without saying that, while very wide apertures are extremely useful for cinematograph and other work in which only very short focal lengths are commonly needed, it is only very rarely that a lens with a focal length of over 6 ins. can be satisfactorily used at an aperture wider than, say, $f/5.6$. The depth of focus condition is a veritable rock ahead in the way of all progress in lens manufacture, as far as aperture is concerned, and on it the popularity of the $f/3$ lens among any but users of very small cameras is likely sooner or later to split. On the other hand, tiny pictures taken with a very short focus lens of this extreme rapidity will, if the lens is anastigmatically corrected, stand considerable enlargement. There is also a special sphere of usefulness for very wide aperture objectives in connection with astronomical and instantaneous colour photography.

The question whether the sensitiveness of emulsions can be increased to a much further extent with advantage to the photographic world in general is one which can be variously argued. Formerly, increased rapidity was accompanied by an appreciable coarseness of grain, and, where the quality of the negative and its capacity to stand enlargement were primary considerations, workers were inclined to shun plates of the ultra-rapid, 500 H. and D. description. But some of the modern very fast plates are of by no means objectionably coarse grain, and yield negatives of excellent quality. As new colour sensitising dyes come to be introduced—and the discovery of Pinaflavol, to which we recently drew attention, shows that progress is still being made in this branch—we may expect further advances in rapidity, apart from increase in the sensitiveness of the original emulsion. It may be thought that it is possible to have plates that are too sensitive, since no method is likely to be devised by

which they can be packed, as well as coated and cut to sizes, in total darkness. But if emulsions ten times more sensitive were to be made, our plate manufacturers would probably be equal to the task of coating them. As things are, there is no plate on the market which cannot be more or less conveniently handled, and, of course, as regards development, otherwise than in a tank, Desensitol is a valuable new friend. And it must be remembered we are only at the threshold of knowledge of imparting highly selective colour-sensitiveness to plates, and still further from what may be of importance in the future, viz., selective colour-insensitiveness.

TESTING THE EFFICIENCY OF BACKING.

Probably a majority of photographic writers assert that halation is mainly produced in the lower portion of the film, and may therefore be avoided by giving a full exposure and developing quickly with a strong solution, so that sufficient density is attained before the developer penetrates to the halated part.

This may be true with a liberally-coated plate of not too high sensitiveness and for subjects where the lights are not exceptionally bright. In all other cases, however, it can be taken for granted that oblique rays strong enough to pass through the film, and to be reflected from the back surface of the glass, will assuredly make their way to the front of the film again, and must inevitably be capable of development. That, indeed, is corroborated by the well-known fact that halation may often be reduced by rubbing the negative with a pad of chamois leather moistened with methylated spirit. If halation were really confined to the lower part of the film friction would have no effect, unless one rubbed almost through the gelatine.

The reason why halation becomes more manifest with under-exposure and forced development is simply because of the greater contrast in the lights and the inadequate shadow detail. Halation would be quite as evident in a fully-exposed negative of the same subject, were it not that by stopping development sooner the result is softer, while the fuller detail in the shadows cancels part of the defect, or, rather, withdraws attention from it. Moreover, with incomplete light-action in the shadows, there is always a tendency for the outline of bright portions to spread sideways; and this is quite independent of halation by reflection, since it may be seen in bad examples of under-exposure even when the emulsion is coated on an opaque or non-actinic support.

Soft development generally has a wonderful effect in cases where halation is feared. Hence we see admirable results obtained from difficult subjects, both by means of over-exposure, followed by development for a short period only with a strong normal solution, and by the widely-different method of over-exposing and developing for a long time in a tank with a dilute solution almost devoid of alkali. The second way must clearly allow penetration and extended action of the developer right through the film, yet it succeeds after a fashion, for the same reason as the first, namely, that both tend to reduce contrast while bringing out detail in the shadows.

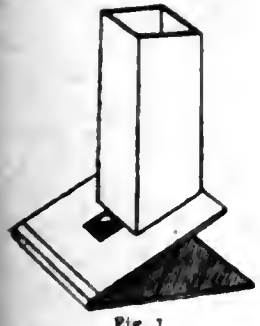

Fig. 1.

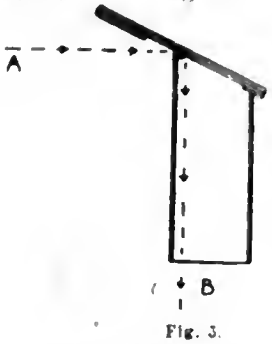

Fig. 3.

I suggested twenty years ago ("B.J." Supplement, November 1, 1901) that the probability or otherwise of halation occurring with any given plate or backing might be tested merely by visual inspection. Recently I have contrived an improved apparatus for the purpose, which is shown complete in Fig. 1. Two rectangular pieces of thick blackened cardboard, 4¼ in. by 3¼ in., are cut. On one of these, a couple of parallel lines are drawn across the middle, 3/16 in. apart, as at A and B in Fig. 2, and against these lines two apertures are marked and cut out, as at C and D, one being ¾ in. square and the other 1½ in. square. Between the two central lines is glued a narrow strip of black velvet E, indicated by shading. The second card only needs to be covered all over with black velvet on what will be the inner side.

A 1½-in. square blackened cardboard tube is next made,

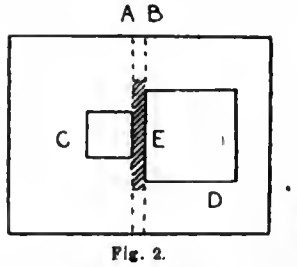

Fig. 2.

4¼ in. long at the longest side, and having its bottom cut across at an angle of 45 degrees. This tube is glued over the larger opening in the first card, having turned the latter so that the velvet strip is underneath. Slips of opaque paper are then pasted round at the junction to stop up any possible crack. The two cards are lastly hinged together with a strip of opaque tape or cloth, leaving just sufficient gap for the insertion of a plate of average thickness.

To use the apparatus the plate to be tested, or a portion cut from it if large, is laid film upwards on the velvet of the lower card, the upper card being then pressed down on the plate in close contact. The small opening is pointed obliquely at a brilliant light, preferably direct sunshine, while the observer looks straight down the tube. Fig. 3 is a sectional plan, in which the arrows show the general course of the light coming from the direction A, the eye being placed at B.

There will be seen, on an unbacked plate, a bright patch or streak, formed by rays that have passed through the film under the small opening, and have been reflected back by the rear surface of the glass, emerging again through the film near the edge of the large aperture. On placing an unbacked plate with its glass side to the opening the halation is greatly increased, which quite accords with theory. A thickly-coated plate is visibly less penetrable than a thinly-coated one, while celluloid film, contrary to general belief, unmistakably shows reflection, though decidedly less than plates.

In every instance, however, when a really effective backing is applied no rays are returned, and only blackness is seen in the tube. In the case of an anti-halation plate with a non-actinic substratum between glass and emulsion the result is equally satisfactory, since the only light that penetrates or can return is non-actinic.

The foregoing simple apparatus gives a real test of halation proper, and it will be found that actual exposures in the

camera agree well with its indications, though plates of different speeds will, as might be expected, vary somewhat in the amount of halation capable of development. It may be stated, in conclusion, that, with a bright enough light-source, it is quite practicable to interpose a filter before the admission aperture of the tester, in order that the trial may, if desired, be limited to rays of a particular colour.

A. LOCKETT.

THE NEW BERGHEIM LENS.

In 1896 a sensation was created among pictorial photographers by some pictures exhibited at the Royal Photographic Society's exhibition in Pall Mall, for nothing quite of the kind had been seen before.

In place of critically sharp definition, which had hitherto reigned supreme, the photographs exhibited were deliberate attempts to produce softened outline *without destroying structure*. So effectively was the object achieved that for a time these were accepted, except among more advanced photographers, merely as examples of some crazy worker's efforts, yet they were the forerunners of what is quite commonplace to-day. Indeed, for the express purpose of producing a similar type of results, quite a number of makers now issue special lenses for giving more or less diffused definition, quite another matter from attempting to gain the same end by means of highly corrected lenses racked out of focus, and producing more pleasing results.

In this country, for some reason, these soft focus effects did not gain much favour; indeed, when American pictorialists first sent over to England a collection of their works, which were exhibited at the Royal Photographic Society's house in Russell Square, they were openly laughed at by most photographers as being merely freak works by a pack of mad Americans Yet to-day they would likely enough seem old-fashioned, were it possible to view them again collectively.

Thus it always seems with any attempt to break away sharply from any conventions; first scoffing, then silent toleration, and in due time acceptance, assuming the innovation to contain elements of truth. It certainly has been so in this instance of soft focus work in pictorial photography.

So far as I know, the first deliberate attempt to produce a lens adapted for this special purpose was that known as the "Bergheim," introduced by Messrs. Dallmeyer from particulars supplied by Mr. Bergheim, in those days equally well known as a painter artist and as a pictorial photographer. The late Mr. T. R. Dallmeyer, in a lecture on March 6, 1896, brought this new power—for so the lens proved itself—before a crowded meeting at the London Camera Club, the late Earl of Crawford being in the chair. It was a memorable meeting, from which world-wide results have spread.

Mr. Dallmeyer described Mr. Bergheim's ideas and aims, how his firm had carried them out, the construction of the lens, and some of the advantages claimed on its behalf.

(1) It was of the telephoto type, of variable focal length, and needed comparatively short camera extension.

(2) It worked with absence of distortion.

(3) It allowed suppression of critical sharpness in varying degrees *without destruction of structure*.

(4) It gave more uniformity of definition and better rendering of different planes in a subject by keeping them within the range of useful focus instead of one plane being sharp and all the rest out of focus.

(5) It produced painter-like effects.

Obviously, any means which could place such advantages within the power of photographers marked an important advance, and so it has proved, for here is an instrument of great plasticity in that it gives power to treat subjects with greater freedom than had been possible before its introduction.

It is an artist's lens for artistic photography; a means for thoughtful expression rather than haphazard snapshot work. Whilst simplicity itself in handling, it needs understanding, which perhaps explains to some extent why it has not been more widely used in the past, but now that bitingly sharp definition, especially in the better type of portraiture, has ceased to be the beau ideal, we may see this lens come into its own, especially as recently some important improvements have been made in its construction, notably reduction in size and weight, the No. 1, with a range of focus from 12 inches to 25 inches, measuring only 4½ inches in length, diameter 2½ inches, and weighing but a few ounces.

Just think what it means, having one lens and being able, simply by a twist of the lens tube, instantly to change it from a 12-inch, into either a 15-, 18-, or 25-inch lens, or, if desired, to stop at any intermediate stage in the focal length. Also, what a change in size of image is possible by this means, *without moving the camera or sitter;* no having to bring them close together to obtain a large head, with its consequent distortion of features, and hands out of all proportion to the face, for with this lens true drawing is obtainable even when a large head is photographed on a comparatively small plate.

Then varying degrees of diffusion are obtainable at will, always with structure truthfully rendered, planes better differentiated; indeed, it more nearly approaches painting with light than any other means I know of, and is such a joy to use when once its simple principle has been mastered, not a matter of any real difficulty. It only needs a slight turn of the focussing screw in order to make the necessary correction between visual and chemical foci. In practice, this is done by first focussing in the ordinary way, first getting the image as sharp as possible on the ground glass, and then racking the camera in slightly, 1-60th of whatever focal length you are using the lens at; that is all there is to do to ensure full correction, so that when exposure is made the lens is working at its chemical focus in place of visual, exactly as is done with uncorrected lenses of the so-called spectacle lens type at one time so popular among photographers.

In practice, even the above simple calculation need not be made, for in portrait work, if the eyes be focussed upon the point of sharpest definition, a slight racking-in of the lens until the point of focus has been transferred to the ear of the sitter will give a negative which, after exposure and development, will be found to have correctly rendered such definition as was desired, and placed exactly as intended. The slight alteration of point of focus from eye to ear is sufficient to make all necessary allowance for difference between visual and chemical foci. From the description it may appear rather a complicated business: in practice it is simplicity itself; just a turn of the focussing screw to throw the point of focus slightly back, and the matter is ended.

Not every photographer cares for extreme softness in definition, but to those who prefer their subjects modelled and outlined with such degree of sharpness as they see in nature this Bergheim lens will prove a treasure, offering, in the one instrument, a wonderfully wide range of possibilities, and these notes may end with the observation that one of the original form—a No. 1 of 12-inch or 25-inch focus—has been for many years one of my favourite lenses, and was only superseded quite recently by one of the improved new form now available of considerably reduced size and weight, a matter of some importance in outdoor work when carrying a large camera, stand and several lenses, when the fire and energy of youth is sobering down before the approach of that period of life when physical effort loses some of its charm.

W. THOMAS.

THE P.P.A. CONGRESS.

THE ANNUAL GENERAL MEETING.

The annual general meeting of the Professional Photographers' Association was held in the Congress Room of the Horticultural Hall on Friday, April 22. Mr. Frank Brown (President) was in the chair.

It was agreed unanimously, on the proposition of Mr. Swan Watson, seconded by Mr. Speaight, to take the minutes of the last meeting as read.

The President said that the first business was the consideration of the annual report of Council and balance-sheet. It was usual for the President to make some fairly exhaustive remarks on such an occasion, but he would only draw attention to the significant progress of the Association in respect to membership. In 1916 the members numbered 720, and in 1920—after an interval of only four years—they numbered 1,073. (Applause.) This figure, however, was not enough, considering the importance of the Association, and the tasks it had to face in the comparatively near future. During the next twelve months some very serious work would have to be done, and he knew that the Council, on behalf of the members, was "prepared to take its coat off."

Mr. S. H. Greenway moved the adoption of the annual report, and congratulated the President and Council on the generally satisfactory state of affairs.

The President asked for any criticisms.

Mr. A. Barratt said that he thought members generally would be pleased with the way the Council had looked after the interests of the Association. There was one point which occurred to him. It would be a very desirable thing, if it was possible to arrange, for the present exhibition of professional work to be transferred subsequently to Edinburgh and Manchester. That was a thing to be undertaken, not by the Council, but by the provincial members. Then there was the question of the "Circular." One of the difficulties he saw ahead was the lack of interest taken by members as contributors. That was one of the reasons why the "Circular" was not as interesting as it should be. The reports of Council meetings were, by the time they appeared in the "Circular," somewhat out of date, and superfluous also, because members had already read the reports in the "British Journal." He suggested that underneath the reports of Council meetings in the "British Journal" there might be, by arrangement with the Editor, an advertisement inviting non-members to become members. A few months ago he read in the "Circular" that a photographer made application to the Council on the matter of getting a reduction on his electric light bill, and after the help had been given it was found that he was not a member of the Association. The moral seemed to be, When in trouble come to the Association, but the use of its machinery should only be available for those who had become members. There was another matter. Would it not be possible to form a small committee for publicity purposes? They had had a demonstration within the last few days, in connection with the exhibition, of the value of Press publicity, and much good had been done by the excellent Press reports of Madame Yevonde's lecture. That was all to the good so far as the Association was concerned, and there should be more of it, done officially by the Council. He would suggest that next year a lecture be given by some advertising expert on the question of advertising or publicity, and how it affects photography. Then—to bring up another matter—was it not possible for the Council to get out a graded minimum price list? Such a thing would be very useful both for town and country members, to enable them to see what prices were being charged in general, for it would be a great pity if ever they allowed prices to come down to the standard of pre-war days. (Hear, hear.) Another suggestion for the next Congress: could not the President and Secretary of the French Association of Professional Photographers be invited to attend? Some friends from abroad had been with them on the present occasion, and this international visiting was all to the good. (Applause.)

The Secretary said that with reference to Mr. Barratt's remark about the "Circular," the report of a Council meeting in the "Circular" was much fuller than the report in the "British Journal," although, of course, neither report gave a complete account of the Council's proceedings, since there were some things which it was expedient to withhold from publication, at least for the time.

Mr. Coles suggested that if they were not satisfied with the "Circular" some of the blame must fall upon non-contributing members, who had failed to make the most of this medium. He himself had been intending to write, but had put it off until now. And he had not noticed contributions from Mr. Barratt.

Mr. Barratt, however, pointed out that he had contributed.

The motion to adopt the annual report of Council was then put, and carried unanimously.

Mr. R. N. Speaight, in moving the adoption of the balance-sheet, said that in these times when one could hardly look at a financial column without finding depression it was a great pleasure to him to present a balance-sheet which was so very satisfactory. The Association had no liabilities, except one, which it could not help, the liability, namely, in respect to those members who had paid their subscriptions in advance. During the year they had spent £698 5s. 1d., which was quite a large sum for an Association of that size, but they had received £830 9s. 10d. in revenue from subscriptions and interest on investments and other odd receipts, so that their accumulated funds were £132 1s. 9d. larger than they were a year ago. (Applause.) The Association's assets were not fictitious. They included £500 in 5 per cent. War Loan, £100 in 5 per cent. National War Bonds, £300 on deposit at the bank, and £90 on current account. The expenses had been heavier than in the previous year; the amount paid for secretarial work was £150 more—to mention only one item—so that it was extremely satisfactory to see an extra £132 added to the reserve. It was a genuine reserve at the moment of close on £1,000. The subscriptions had increased in number by 168, and in amount by £115 over the previous year. Everything the Association had touched it had made on. There was a profit on last year's Congress, yet no one could say that those who attended did not get their money's worth on that occasion. The balance to the good on the Congress account was £13. He hoped that as much, if not more, would be made this year. It was the Council's duty to see that in all its enterprises the Association came out on the right side. (Applause.)

The adoption of the balance-sheet was moved formally by Mr. W. J. Stocks, and seconded by Mr. H. J. Jarman, the seconder saying that he thought the thanks of the members were due to the Treasurer (Mr. Speaight) for his masterly handling of the accounts, for he supposed that the major part of the duty fell to him.

Mr. George Hana said that he would like to protest against this balance-sheet. The Association was accumulating far too much money, and it ought to be spent in propaganda and general usefulness. Some hustle should be put into the Finance Committee, so that they made fuller use of the funds they possessed.

The President said that Mr. Hana was quite aware that some suggested steps were being taken with regard to propaganda, but the matter Mr. Hana had raised would not be allowed to slip.

The balance-sheet was then adopted unanimously.

Mr. Speaight, in reply to Mr. Hana, said that there had been a big scheme in contemplation, which had the support

of the Finance Committee, but three weeks previously he as treasurer had asked that a resolution which committed them to considerable expenditure might be rescinded, and the matter be postponed until the labour troubles had passed over their heads. It would be well to wait and see how things went before allowing money to go out of the bank on fresh enterprises, however excellent they might be. The success of the balance-sheet was only in small part due to any efforts of his own. In greater part it was due to the late Secretary and Treasurer, Mr. S. H. Fry. (Applause.)

A telegram from Mr. Fry was read at this point, regretting inability to be present, owing to a bad influenza cold. It was agreed to communicate to Mr. Fry an expression of regret at his absence and its cause, and to offer him the best wishes of his fellow-members.

The Secretary said that he had a letter from Mr. Rigden, one of the auditors, who informed him that he was now going out of business, and would no longer be a member of the Association.

Mr. Alfred Ellis then proposed the motion relating to the incorporation of the Association. The motion ran as follows:—

"That having regard to the disadvantages of the present constitution of the Association and with a view to it becoming a formal legal entity possessing legal rights, and with a view to the effective protection and indemnity of its officers and removing impediments to its progress and acquiring greater certainty in regard to its correct administration, government and powers, it is resolved that the Council be authorised, at the expense of the Association, to register under the Companies Acts, 1908 and 1917, a new Association, not for profit and limited by guarantee, to be called the Professional Photographers' Association of Great Britain (Incorporated), and that by the constitution of such new Association the liability of members shall be limited to

"(*a*) A subscription of 10s. per annum, and

"(*b*) *A contribution to the assets of the new Association in the event of the same being wound up during the period of membership of each member or within one year afterwards* for payment of the debts and liabilities of the Association contracted before the time at which such member ceases his membership, and of the costs, charges and expenses of winding up the same and for the adjustment of the rights of the contributories among themselves, such amount as may be required *not exceeding* 10*s. per member.*

"And that all the members of the existing Association shall be entitled to become members of such new Association when registered without payment of any further subscription until the expiration of the period for which their respective subscriptions have been paid to the present Association, and that upon the registration of the new Association the assets of the existing Professional Photographers' Association be transferred to such new Association.

"And that a committee be elected from the Council of the existing Professional Photographers' Association of Great Britain with power to settle the Memorandum and Articles of Association embodying so far as practicable the objects and rules of the existing Association and such further objects and rules as such committee may be advised are desirable."

Mr. Ellis said that the question of incorporation had been before the Council for a considerable time past. Mr. W. Illingworth read a paper on the subject in 1919, and since then the subject had received a large amount of attention from the Council, and the Council was unanimous in recommending the resolution to the members. The Association as at present constituted had no legal entity, and the officers, Council, and, in some degree, the members were liable for its debts and liabilities. As their first secretary, he, in conjunction with Mr. A. Mackie, framed the first rules and regulations of the society, and also any amendments since then. He thought it would be agreed that these had answered their purpose very well while the Association was a small one, but the Council was of opinion, now that the membership was over a thousand, and there were invested funds, that the Association should be placed on a firm and legal basis. The present rules did not provide for many contingencies which might arise, and therefore the rules should be legally drafted in accordance with the Companies Acts, and should properly define the duties of president, secretary, treasurer, chairman, council and trustees, so that those who carried on the work of the Association might be properly protected from legal liability. At present outsiders did not recognise the Association itself, but looked to the secretary or the individual councillor as the responsible person for any liability incurred, whereas under incorporation these officers would be acting as agents of the Association. Incorporation not only insured the safety of the officers, but it protected the members, for in the event of the Association getting into debt or being "wound up," the most that each member could be called upon to pay was 10s. in addition to his annual subscription. The funds of the Association would be better protected. At present there was no restriction as to their use by a majority of the Council. They could divide the funds among existing members or spend them on absurd schemes. If they became incorporated, the Board of Trade, when reviewing the articles of association, would provide that the funds be only used for stated objects and purposes that would be considered beneficial to the Association generally, and the Council would not be able to make any alteration or deviation from the articles of association without the further approval and permission of the Board of Trade on each occasion. The Secretary informed him that since the notice of motion was sent out he had received two suggested amendments, one from an Irishman that the word "Ireland" should be added to "Great Britain" in the title, the other that the title should be "The Institute of Professional Photographers." If they thought seriously of these alterations he would suggest that they be proposed as two amendments, after his proposition had been seconded by Mr. W. Illingworth, who was very much interested in the scheme. Mr. Vaughan, the hon. solicitor, was in attendance, and would be pleased to answer any legal questions on the subject of incorporation (Applause.)

Mr. W. Illingworth seconded the motion. After he was first elected on the Council he quickly came to the conclusion from his observations at its meetings that they were on the wrong track, and had not a leg to stand on, if they were to attain the object for which the Association was founded—namely, the improvement of the status of those practising photography as a profession. He did not mention his thoughts, but he definitely made up his mind that he would bring a motion forward at the proper time, a motion which, if acted on, would place the Association on a sound business foundation. That time did arrive, and the motion was now before the members. It was very gratifying to him to know that his colleagues on the Council had recognised the force of the arguments he put before them at one of the meetings during 1919, when he urged that the incorporation of the Association was a sound and practical business proposition, and was absolutely imperative to the carrying out of their fundamental objects. This recognition by his brother councillors had not been obtained without persistent determination on his part, and nothing could have given him greater satisfaction than to realise that they had seen the wisdom of acting on these ideas. He seconded the proposal as indisputably the most sound and practical business proposition ever put before that society of professional photographers, and asked that it might be supported unanimously.

Some discussion then took place on the order of the proceedings, the President and Council not having yet been elected.

In reply to questions from Mr. Barratt, Mr. Greenway, Mr. Swan Watson, and others,

Mr. Vaughan (the hon. solicitor) said that undoubtedly when once the Association became an incorporated body the members would have to re-elect their president and council, and the only reason why he had suggested taking that business

later, after this resolution had been decided, was that another resolution might be put forward stating definitely that the president and council now to be elected should be president and council for the new association. The Companies Acts provided that the election of council—which took the place in this instance of what was usually called a board of directors—should be effected by members of the incorporated body after incorporation.

Mr. Barratt said that he believed a general meeting must be called in any case to confirm what had been done.

Mr. Vaughan said that this was so; there must be a confirming meeting after the registration of the company.

The President, in reply to a member who asked whether this suggested scheme had the unanimous support and approval of the members of the Council, said that after two years' careful deliberation and consideration, it had received the unanimous approval of the entire Council.

It was agreed eventually that the election of president and council should be proceeded with before the resolution with regard to the proposed incorporation was put to the meeting.

Mr. Alfred Ellis said that according to the present rules, as a Professional Photographers' Association, the Council had to nominate a president, treasurer, and twenty-four members of council, twelve of whom should be London, and twelve country members, and if there were any other nominations from members of the Association a ballot had to take place. On this occasion there were no other nominations, and therefore the names went forward without the necessity for a ballot.

Mr. Greenway protested against this procedure. The outgoing Council might nominate, but this did not necessarily mean election. He wanted to show that the feeling of the meeting was in favour of the gentlemen proposed for election, whatever might be the fate of the resolution with regard to incorporation. It seemed to him that the new procedure not having yet been settled, this important business must be done according to the old procedure.

The President, signifying his willingness to take the resolution at this point,

Mr. Greenway formally proposed, and Mr. Jarman seconded, the election of the following members who had been duly nominated to serve as officers for the ensuing year:—

President, A. Swan Watson.

Past President, Frank Brown.

Hon. Treasurer, Richard N. Speaight.

Members of Council.

London.	Country.
Adams, Marcus, F.R.P.S.	Chaplin, W. B. (Windsor).
Bassil, Angus.	Chapman, A. H. Ll. (Swansea).
Bennett, Arthur.	Chase, Gordon (Bromley).
Corbett, Alexander.	Chidley, T. (Chester).
Dickinson, C. F.	Fry, S. Herbert (Ripley).
Ellis, Alfred.	Illingworth, W. (Northampton).
Gray, W. E., F.R.P.S.	Lambert, Herbert (Bath).
Haines, Reginald.	Read, F. (Southport).
Hana, George.	Spink, H. C. (Brighton).
Speaight, Richard N.	Turner, T. C. (Hull).
St. George, H. A.	Wedlake, W. H. O. (Forest Gate).
Wakefield, F. G.	Wheeler, Halksworth (Folkestone).

Secretary, Lang Sims, 437, Brixton Road, London, S.W.9.

The motion was carried unanimously amid applause.

The discussion on the main resolution was then resumed.

Mr. Vaughan (hon. solicitor), in outlining the advantages of incorporation, congratulated the Association on the step it was now proposing to take. As the Association stood to-day it was really a non-legal body. While every one of its officers could be "shot at," the society as a society could get no redress for any wrongs it suffered. On reading the rules of the Association as at present in force it was very difficult to say what were the powers and the limitations of the officers and governing Council. Incorporation would place all on an absolutely firm footing. The Association would be like a company in many respects, and the Council would be in exactly the same position as the board of directors of a trading concern. The members' voting powers would all be defined by the memorandum and articles of association, which would be drawn up in accordance with the Companies Acts. Before incorporation, the memorandum and articles would have to be submitted in draft to the Board of Trade. The Association was not to be registered for the purpose of making a profit, but for the good of a certain body of persons—namely, professional photographers—and in that memorandum and articles the objects which the Association might carry out would be defined. That was the limitation which was put upon the powers of the executive, for these objects could not be extended without a special resolution which had afterwards to be approved by the Board of Trade. Care would, of course, be taken that the objects were sufficiently wide to enable the Association to carry on its work with reasonable freedom. It might be necessary to enlarge them in some respects. The subject of propaganda had been referred to at that meeting, and also an improvement of the quarterly journal. The object clauses must be sufficiently wide to enable the executive to give effect to these objects if considered desirable. If the usefulness of the Association was to be extended it would necessarily mean that certain risks were incurred, more expenditure would be called for, and contracts might have to be entered into with advertisers and manufacturers. It was desirable that the executive should have power to undertake this, and that their liabilities should be protected. There might, for instance, be some slip made with regard to a certain firm or individual, and it was desirable that the liability of particular officers should be effectively safeguarded. In working, the plan would prove by no means complicated. In any matter of difficulty it would only be necessary to refer to the memorandum and articles, and doubts could be set at rest immediately. The memorandum and articles were the result of very careful thought by people who had had to frame and constitute associations of that character before. It would mean to the executive greater certainty both as to powers and rights. With regard to assets, at present these had to be held by an individual; in future they would be no longer in the name of any individual, and the banking account would be in the Association's name and could only be touched by persons authorised by the council, which might at any moment revoke its authority. Supposing a bank were to fail the Association, as a body, at present would have no rights against the assets available. By incorporation the Association would save itself from many equivocal positions.

Mr. R. Haines asked whether, supposing the resolution were passed, the title of the Association could be altered afterwards.

Mr. Vaughan said that that would have to be done by a special resolution which would require the sanction of the Board of Trade. The Board of Trade, however, would not be captious in such matters, as long as no confusion with any body was created.

The President said that the title "Institute of Photographers" was suggested. The word "professional" surely should be inserted.

Mr. Ellis said that they would only be following the example of architects or engineers, who did not use the word "professional."

In the course of further discussion, however, it was pointed out that there were no amateur architects, engineers or auctioneers.

The President said that this proposed amendment would seem to make the Association include all photographers, whereas this had been an association of master photographers.

Other expressions of disapproval at such change of name were made, and the amendment which had been sent in was withdrawn.

Mr. Vaughan stated, in answer to a question, that it was necessary to include the amount of the subscription in the resolution because the Companies Acts required that the liabilities of the members must be stated, but if an alteration was desired later there would be no difficulty.

On the motion of Mr. A. Barratt, it was agreed, with two dissentients, that the words "and Ireland" should be added to the title.

Mr. Vaughan advised that the words "if permitted by the Board of Trade" should be added in this amendment, because as they would be incorporated under an English Act of Parliament some objection might be raised, though he hardly thought it likely.

This was agreed to.

The original resolution, with this addition of "and Ireland" to the title, was then put and carried with absolute unanimity and amid applause.

The President congratulated Mr. Illingworth upon his successful endeavours.

A vote of thanks was accorded to the hon. solicitor for his attendance, and the business then concluded.

PHOTOGRAPHS FOR PASSPORTS.

In the early days of the war I had to produce quickly thousands of small portraits to be used on Government permits.

Happily these days are gone, but the photo-permit seems to be a legacy of the war, and almost any day now an emergency might arise where a small photographer would find a big volume of business offered to him. My experience and method of working may therefore prove instructive.

It was left to me at a price per head to take the men anywhere I liked, to produce two stamp-size pictures, and to get the work through in a few days. At first I took them in the studio, using a Billcliff repeating back, but I soon found that I could never cope with a percentage of the men that way, and that I would ruin my ordinary trade. So, after thinking the matter out, I decided to take them in batches at the docks, railways, or sheds where they were employed. I used my half-plate outfit, which has six double dark slides. Eighteen on a half-plate was what I produced, and I took six at a time on a third of the plate. To cover up the other two-thirds during exposure was simple, two shapes of thin, dark card being necessary, one

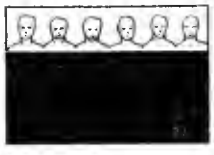

Fig. 1.

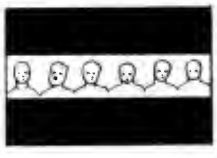

Fig. 2.

always being in position immediately in front of the focussing screen or dark slide. The illustrations will show how this works (figs. 1 and 2).

Now, the only thing I had to be careful of was to avoid duplicating exposures. I made a blunder the first day, but never again, for after that I always carried a note-book with skeleton drawings of the twelve plates, crossing off each portion as exposed. Well, then, six men were placed against a wall, shoulder to shoulder, the exposure made, and so *ad infinitum*. To avoid changing the focus frequently, I worked through the top portions of plates first, and so on. It will be seen that I made 216 portraits on 12 plates without changing. I never risked wholesale disaster by having an assistant, and the way the "sitters" fell into the spirit of the thing was wonderful, arranging themselves in groups of approximate heights, so that I had scarcely ever to leave the camera. My day's operating—frequently finishing after the dinner hour—usually was about four changes, or 864 faces on 48 half-plates. To develop those, dry off, and make two glossy bromides from each before the next morning was not a tremendous task, and at the charge of 1s. per head shows a return of over £40!

Sometimes I had to number them. This was done by pinning a numbered "cloak-room" ticket on one of the subjects. I never cut the prints up, as I found the clerks and foremen who handled them could do that better when allocating the lots to the different departments.

In finishing up my contracts, particularly with railway men, I had to pick up a few at a time at different points. I took those singly, working eight on a plate, as follows (figs. 3 and 4):—

It will be noticed that here again two intermediates of dark card allow for all the different changes, merely by turning them about and upside down.

This way of producing "Victoria" midgets is useful for fêtes or similar outdoor gatherings, as a repeating back is not quite suitable for a field camera.

Passport or permit photographs may mean a good help to the studio business. In Ireland, at present, every owner or driver of

Fig. 3.

Fig. 4.

a car or motor-cycle must have a properly authorised permit, with photograph affixed.

Do not make the mistake of charging too small a price for this work. "Oh! any sort of thing will do," we are told. "Yes," I reply, "but I have to upset all my routine to give you quick service, and that is what we charge you for."

You may frequently bag a local big-wig, who ordinarily dislikes being photographed. In such case, do not make the fatal mistake of making him wait while you take two or three large negatives of him. The clever way is to take, without any apparent fuss, but, of course, as carefully as possible, one large negative only. As the sitting is "only for a passport," you ought easily to cajole a good expression. Then copy the small prints from this negative. A week or ten days later you may send for approval the "enlargement," with every chance of a good order accruing. J. Effel.

Exhibitions.

HAMMERSMITH PHOTOGRAPHIC SOCIETY.

The exhibition which once again has been brought together at Hampshire House, Hog Lane, Hammersmith, represents very well the present-day standard of pictorial work in landscape and portrait photography. Quite a respectable proportion of the work comes up to the standard of the larger exhibition and there are very few foolish things. The work of Louis J. Steele, always fresh in his outlook, is here represented by some very pleasant examples, and other notable exhibitors of both portraiture and landscape are Charles R. Wormald and Hugo Van Wadenoyen. In portraiture, the prints by Marcus Adams add distinction to the walls; and, in landscape, F. Prior has some imposing prints, rather theatrical in style, but giving promise of more mature achievements. The members' section represents a large volume of enthusiastic effort, and contains the makings of a number of fine works. There is a collection of colour transparencies which can be seen after dusk by artificial illumination. The exhibition remains open until May 19 next, and may be visited without charge for admission.

FORTHCOMING EXHIBITIONS.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

April 28 to 30.—Nottingham and Notts. Photographic Society. Particulars from the Hon. Secretary, A. Beeston, 103, Nottingham Road, Nottingham.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

New Books.

Photographic Abstracts. London: Royal Photographic Society. 10s. per annum.

THE first number of this systematic review of the technical photographic press and of periodicals relating to branches of science connected with photography has at length appeared under the direction of Mr. E. K. Hunter, Dr. T. Slater Price, Mr. F. F. Renwick and Mr. B. V. Storr, assisted by a staff of abstractors. The arrangement of the abstracts into eleven groups is one which, we think, will allow of subject-matter being found without much difficulty, and without the need of cross-references, a device which apparently the compilers propose to dispense with altogether, since no instance of it is to be found in this first number. Nevertheless, we think further experience will show that occasions arise when a limited amount of cross-referencing adds to the usefulness of the publication without materially increasing its length. The sections into which the abstracts are classified are as follows:—

Colour Photography.
Cinematography.
Manufacture of Photographic Materials.
Photographic Appliances (Cameras, etc.).
Photographic Optics.
Photo-Mechanical Processes
Radiography.
Applications of Photography (Astronomy, Spectroscopy, Photo-micrography, etc.).
Sensitometry, Actinometry, Photometry.
Theory of Photography.
Photographic Processes.

It will be seen that the methods of what is usually termed "practical photography" form only one of the eleven sections: the purpose of the publication, which alone could justify its appearance, is the wide scope of its review among subject-matter, and over periodicals which are less directly related to the technics of photography than are the papers and articles published in purely photographic journals. By keeping this aim clearly before them, the publication committee will render a most valuable service to students of photography now and in the future. They have made an excellent beginning on these lines under conditions which, as they say in a brief prefatory note, have not been favourable to creating the full organisation necessary for putting their ideals into effect. "Photographic Abstracts" is sent free to members of the Scientific and Technical Group of the Royal Photographic Society; by others it is obtainable, price 2s. 6d. per copy, or 10s per annum, from the R.P.S., 35 Russell Square, London, W.C.

New Materials.

Super-Gladiator Plates. Made by the Mawson Co., Ltd., 81, Northumberland Street, Newcastle-on-Tyne.

THE MAWSON CO. have applied the prefix "Super" to their Gladiator plate in significance of recent improvements in the emulsion which have greatly increased the rapidity. The Gladiator plate, within our experience, has always been one of extreme speed, and it is evident that by further experiment in its manufacture this quality has been enhanced. The makers now rate it at 500 to 530 H. and D., and claim that it is the most rapid emulsion upon the market. It would require a more extensive series of tests than, we think, we can be expected to make to examine the practical performance of the plate in comparison with others; and, indeed, from the variety of conditions under which a plate is used, within and outside the straight-line portion of the characteristic curve, it can hardly be maintained that a plate is of the same practical speed for different descriptions of work—at any rate where the margin of difference is not a very wide one. But it certainly can be said that the Super-Gladiator is a plate of the most extreme speed and, moreover, one which develops readily and easily gives negatives of any required degree of vigour. And it works exceedingly cleanly, yielding a negative of remarkable fineness of grain for an emulsion of such rapidity. As the oldest makers of dry plates in this country the Mawson Co. have certainly reason to congratulate themselves upon their latest success in achieving a new record in emulsion speed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, MAY 9.

Bowes Park and Dist. Phot. Soc. "Carbon Printing." F. P. Bayne.
Cripplegate Photographic Society. Demonstration. B. C. Wickison.

TUESDAY, MAY 10.

R.P.S. "The Theory of the Screen in Half-tone Work." L. P. Clerc. "Suggestions for a New Printing Process." K. C. D. Hickman, B.Sc., A.I.C. "The Behaviour of the Silver Bromide Particles in Dry Plates towards light, alpha and beta rays." Prof. The Svedberg of Upsala.
Hackney Phot. Soc. Print and Slide Competition; Seascape.
Manchester Am. P.S. "Bromoil Demonstration." S. Grimshaw.
Portsmouth Camera Club. "Photography—Its Present-day Importance and Power." Messrs. Johnson and Sons.

WEDNESDAY, MAY 11.

Croydon Camera Club. "Shaw, Shakespeare and Cæsar." Cavendish Morton.
Photo-micrographic Soc. Annual General Meeting, Exhibition, etc.

THURSDAY, MAY 12.

Gateshead and District Camera Club. Annual Meeting.
Hammersmith (Hampshire House) Photographic Society. "Improving the Negative." R. H. Lawton.
Kinning Park Co-op. Soc. C.C. Open Night.
Kryn and Lahy (Letchworth) Phot., etc., Soc. "The Romantic in Landscape."

SATURDAY, MAY 14.

Glasgow and W. of Scot. Amateur P.A. Excursion to Bothwell Castle.
Hammersmith (Hampshire House) Phot. Soc. Outing to Lewes (three days).
Kinning Park Co-op. Soc. C.C. Outing, Bishopton to Erskine Ferry.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, May 3, Dr. Rodman in the chair, when Mr. H. S. Watkins read a paper on "Principles of Colour Processes." Owing to pressure on space a brief report will be found on another page of the "Colour Photography" Supplement.

CROYDON CAMERA CLUB

THE club rooms last week closely resembled an American bar prior to the Reformation, Mr. J. W. Purkis being the cocktail mixer for the evening. The simple subject chosen was "The Principles Underlying Photographic Printing," simple only in the sense that he made it so. For an instructive series of elementary articles the lecture-demonstration would make an admirable basis; it was essentially one unsuitable for a brief report. Nearly every familiar printing process, from P.O.P. to Carbro, was reviewed, and the many telling experiments kept interest alive to the end.

So interested was the artistic, but not too scientific Mr. Harpur, that in the discussion he expressed himself as completely and utterly bewildered, reinforcing this compliment by adding that had he experienced such an evening at the start of his photographic career, rabbit breeding might have been substituted. The thought is appalling—especially from the rabbit's point of view.

After some desultory but appreciative remarks from others, enters the "office boy" with glee writ large on his countenance. With real sorrow he had noticed that the lecturer had repeatedly referred to potassium bichromate as the *light-sensitive* salt in the carbon process, a mistake which no baby in arms would dream of making. Personally, he did not pretend to be a chemist, but had read an editorial statement in a recent issue of the "B. J." to the effect it is incorrect to allude to the salt as "light-sensitive."

In turn, wreathed in smiles, up rose Mr. Purkis, thumped two heavy volumes on the table and proceeded to read the following extracts, much to the discomfiture of the prior speaker, who made bitter allusions to photographic journalism in general. According to Vogel, "the salt is sensitive to light, but not changed," though as the author was writing in a popular sense, the lecturer said, the wording, in strictness, required amplification. Wilhelm Ostwald, one of the greatest chemists of the world, points out that "sensitive chromic mixtures are not to any extent sensitive to light, but become so in high degree when they are in contact with organic matter." "I therefore maintain it is perfectly correct to say that bichromate of potash is the sensitive salt in the carbon process," triumphantly concluded Mr. Purkis.

This week the "Walrus" is due, on "a subject to be announced." Those at the Photographic Fair who may have noticed him in the vicinity of the telephone call-boxes must also have noticed a certain preoccupied air, entirely due to the fact that up to then he had struck no definite idea on a subject for Croydon.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given, pursuant to Section 242 (3) of the Companies (Consolidation) Act, 1908, that, at the expiration of three months from April 29, the name of Park's Press Photographic Agency, Ltd., will, unless cause is shown to the contrary, be struck off the Register of Joint Stock Companies, and the company will be dissolved.

NEW COMPANIES.

GLOBE DRUG CO., LTD.—This private company was registered on April 26 with a capital of £2,000 in £1 shares. Objects: To carry on the business of chemists, manufacturers of photographic instruments, etc. The first directors are:—A. J. Espley, 64, Higher Antley Street, Accrington (permanent governing director), and S. J. E. Bourn, 95, Conway St., Birkenhead. Registered office: 18, Blackburn Road, Accrington.

DONALD LOCKWOOD AND CO., LTD.—This private company was registered on April 27 with a capital of £1,500 in 1s. shares. Objects: To carry on the business of manufactnrers of and dealers in proprietary articles of all kinds and of photographic apparatus and materials, etc. The first directors are: D. R. Lockwood, Glenwood, Broom Road, Hampton Wick, Middlesex; B. Sherman, 87, Holmesdale Road, Hampton Wick, Middlesex. Registered office: 21, Sugar House Lane, Stratford, Essex.

SOUTH SUBURBAN PHOTOGRAPHIC SOCIETY.—Mr. P. R. Salmon was elected president of this Society at the annual meeting, held on 27th ult. The Society was founded fourteen years ago by Mr. John Nixon, who was its first secretary, and for the past nine years its president. Mr. Salmon has been a vice-president from its start. Mr. H. D. Fretwell, Bexley House, The Grove, Greenwich, S.E.10, was re-elected hon. sec.

SANDS-HUNTER CAMERAS.—A 64-page list of new and second-hand cameras at bargain prices just issued by Messrs. Sands, Hunter and Co., 37, Bedford Street, Strand, London, W.C., marks a policy which is observable elsewhere of issuing class or departmental lists. The catalogue is limited to cameras and a few other accessories, such as changing boxes, shutters, and tripods. It is therefore of special interest to the amateur purchaser who buys his hand-camera all complete for use, and, as a rule, prefers not to go to the trouble of having this or that lens specially fitted. For the legion of these purchasers Messrs. Sands, Hunter offer an extraordinary variety of folding plate and film cameras, including a wide selection of those in the vest-pocket and $3\frac{1}{2} \times 2\frac{1}{2}$ sizes. But the professional photographic worker should also note the exceedingly ample choice here offered of reflex and folding focal-plane cameras. The list is one which brings the facility of purchasing from a large stock of reliable goods to the door of the intending buyer, who can obtain the catalogue free on application, and particular goods on approval for five days.

News and Notes.

THE CITY SALE AND EXCHANGE is exhibiting prodigious energy in the publication of catalogues. We have before us the third issued within the last few weeks, and itself a book of nearly 200 pages. It comes to us from the branch of the firm at 54, Lime Street, London, E.C.3, and a copy will be sent to anyone on application to that address.

CANADIAN PACIFIC PHOTOGRAPHS.—On the library floor of the Canadian Pacific Railway building, 62, Charing Cross, London, an exhibition of pictures by Mr. P. A. Staynes, R.O.I., taken by him during a tour in China and Japan, together with a fine series of photographs in colour taken in Canada by Miss Olive Edis, F.R.P.S., will be on view from May 2 to May 16 between 10 and 5 p.m. (on Saturdays, 10 to 1).

MAWSON PLATES.—The Mawson Co., Ltd., 81, Northumberland Street, Newcastle-on-Tyne, send us their revised price list of dry plates, including the "Super-Gladiator," noticed on another page of this issue. With the exception of the firm's X-ray, panchromatic, and "Wizard" (anti-halation) plates, their brands are uniformly priced on a basis represented by 2s. 6d. per dozen in quarter-plate size, 5s. in half-plate, and 10s. 6d. in whole-plate.

JIFFY PASTE.—Messrs. The Binney and Smith Co., 6 and 7, Stonecutter Street, London, E.C.4, send us a sample of an adhesive in powder form which simply requires mixing with cold water to form a powerful paste. The paste is recommended for newspaper wrapping, paper box making, and though its suitability for photographs is not mentioned it appears to be a very clean product, and more suitable, at any rate, for the cheap enlargement trade than many of the cheaper pastes which we have seen. A sample may be had on application to the Binney and Smith Co.

THE CLUB PHOTOGRAPHER is the title which our friends of what hitherto has been "The Northern Photographer," will adopt for their new volume commencing with the June issue. The name has been chosen from many suggestions submitted in competition for a prize, in reference to the wider appeal which the little magazine is intending to make among members of photographic societies throughout the country. A feature of the first issue of the "Club Photographer" is to be articles and illustrations entirely supplied by the Hampshire House Photographic Society.

CINEMATOGRAPHY FOR PROFIT.—Messrs. Butcher have just issued a booklet directing the attention of professional photographers to the opportunities which, on an increasing scale, are being afforded for the supply of films of local interest to cinema theatres. The theatres are glad to have these films for exhibition, but are not in a position to make them. Messrs. Butcher's list contains notes on this outlet for business and shows the equipment with which it can be done. The list is obtainable free on application to Messrs. Butcher's cinematograph branch, 28, Denmark Street, London, W.

HALF-WATT PROJECTION LAMPS.—A small descriptive price list of a very special kind, and one of interest to all makers of enlargements, reaches us from Cinema Traders, Ltd., 26, Church Street, Charing Cross Road, London, W.1. It, is a catalogue of focus-lamp outfits for projection lanterns of all descriptions and shows the various patterns of stands or trays for these lamps specially designed for accommodating them in lantern bodies and for providing the necessary adjustment of the position of the light. Means are also provided for the use of reflectors, increasing the power of the light by approximately 50 per cent.

ENSIGN CAMERAS.—The high cost of printing is evidently restraining manufacturers from issuing the large catalognes which were common a few years ago, but perhaps that is not altogether a drawback when the outcome is the publication of such excellent departmental lists as one just issued by Messrs. Houghton of Ensign cameras and accessories. It is a publication of 160 pages which fully describes and illustrates the Ensign manufactures, from the inexpensive "Mascot" cameras to the lordly "Sanderson." Its pages show the range of cameras for all descriptions of photography which carry the Ensign trade mark in significance of their manufacture in Messrs. Houghton's works.

DEALERS' WINDOW DRESSING.—Messrs. W. Butcher and Sons, Camera House, Farringdon Avenue, London, E.C., have recently organised a most complete service of help for the display of goods in dealers' windows. A booklet shows actual photographic reproductions of a considerable number of window arrangements with lettered plans for the placing of the goods on stands or brackets, which are supplied by Messrs. Butcher. This programme of creating sales is planned in connection with the series of catalogue booklets and show-cards supplied by Messrs. Butcher, and moreover includes electros of photographic advertisements which a dealer may insert in his local newspaper.

BARKAY REFLECTORS.—A descriptive catalogue of these new reflectors for studio artificial sources of light has at length been published by Messrs. W. J. Bartholomew and Co., 40, Gerrard Street, London, W.1. It contains the report by Mr. H. M. Lomas, F.R.P.S., on his tests of the sevenfold increase of light produced by the reflector. The latter, it should be noted, acts by directing the light from an arc lamp or a half watt along a certain but wide path instead of allowing it to be scattered in all directions. Thus, while it produces greater intensity of light the light is still a soft one compared with that from an unscreened light-source. The catalogue illustrates the several patterns of reflector and fittings which can be obtained, and contains a list of some of the notable photographic studios which have installed this important and valuable adjunct to artificial lighting.

QUARTZ LENSES.—The Hanovia Lens Laboratories, Newark, New Jersey, have issued an illustrated price list of the quartz lenses, to which we drew attention some months ago on the strength of the experience with one of the first to be made, published by Dr. D'Arcy Power, of "Camera Craft." The lenses are now issued in two series, of *f*/4.5 and *f*/6.3 aperture, under the name of "Kalo-sat." In the *f*/4.5 series they are made in focal lengths from 6½ inches to 13½ inches for plates from 5 × 4 to 10 × 8. The prices range from 24 to 115 dollars. In the *f*/6.3 series, similarly priced for the same series of plates, the focal lengths, rather curiously, are longer, from 9½ inches to 19 inches. A special characteristic of these lenses is their greater rapidity, aperture for aperture, owing to the higher spectral transmission of the quartz. The definition also is one of a peculiarly pleasing soft character when the full aperture is used.

Correspondence.

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

No notice is taken of communications unless the names and addresses of the writers are given.

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

HALATION AND DEVELOPMENT.

To the Editors.

Gentlemen,—May I contribute a few words to your discussion on halation? I quite agree with your correspondents who advocate the use of a strong developer. Some time ago a friend of mine took some photographs of some birds in the Botanical Gardens here. The house in which they were has glass roof and side; the day was extremely bright, and, in consequence, short exposures were given. I think most of them were exposed for only the 25th of a second. On developing these, several of which included large portions of the glass side and roof, I was surprised to find no trace of halation. The developer I used was pyro soda, which had accidentally been made too strong a solution. It never occurred to me that the absence of halation was due to this fact until I saw the controversy in your journal.

The plates used were Wellington Anti-screen. In my opinion self-screened ortho plates have less tendency to the giving of halation than the ordinary plates have. Personally, I have been disappointed with films. They seem as bad as plates with the exception of one or two particular makes, for instance, Portrait Film, where the emulsion, being thick, seems to give better results than ordinary unbacked plates.—Faithfully yours, J. J. GROVER.

Temple House, Bath Row, Birmingham, April 23.

DESENSITISING AND PANCHROMATIC PLATES.

To the Editors.

Gentlemen,—Mr. Crowther's article in your issue of the 22nd is of great interest to amateurs like myself, but does not lead us much farther with the question of avoiding the red stain due to Desensitol. The stain is sometimes patchy or uneven in tint, and occasionally, as Mr. Crowther remarks, a bluish violet tint will appear on drying an apparently stainless negative. Such negatives are spoiled for printing or enlarging.

I have further found the alteration in Watkins factor noted in the article, and am glad to see it explained. Mr. Crowther speaks also of desensitising backings, and it may be of interest to your readers to learn that I accidentally found this to happen when developing some red-backed Anti-Screen plates, though at the time I ascribed the absence of fog as due to the protective red colour of the developing bath caused by the solution of the red backing.

I have concluded that until we know more about the use of Desensitol I can get on better by developing by the factorial system with a Wratten Green safe-light for panchromatic plates. Although the Ilford Company state that their panchromatic plate is unsafe in any light, I have successfully developed some of these plates with pyro-soda, using a Wratten safe-light and factorial development. All negatives are bright and clear, and no fog is apparent in any one of them.—I am, sir, yours faithfully,

HENRY N. HOLLAND.

13, Cawdor Road, Fallowfield, Manchester.

THE CONGRESS—AND NOW.

To the Editors.

Gentlemen, After a well-attended and most successful Congress—particularly under the existing difficult circumstances—I would ask my brother professional photographers, through your kind indulgence, not to hesitate in becoming members of the P.P.A. Cogent matters, requiring strength of numbers and unity of purpose, are coming to the fore with which the *combined* efforts of those making their livelihood by photography are necessary to cope, and I beg my professional brethren not to stand passively looking on—as four-fifths of the profession are doing at the present moment—while the 24 men constituting the P.P.A. Council do the work.

There is a saying that "actions speak louder than words," and if the labours of the Council are worth anything at all, surely they are worth encouragement. The London Councillors are on the spot, like permanent men of a fire brigade, and are always at P.P.A. work. The country men, too, spend time on looking after its interests, in addition to the expenses incurred by attending Council meetings, and their expenses average, I should say, *quite ten pounds* per annum per Country Councillor, in *railway fares alone*. Your non-member of the P.P.A., when pressed to join, often asks, "What will it benefit me?" Well, to what extent does it benefit men on the Council? What do they get for their work? What do they ask for? *Encouragement*, that is the word; encouragement to look after his interests, for which he is asked to pay 10s. per year, while some of these men spend *more than ten pounds* a year for that particular purpose.

We are supposed to number 5,000 or more professional photographers in the United Kingdom. The membership of the P.P.A. stands at a little over 1,000—when it ought to be four times as many. Come, men, buck up! The subscription will not break you, even if times are hard, and later on you will be glad.—Yours, etc.,

FRANK BROWN,

Ex-President, Professional Photographers' Association.

Leicester, May 2.

TECHNICAL JOURNALS.—When felicitations are offered to our confrère, Mr. Arthur C. Brookes, on the organisation of a Fair, or the regular publication of his trade journal, it is perhaps not remembered that Mr. Brookes carries also on his shoulders the responsibility for the management of the British Association of Trade and Technical Journals, a body representing the interests of a very large number of technical periodicals. The official handbook, just issued at the price of 1s., of this Association, contains particulars of these periodicals, such as subscription rates, advertisement tariff, and character of circulation. It provides a most useful conspectus of the technical press for the purposes of the large or small advertiser.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

B B.—In some districts the police require a canvasser for photographs to have a hawker's licence, but in other districts, according to our experience, this is not the case. The only thing you can do to make sure is to apply at the local head police office in the district where you are working.

F. T.—Aluminium is most unsuitable for developing solutions, and not by any means the best for fixing baths. You can improve matters by covering the metal with ordinary quick-drying enamel, but a better material, though more expensive, is the so-called anti-sulphuric paint sold by dealers in electrical requisites.

A. S. F.—We think the text book "Optical Projection," by Russell S. Wright, published last year by Messrs. Longmans, Green and Co., 39, Paternoster Row, London, E.C.4, price 4s. 6d., would give you the information you want. It is only a small book, but it deals fairly thoroughly with arc lamps, and Mr. Wright is a thoroughly practical lanternist.

F. A.—(1) Nothing better for preserving gum arabic than thymol, a few grains per ounce of the mucilage as required. (2) We are afraid we cannot express an opinion, for the Rents Act is such a complicated thing that you should apply to one of the daily papers, such as the "Daily Chronicle," which keeps a barrister engaged in answering queries relating to it. But we don't think they could turn you out.

T. C.—We are afraid it is very difficult to ventilate the room satisfactorily except by putting the lamp outside. Could you not make the shutter blocking up the window with some kind of covered box on the outside so that you could put the lamp in it sufficiently sheltered from draught and so escape the bad effects of it in the room? As the window is so small we do not think any pair of ventilating passages—one on the top and one at the bottom—would be any good.

G. S.—(1) Preventive means as also susceptibility to amidol poisoning vary considerably with each individual. Generally speaking, about the best preventive means is to dip the fingers into plain water, or into water just made acid with a few drops of hydrochloric acid, every time they have been in the developer. Regular use of an emollient, such as Hazeline cream, is also a preventive, but nothing that we know of can be said to be an absolutely certain or effective preventive for a given individual.

C. L.—(1) Using a wide-angle at its maximum aperture, usually of *f*/16, the shortest focus which it is wise to use for covering a half-plate is about 5 inches. If you are ready to stop down to *f*/32 you can cover a half-plate with an *f*/16 W.A. lens of about 4½ inches focus. The above applies to the ordinary types of wide-angle lens. There is also the "Hypergon" wide-angle, not now on the market, but no doubt obtainable second-hand, which would allow of a much shorter focus, probably less than 4 inches for half-plate.

A. R.—Your room is rather low for a studio, and some ingenuity will have to be exercised to get your front lamps high enough for groups and standing figures. We should estimate that you will require about 8,000 c.p., and for groups it must be well distributed. The lamps should all be made to raise and lower so that you can shorten the exposure with sitting figures and children. As you arrange in your diagram you will have the lights on the wrong side of the studio for the majority of faces. If you can work the other way round it will be better. You can shift the 2,000 lamps to where you want them for any special subject.

C. M.—Providing that the projection lens is of appropriate focal length to your 8½-inch condenser, that is about 8 to 9 inches focus, there is no useful purpose in having the negative carrier frame movable to and fro between the condenser and the objective, except for the purpose of shortening the exposure when enlarging very much smaller negatives than the full half-plate covered by the condenser. If you move the little negative further away from the condenser you get a more concentrated beam of light on it, and so shorten exposure, which may at times be an advantage, at any rate for dense negatives or when using slow papers. In this case a useful amount of movement would be one-third to one-half the distance between the condenser and the objective.

H. S. G.—(1) There is no means of calculating the quantity of potassium carbonate equivalent to a given weight of sodium carbonate in a developer. You can only go by the quantities of these alternative alkalies prescribed in specific formulæ. (2) No doubt silver nitrate keeps better in an amber bottle, but experiments made some years ago showed that the developers do not keep any better, and, in fact, in some cases, keep better in a bottle of blue glass than in one of amber. (3) The only "secret," if it can be called one, is that a reflex camera in which the mirror is raised by mechanical means is much more satisfactory as regards smoothness of working and uniformity of action than one in which the mirror is raised by the human user, as is the case with most of the cheap models.

L. B.—We had better deal generally with your two queries together by saying that we think it is bad practice to use daylight for illumination of the dark-room. One inconvenience is that a light which is safe at one time may be unsafe half an hour later owing to changes in the outside light. Also the fabrics, through constant exposure to daylight, are gradually bleached to some extent, and you never know when the bleaching has reached a point at which the fabrics become unsafe as filters. On both of these accounts it is far better to use a gas or electric dark-room lamp fitted with one or other of the tested safelights supplied by Messrs. Kodak, Ilford, and others. However, we should say, as a kind of guess, that two thicknesses of commercial ruby fabric would provide a reasonably safe illumination for the handling of films, but you would probably want one ruby and one yellow for handling bromide paper. Yellow alone would not be safe for bromide. You could, of course, cover the glasses of the window with a dye varnish, but it would be a messy job, the dyes would always be exposed to full daylight and you couldn't get a full flood of daylight in the room. We think this plan is the least advisable of those you mention.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3184. Vol. LXVIII. FRIDAY, MAY 13, 1921. Price Fourpence.

Contents.

SUMMARY

In a communication from the Eastman Research Laboratory Messrs. Loyd A. Jones and C. E. Fawkes have recorded their experiments on the relative suitability of different reducing formulæ for diminishing the depth of gaslight prints and of prints on other development papers. They point out that reducers in some cases act differently upon prints and negatives, and that the different properties of reducers which are in common use are adapted for various specific effects in reduction. (P. 275.)

In a leading article we emphasise some of the practically useful results contained in the paper, among them the value of the reducer compounded with both ammonium persulphate and potassium permanganate, which, especially has the effect of undoing, so to speak, the effect of excessive development. (P. 274.)

In a contributed article "Thermit" suggests that living organic matter in water is liable to produce stain on gelatine papers which at some stage of their production have been treated with alum. (P. 278.)

In his "Paris Notes," M. L. P. Clerc refers to the present need in France of systematic instruction in photography. He also describes some recent work by MM. Lumière on desensitisers, a new three-colour camera, cinematograph film printer, and directs the attention of photographic societies to an experiment in stereoscopic vision. (P. 279.)

£1,000 in prizes for professional photographers and their sitters is to be awarded by Messrs. Wellington and Ward in a competition. (P. 282.)

Mr. Walter Thomas is showing examples of his professional photography at the Davis Galleries, New Bond Street, during the present month. (P. 282.)

The Edinburgh Society of Professional Photographers has issued a costing schedule for the information of its members undertaking commercial photography. (P. 285.)

Inspectors under the Shops Act should take a hint from their colleague at Aberdeen who has been to the trouble of notifying photographers of their rights in respect to making portraits by appointment at the studio on the week's half holiday. (P. 273.)

An obituary notice of the late Mr. W. Friese-Greene, whose sudden death last week has received much notice in the daily Press, will be found on page 281.

A remarkable case of a printable negative produced by six weeks' exposure on an outdoor subject is mentioned on page 288.

At the Croydon Camera Club last week Mr. W. L. F. Wastell gave a good deal of practical information on the use of "Transferotype" paper. (P. 285.)

Notes on the design and use of simple soft-focus lenses are contributed by correspondents. (P. 287.)

New formulæ for the Carbro process have been published by the Autotype Company. (P. 281.)

EX CATHEDRA.

Posing Chairs. We do not know whether there are any photographers who are investing money in furniture at the present juncture, but if such there be, they should bear in mind that a chair needs to be something more than attractive looking to be of the greatest utility in the studio. Many chairs have a tendency to cause the sitter to have a "bunched up" appearance, due to their being too low. For bust portraits and three-quarter-length ordinary poses the seat should always be high enough to keep the knees well below the line of the thigh bone. The height of the seat also has a considerable effect upon the pose of the shoulders, so much so that some workers advocate a standing position for head and bust portraits. When selecting a chair it is a good plan to secure the services of a lady who will act as a model and test the possibilities of the article by sitting in it. It will often be found that very graceful-looking (chair) arms come very awkwardly in the way in certain poses. Two or three small tightly-stuffed cushions will be found of great value for increasing the height of the seat to suit the pose and the figure of the sitter.

* * *

Half-day Closing. We must say a good word for Mr. James Cumming, chief inspector under the Shops Act in Aberdeen. We do so because Mr. Cumming has gone to the trouble of issuing a circular letter notifying photographers of their freedom to take portraits by appointment on the afternoon in the week which is the statutory half-holiday under the Shops Act. The circular letter runs as follows:—"On 18th March one of the photographers in the City drew my attention to a paragraph which appeared in 'Answers to Correspondents' column of the 'British Journal of Photography,' dated 21st January, to the effect that it had been definitely stated by the Home Office that the taking of portraits by appointment at a studio on the weekly half-holiday was not contrary to the Shops Act. I immediately communicated with the Under Secretary for Scotland asking whether the information referred to was correct. As I had not received a reply up to 27th April, I again wrote him on that date, and have now been informed 'that the statement is substantially correct, and is based on the view (from which the Secretary for Scotland sees no reason to dissent) that the actual taking of a photograph is part of the process of manufacture.'" Such consideration of those coming within their inspection is so rare a quality of the official mind that the citizens of Aberdeen are to be congratulated on the sensible point of view of the officer in question. Other inspectors charged with administration of the Shops Act may be advised to follow his example. Since there has been a definite expression of opinion by the Home Office, it is plainly to the interest of both inspector and inspected that the fact should be made as widely known as possible.

Finders It is not always easy to see the image in the finder of a hand camera unless it happens to be a reflex, or the eyesight of the photographer is unusually acute. With practically all types of finder, either direct vision or reflecting, the short-sighted person is at ease, but when the slightest tendency to hypermetropia is present there is a difficulty in seeing the finder image clearly, unless "reading" spectacles are worn. These, however, preclude a clear view of the actual object or view to be photographed, so that it is better, if possible, to arrange a magnifying lens as an attachment to the finder. An ordinary small magnifying glass of the linen-prover type can be fixed over either a ground glass or "brilliant" finder, so that it will fold flat when not in use, while those who prefer a direct-vision finder will do well to select one that has a small magnifying lens fitted in place of the usual sighting vane. If this is not done the eye must be kept so far from the concave lens that a much smaller field than that of the camera lens is covered. The ordinary wire-frame finder fitted to some focal-plane cameras is, perhaps, the most satisfactory arrangement, as although the wire may not appear quite sharp, it is sufficiently so for all practical purposes.

THE PROPERTIES OF REDUCERS FOR BROMIDE AND GAS-LIGHT PRINTS.

In these days of almost endless variety in printing media—variety which allows of passable prints being obtained from negatives which would, even a decade ago, have been transferred straight from the fixing bath to the waste box—it is somewhat of an irony that exact knowledge of the nature of that appearing in the communication which we print to-day by Messrs. Loyd A. Jones and C. E. Fawkes should become available. But even with the present wide choice of papers to suit any negative, it sometimes happens that the results are not quite up to the standard quality on which the professional's reputation depends; and should the prints happen to be enlargements, the knowledge of how to correct them by intensification or reduction becomes of intrinsic value. As far as intensification is concerned, the now well-known chromium process leaves little to be desired, for not only is the permanence of the intensified print equal to that of a pure silver image, but also the colour of the image is usually much improved by the process.

Those who have made a study of the matter do not hesitate to affirm that the majority of present-day printers habitually over-expose, with the result that unless great care is exercised in the timing of development, the prints are degraded by being developed too long. It should further be remembered that even an acid fixing bath does not instantly stop the developing action of amidol, so, from one cause or the other, it frequently happens that treatment with an appropriate reducing solution would noticeably improve matters. Hitherto, the problem has been to find the appropriate reducer, for until definite measurements of the alterations effected by the various available reducing solutions had been made, only the usual confusion of ideas and terms could be expected to exist. Taking advantage of the possession of apparatus of proved accuracy, Messrs. Jones and Fawkes have investigated the action of all the well-known reducers on typical hard, soft and normal development papers. Their results indicate that it is possible not only to undo the effects of over-development, but also to compensate for errors arising from the use of an unsuitable printing paper. They have demonstrated, for example, that certain reducers in the early stages of their action produce no change of contrast in the tones of the print and that continued action of the solution effects a diminution of contrast which tallies exactly with that exhibited at various stages of the original development of the print. Again, it is evident from the curves which form a valuable portion of the communication that reducers like iodine-cyanide and the Howard-Farmer actually increase the contrasts of the print, a fact which has long been known in a general sort of way by most practical workers who by the use of one or the other of these solutions for clearing "sketch" portraits effectively emphasise the outlines of the subject by cutting out the lighter half-tones. Apart from the slight staining of the gelatine by the Farmer reducer, it appears that there is little to choose between this and the highly-poisonous iodine-cyanide solution. Indeed, if the respective solutions be made up in the rough and ready way usually adopted by busy photographers, the Farmer solution is to be preferred on account of the well-known softening of the gelatine induced by potassium cyanide solution.

Perhaps the most interesting information contained in the communication is that which deals with the "proportionate" reducer, a solution containing both ammonium persulphate and potassium permanganate. It will no doubt be recollected that this mixed solution was investigated for negative reduction at the suggestion of a correspondent of this journal, Mr. N. C. Deck, and was found to fill a long-felt want. From personal experience we can strongly recommend it; the small quantity of sulphuric acid which is present in the permanganate portion of the mixture renders the action of the persulphate very smooth, and by variation of the proportions of the two solutions almost any type of reduction can be secured at will. It is now found that prints can be treated with this reducer without any staining occurring and that the reduction effected is truly proportional. This information is, of course, of little interest to the printer who has the misfortune to be working in "Quantity Street," but to the assistant who aspires to the possession of his own establishment in "Quality Street," it means much, for a few trials on waste prints will soon indicate whether choice of paper, exposure or development is responsible for the existence of such waste prints. By referring the modified prints to the original negatives an excellent guide for future manipulation in the quest of the best result procurable will be obtained. Although no reference is made in the text to the matter, it should be pointed out that a sulphite stop-bath must not be omitted after reduction with persulphates.

The effect of the addition of chlorides or soluble silver salts to the persulphate reducer is of particular interest, for although it was well known that these substances interfered in some way with the characteristic depth reduction of persulphate solutions, the fact that the presence of 1 per cent. of sodium chloride brings persulphate into the class of proportionate reducers, as is so well shown in figs. 9 and 10 in the communication, is new knowledge which cannot be disregarded by either the practical worker or his scientific confrère who is responsible for the formulation of acceptable theories. At some future date, perhaps, Messrs. Jones and Fawkes will deal with the persulphate-hypo reducer recommended by T. H. Greenall, as it would be interesting to know whether the addition of the hypo, which keeps the silver in solution as it is acted on by the persulphate, has the same effect as an initial addition of a soluble silver salt, or whether it acts in a contrary direction to chlorides, which cause precipitation of the silver immediately it has been dissolved by the persulphate.

A SENSITOMETRIC STUDY OF THE REDUCTION OF GASLIGHT PRINTS.

(A communication from the Research Laboratory of the Eastman Kodak Co.)

The action of photographic reducers upon the silver deposits in photographic plates and films has been studied rather extensively by various workers in the field of photographic research. These investigations have been carried out both from the practical and theoretical points of view. Among the most prominent researches of this nature may be mentioned those by Lüppo-Cramer,[1] A. and L. Lumière and Seyewetz,[2] Stenger and Heller,[3], Deck,[4] Nietz and Huse,[5] and Sheppard.[6] Practically all of this work has dealt with the reduction of density in the case of photographic materials coated on transparent supports, such as plates and films, for not until a satisfactory method for paper sensitometry[7] was available could the usual H. and D. methods be applied to the study of the reduction of density in photographic papers.

Since it is evident that the quality of the photographic print may in some cases be improved by the proper reduction of density, it seemed advisable to investigate the effect of various reducers when used for this purpose. The problem is considered in this paper entirely from the sensitometric standpoint, very little attention being paid to the theory of the action of these reducers on the deposits, and all conclusions relative to the merit of the various reducers tried are based upon the consideration of the sensitometric curves rather than upon actual prints. The sensitometric method for the study of the characteristics of photographic materials has

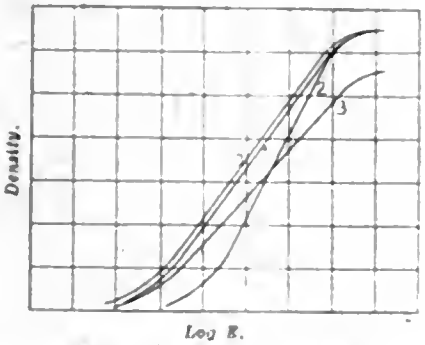

Fig. 1.—Types of print reducer.

been discussed at length in previous papers (footnotes 5, 7 and 8), and to these the reader is referred for the details of such methods.

Excessive density in all parts of the print or in certain limited regions may result either from over-exposure or over-development of the print or because a paper of the proper contrast was not used in making the print. It is doubtful if reduction can completely correct the latter defect, but certainly some improvement may be effected. From a consideration of the shape of the characteristic curves of various papers, it will be seen that in order to improve the quality of the print in some cases reduction of density should be such as to cause a decrease in contrast, while in others the reduction should increase the contrast, while a third possibility may require reduction which will reduce the density in such a way that no change in the contrast is produced. These three general types of reduction may be illustrated by the curves shown in fig. 1. Thus, if we consider the curve 0 as the characteristic of the material considered, then curve 1 will represent the result when this material is subjected to the action of a reducer producing no change in contrast. Such reducers will be referred to as Type 1. Curve 2 represents the result when the same material has been subjected to a reducer which produces an increase in contrast, this increase in contrast being caused by a more vigorous action of the solution upon the low densities than on the high.

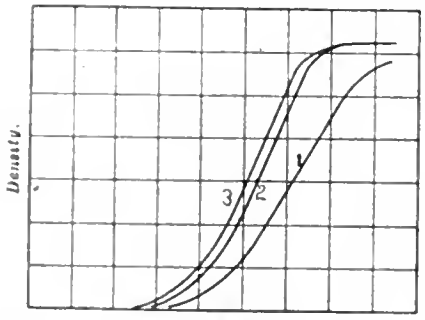

Fig. 2.—Characteristic curves of development paper.

Reducers of this kind will be referred to as Type 2. Curve 3 represents a case of the decrease in contrast, and results from the proportional reduction of all densities regardless of their magnitude; that is, each density is reduced to the same percentage of its original value. Reducers having this action will be referred to as Type 3. No distinct line of demarcation can be drawn between these various types, since some reducers have characteristics intermediate between those represented by the typical curves in fig. 1.

In fig. 2 are shown the characteristic curves of Iris Artura paper. Curves, 1, 2, and 3 represent the change in density with increasing times of development. From the shape of these curves it is possible to draw conclusions as to the action of the reducer which can be used successfully to correct over-development in the case of this material. It will be noted for the longer times of development that for the correction of over-development a reducer of Type 1 will be necessary, while if it be desired to obtain results comparable with those resulting from under-development in such a print a reducer of Type 3 will be required. In fig. 3 are shown the characteristic curves of Velox, the different curves representing increasing times of development. It will be noted in this case

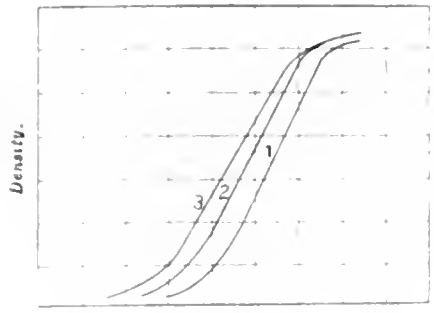

Fig. 3.—Characteristic curves of Velox paper.

that for the correction of over-development a reducer of Type 1 is necessary.

Ten reducer formulæ were chosen principally from the "British Journal Almanac," and prepared full strength. The list included permanganate, bichromate, Eder's and iodine-cyanide, whose action upon negatives is of Type 1, corresponding to the curve shift 0 to 1 (fig. 1). Farmer's

1. "Colloid Chem. and Phot."
2. "Bull. Soc. Fr. Phot.", 1901.
3. "Zeit. für wiss. Phot.", 1913.
4. "Australian Phot. Rev.", 1916
5. "B.J.", Oct. 27, 1916.
6. "Phot. Jour. of Amer. 58," 1918.
7. "Jones, Nutting and Mees, Phot. Journ.," Dec., 1918.
8. J. Frank Inst., March, 1918, p. 329

and Belitski's reducers were selected as being typical of Type 2, while sodium hypochlorite, ammonium persulphate and the Nietz-Huse proportional reducer were taken as representative of Type 3. As typical examples of the developing-out papers, the following were chosen:—

Paper.	Grade.	Relative speed.
Azo	E-Hard X	Medium Fast.
Velox	Regular Velvet	Very Fast
Artura	Iris B	Slow

These papers were exposed in the non-intermittent sensitometer in the usual way, and strips consisting of twenty-six steps increasing in exposure by consecutive powers of the cube root of two were obtained. These exposed strips were then developed in the recommended solutions so as to obtain normally and over-developed results.

A number of preliminary tests were made with each reducing solution to find the dilution necessary to obtain uniform and controllable action. From these preliminary tests the most satisfactory concentration for use in the subsequent study of reduction was determined. These dilutions and the formulæ are given later in this report. All reduction was carried out at a temperature of 20 deg. C. Careful observations were made relative to the colour of the deposit resulting from the action of the reducing solutions for various lengths of time, and also upon the staining of the image and gelatine by the reducers and their reaction products. Some staining was observed, but in those reducers which were found to be otherwise satisfactory it was possible to remove these stains by returning the print after reduction to the ordinary acid fixing bath for a short time, this, of course, being followed by washing and drying in the usual way. After being reduced, the reflecting power of the various areas of the sensitometric strips were read on the reflectometer and the characteristic curves plotted in the usual way. These curves were then compared with one plotted from the results obtained from the non-reduced strip. By a comparison of the curves thus obtained information is secured from which it is possible to predict the action of the various reducers upon prints.

Reducers of Type 1.

1. *Potassium Permanganate.*—This reducer converts the silver of the deposit into silver sulphate, which is soluble in the solution. The reduction is rapid, and no stain is produced either in the silver deposits themselves or in the gelatine. With prolonged action it gives a slightly grainier appearance to the areas of low density. In fig. 4 is shown a

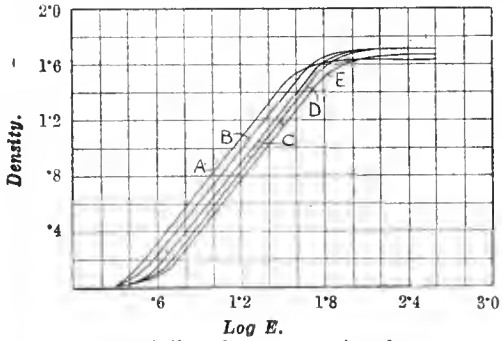

Fig. 4.—Action of permanganate reducer.

series of curves obtained with this reducer on Artura paper. It will be noted that the straight-line portions are almost exactly parallel to each other. Curve A was plotted from the unreduced strip, while B, C, D, and E were obtained by subjecting identical strips to the action of the solution for 45, 60, 90 and 120 seconds respectively. It will be noted that the maximum black on the reduced strips is apparently higher than that of the unreduced. This is because the densities plotted are measured relative to the fog density of the paper. The action of the reducer cuts away this fog density and tends to give slightly higher maximum density when measured against the unexposed regions of the paper. The action of this reducer on Velox and Azo is the same as that on Artura (as shown in fig. 4), with the exception that in the case of Velox there is slightly more reduction of the high-light regions. This reducer, as shown by the curve in fig. 4, is an almost ideal corrective for cases of over-development.

2. *Belitski's Reducer.*—The image is converted by the ferric oxalate and soluble chloride solution to silver chloride, which

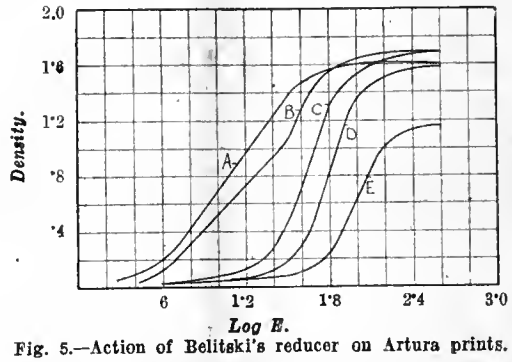

Fig. 5.—Action of Belitski's reducer on Artura prints.

is then dissolved by the hypo in the reducer. The action is very rapid at the concentration recommended, and, although stainless and uniform in action, it seems to give a slightly brownish coloured deposit when the reduction is carried to any length. In the case of slight reduction this tendency to give brownish deposits seems to be entirely absent. On Artura it acts as it does on negatives, giving a transforma-

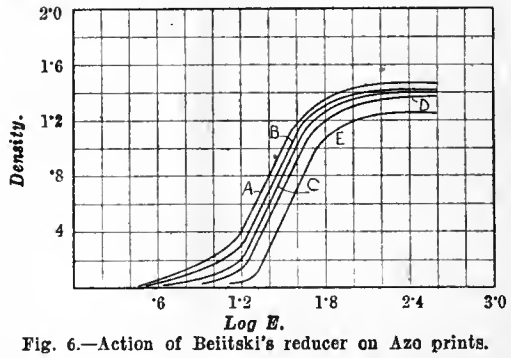

Fig. 6.—Action of Belitski's reducer on Azo prints.

tion of Type 2; that, is reducing the lower densities more rapidly than the higher ones and therefore giving an increase in contrast. Upon Velox and Azo its action is of Type 1; the straight-line portion of the curve remaining parallel to that of the unreduced strip. In fig. 5 is shown a set of curves obtained from sensitometric strips made on Artura and treated with this reducer, the times of action being 45, 60, 90, and 120 seconds respectively for curves B, C, D, and E. In fig. 6 are given the curves, showing the action of this reducer on Azo. These curves are almost identical with those obtained on Velox. It should be noted that, while the straight-line portion of the reduction curves are practically parallel to that of the unreduced, the high-light densities are attacked more vigorously than those of the half-tone and shadows, thus producing a cutting away of the toe of the curve in the case of the reduced strips.

3. *Iodine-Cyanide.*—This reducer, applied on prints, falls in Type 2. Further reference is made in that classification.

4. *Eder's.*—This reducer was found to be unsatisfactory, owing to the unevenness with which action occurred.

5. *Bichromate.*—This also was found unsatisfactory owing to excessive staining of the gelatine.

Reducers of Type 2.

1. *Iodine-Cyanide.*—The free iodine in the solution converts the silver of the image into silver iodide, which is soluble in the potassium cyanide of the solution. This reducer acts rapidly, uniformly, and is clean and stainless. No mottling effect is noticeable even in the lowest density.

It is, however, extremely poisonous, and therefore it is undesirable to recommend it for general use. In fig. 7 is shown a series of curves plotted from strips made on Artura Iris and reduced in this solution. Curve A is that of the unreduced strip, while B, C, D, and E received treatments of 30, 45, 75, and 120 seconds. It will be noted that the upper portion of the curves are changed very slightly, while the high-light and lower half-tone densities are cut away, producing an increase in contrast. The action on Velox and Azo is identical with that on Artura. During the reduction the paper stock of the print appears a brilliant blue, due

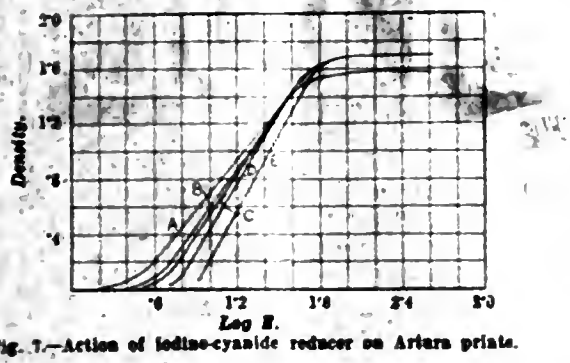

Fig. 7.—Action of iodine-cyanide reducer on Artura prints.

to the presence of starch iodide, which can be completely removed by soaking in an acid hypo solution after the reduction is completed.

2. *Farmer's Reducer.*—The silver is converted by the potassium ferricyanide into silver ferrocyanide, which is soluble in the hypo of the solution. A slight staining of the gelatine was noticed in some cases, but in other respects the action is identical with that of the iodine-cyanide. The curves shown in fig. 7 are typical of Farmer's reducer on all kinds of paper.

Reducers of Type C.

1. *Nietz and Huse Proportional Reducer.*—The reduction in this case is due to a combination of the actions of ammonium persulphate and potassium permanganate. Each reducing agent retains its chemical identity. The permanganate attacks the lower densities while the persulphate is acting upon the higher densities. Used on prints the action is very rapid, uniform, and stainless. Its concentration can be adjusted to any particular paper reduction problem with great ease. In fig. 8a are given curves plotted from

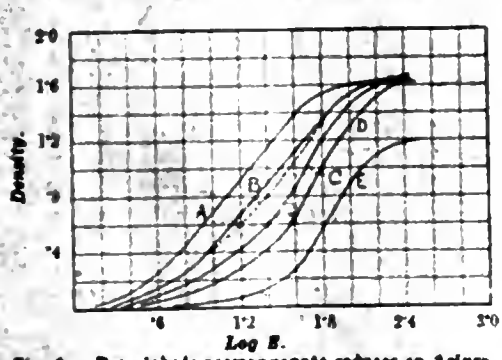

Fig. 8a.—Persulphate-permanganate reducer on Artura

strips made on Artura Iris treated with this reducer. In fig. 8b are shown the results on Velox, and in fig. 8c those obtained upon Azo.

2. *Ammonium Persulphate.*—Various attempts have been made to explain the peculiar action of this reducer. Lüppo-Cramer has advanced a protective colloid theory based on the idea that the chemical composition of the photographic image is dependent upon the exposure. The images having higher density are therefore in some way different from those of lower density, and this difference is of such a nature that the ammonium persulphate reducer attacks densities above a certain critical value very vigorously, while the action of lower densities is almost inappreciable. A catalytic theory of the action has been proposed by E. Stenger, which assumes a selective action on the higher densities due to the presence there of an excess of silver ions. In fig. 9 are

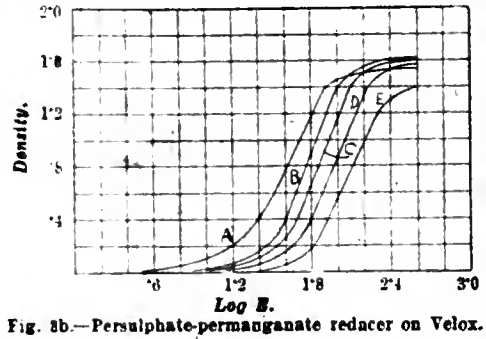

Fig. 8b.—Persulphate-permanganate reducer on Velox.

shown curves illustrating the action of this reducer on the Velox strips. It will be noted that above a certain critical density designated by the point P the action is very vigorous, while for densities lower than that no measurable action occurs. Strips reduced in this solution, therefore, have very peculiar density characteristics. For instance, a strip treated four minutes exhibits a density maximum in the half-tone regions, the shadows being cut away so that they are

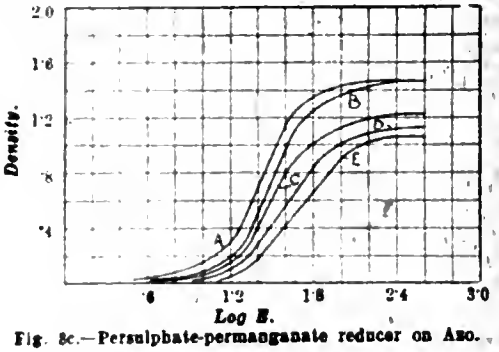

Fig. 8c.—Persulphate-permanganate reducer on Azo.

actually lower in density. It is evident that this reducer is unsatisfactory for most purposes, although it is possible that it may be utilised to advantage in some special cases where it is desirable to reduce the shadow densities without affecting high-light and half-tone regions. By the addition of a soluble chloride or of silver ions (silver nitrate) to the reducing solution the character of the action is changed radically, and the reduction becomes strictly proportional. In fig. 10

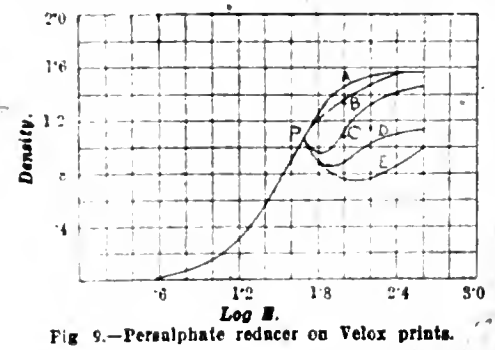

Fig 9.—Persulphate reducer on Velox prints.

are shown the curves obtained from strips made on Velox reduced in an ammonium persulphate solution containing 1.0 per cent. sodium chloride. Curves B, C, D, and E were obtained from strips which had received 2, 3, 5, and 7 minutes' treatment. It will be noted that the reduction is very nearly proportional, the action is uniform, and no

staining of the deposit or gelatine is perceptible. It should be pointed out that the results shown in fig. 9 were obtained by the persulphate reducer when made up with distilled

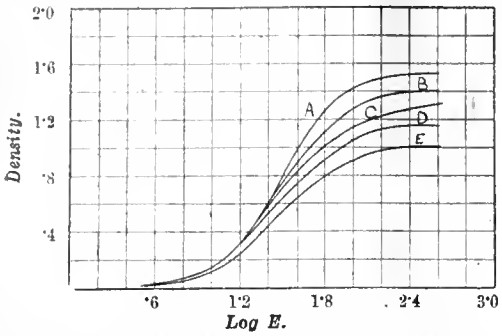

Fig. 10.—Persulphate-chloride reducer on Velox.

water, the only difference in the solution used for obtaining results in fig. 10 being the addition of 1 per cent. of sodium chloride.

Summary.

1. Several reducers commonly used for the reduction of negatives have been studied and modified in such a way as to be applicable to the reduction of prints made on gaslight papers.

2. A classification has been made on the basis of the character of the modification in the characteristic curve obtained with the several reducers.

3. Observations have been made relative to the staining of the deposit and of the gelatine resulting from the action of the reducer and its reaction products, and a means of removing the stain in most cases has been found.

4. The character of the action of a given reducer on negatives cannot in all cases be taken as indicative of what its action on prints will be.

5. Reducing solutions made up according to the formulæ appended to this report have been found to give satisfactory action on printing-out papers, the particular one to be chosen in any case depending upon the modification which it is desired to make in the print.

Formulæ are as follows:—

Permanganate Reducer.

Potassium permanganate	0.5 gm.
Sulphuric acid, 10 per cent.	25 c.cs.
Water	500 c.cs.

Dilution for use, 1 part of solution in 13 parts of water.

Belitski's Reducer.

Ferric chloride, cryst.	6.5 gms.
Potassium (or sodium) oxalate	12.5 gms.
Sodium sulphite	8 gms.
Water	200 c.cs.

When ready to use, add to the above 3 gms. of oxalic acid crystals and agitate the solution until it turns green. Pour the supernatant liquid off the crystals and add to this clear solution 50 gms. of sodium thiosulphate (hypo). Dilute this solution 3 parts in 11 parts of water for working on prints.

Iodine Cyanide Reducer.

Iodine (10 per cent. solution in potassium iodide)	25 c.cs.
Potassium cyanide, 10 per cent. solution	4 c.cs.
Water	400 c.cs.

For paper reduction, take solution 1 part, water 10 parts.

Farmer's Reducer.

Sodium thiosulphate (hypo), 20 per cent. solution	150 c.cs.
Potassium ferricyanide, 10 per cent. solution	50 c.cs.

Dilution for print reduction, 1 part in 3 parts water.

Nietz' Proportional Reducer.

A.	Potassium permanganate	0.125 gm.
	Sulphuric acid, 10 per cent.	7.5 c.cs.
	Water	500 c.cs.
B.	Ammonium persulphate	12.5 gms.
	Water	500 c.cs.

For print reduction, take 1 part A, 1 part B, and 4 parts of water.

Ammonium Persulphate Reducer.

Ammonium persulphate	40 gms.
Water	500 c.cs.
Sulphuric acid	0.53 c.c.
Sodium chloride	0.4 gm.

Dilution for print reduction, 1 part in 2 parts of water.

LOYD A. JONES.
C. E. FAWKES.

AN OBSCURE CAUSE OF STAINING.

Is it possible for germs in tap water to bring about a discolouration in photographic gelatine, the action being dependent upon the presence of a certain chemical?

From recent investigations of a peculiar staining problem I am inclined to believe that it is not only a possibility but a probable cause of quite a lot of staining in prints and negatives. Some little time ago I was badly worried by spasmodic appearances of yellow stain in bromide and gaslight prints. At first I suspected the paper, but found that three different brands of gaslight and four of bromide were all liable. The stain was even and apparently permanent, a great variety of chemicals being used in an endeavour to bleach it, but without result. Exposure to strong daylight had no effect; in fact, the stain seemed to gain depth with age. Suspecting the developer, a brand of amidol, the brand was changed, but without definite results. It was, however, noticed that when a certain brand was used in conjunction with a fixing bath containing acetic acid the staining was worse than ever. A change to metol-hydroquinone was followed for a time by absence of the trouble, but as the weather at the time was very changeable and the normal temperature different every day, the M.Q. was not as good for general work as amidol. Things were improved by the adoption of a heating box made from a tin biscuit box containing a 16 c.p. carbon filament lamp. By using this as a stand for the developing dish, the developer could be kept in the neighbourhood of any desired temperature. But the stains reappeared.

It had previously been suggested to me by Mr. Cullen, of Kodak, Ltd., that the trouble might be purely between the tap water and the gelatine, and on examining this possibility I discovered that the stain was controlled by the length of time the prints were wet. By rushing matters and shortening the period of wetness to the minimum, the stain was avoidable. But with large quantities of work it is often necessary, or at least convenient, to leave batches in overnight, and it is always necessary to wash large batches thoroughly. This was where the staining agency got to work. I eventually suspected germs to be the fundamental cause, and to test the theory I divided a pint of water between three dishes and doctored two of them with antiseptics, putting a trace of potass. permanganate in one and a few drops of mercuric chloride solution in the other. The third was untouched. A vignetted print was taken from the fixing bath and torn into three pieces, which, after a short wash, were put into the dishes, one in each, and left for twenty-four hours. The strips in the doctored dishes were still pure in the whites after this immersion, but the third one showed

signs of discolouration. A second test came out the same way, but as might be expected, no violent staining properties were in the water at the time they were desired, and so the tests were not as decisive as they might have been had the undoctored water stained more pronouncedly. However, it was decided to treat all water in which prints were left standing with a few drops of permanganate solution, and since then the trouble has not been in evidence.

I have since heard from Messrs. Kodak that the production of this particular stain is only possible when alum is in use, and, as a matter of fact, all the staining I had experienced was with prints that had been through hardening-fixing baths. I have since left prints overnight in untreated water without any sign of the trouble, the same prints being unhardened.

It appears, therefore, that organic matter in the water that is used for photography is capable of staining gelatine if allowed sufficient time to act, and that such action is dependent upon the gelatine having been previously treated with alum.

During the time that I experienced the staining I did not find negatives affected, but experience in past times leads me to believe that the same thing is possible with the gelatine coating on plates, though an observation of mine would suggest that plates are not so liable to it. The observation referred to is that the stain starts on the underside of the gelatine film, sometimes being quite distinct by transmitted light before appearing on the surface. With plates, the under side of the emulsion is, of course, more difficult to get at.

THERMIT.

PARIS NOTES.

Photographic Instruction in France.

FRANCE is one of the few countries which is without means for systematic instruction in photography or laboratories for research in photographic processes, if we except the small number of the latter supported by manufacturers of photographic materials or by cinematograph firms. Colonel Laussedat, the founder of photogrammetry, when director of the Conservatoire National des Arts et Metiers, attempted on several occasions to provide education in photography in this institution; and in order to convince the authorities of the importance of this undertaking he organised in 1891-1892, and again about 1905, a series of lessons, at each of which the attendance was greater than a large lecture hall could accommodate. His aim seemed to have been accomplished. Government grants were made in aid of his scheme, but at the last moment an outcry for economy caused their withdrawal.

It is true there are some courses of elementary instruction undertaken in various institutions for popular education or in some photographic societies, but they are almost exclusively for beginners in amateur photography. The Municipal School for the Book Industry (Ecole Estienne) in Paris provides a course of instruction in photo-mechanical processes for students of from 13 to 16 years of age, but its teaching is limited to the rudiments of the subject, and the small staff has neither time nor material resources for research in the improvement of the traditional empirical methods.

During the war some efforts were made, notably in Paris and Lyons, for the photographic training of wounded soldiers unable to follow their own occupations, but these attempts at professional instruction have been discontinued.

For a long time past the Chambres Syndicales (trade or professional associations) connected with photography have considered the establishment of a school of professional photography, the need of which becomes more and more felt, but their resources are unequal to the enterprise, and they have to deplore the complete indifference of public authorities or unacceptable offers of inadequate collaboration. The French official mind regards professional instruction only as free instruction, and makes any offer of assistance subject to this condition. Therefore, it seems that a French school of photography is likely to remain a chimerical project for a long time to come, unless it can be established under the stimulus of some active photographic personality, and, without relying on platonic expressions of support from public authorities, can be founded and maintained on a commercial basis. I am convinced that an attempt of this kind would soon become a success.

Slide Changing from the Platform.

The French Physical Society during the first few days of last month resumed its customary annual exhibition of new appliances and methods appertaining to scientific research, instruction in physics and to industrial application. These exhibitions, which formerly were one of the most welcome activities of the Society, were discontinued during the war. Last month a new application of photography was represented by the method of photo-stereo-synthesis, devised by M. Lumière, and already described in the "B.J." of February 25 last, p. 110. The specimens were somewhat different from those previously shown. The portraits, in natural size, are now formed by seven component images, the respective distances of which increase in geometrical progression, thus giving in greater detail the most important parts of the face. Some very interesting examples of X-ray work on Eastman duplitized film by Mr. N. E. Luboshey were exhibited personally by the author, who communicated many practical details of his method of working. The microphotometer, designed by Professors Fabry and Buisson, for the measurement of photographic densities of such small areas of negatives as those of the spectra of rare elements, was shown by its constructor, M. A. Jobin. M. G. Massiot, a maker of scientific instruments, well known for his projection apparatus, showed an automatic projection lantern for use in class instruction. The slides are arranged beforehand in a magazine in the order in which they are to be shown, and are brought in turn into the projection stage by means of an electrical mechanism operated by the teacher or lecturer.

Cinematography in Colours.

A new attempt to apply one of the oldest processes of cinematography in three colours has recently been made by M. Herault. The images are registered successively on the same film by means of one lens, in the beam from which a disc containing the three filters is rotated, as in the ordinary cinematograph apparatus. The positive film is shown by an ordinary projector provided also with a rotating filter disc, the colours being combined by the successive impulses upon the spectator's eyes. Although M. Herault takes and projects his views at the rate of about 30 per second, and although in the picture play which was shown the actors had almost entirely avoided all relatively rapid movement, there was a most unpleasing fringe of green and red around the outlines of moving objects. On the other hand, for still subjects, or for portraits taken close up, the colour rendering was very satisfactory; nevertheless, the successive projection of contrasting colours produces a species of colour flicker which is somewhat fatiguing to the eyes.

The process is certainly far inferior to the Gaumont three-colour cinematography shown in the Hippodrome in Paris. In this process the three colour-sensation images are made simultaneously on a single film by means of three lenses, each provided with its appropriate filter. The three positives are then

projected simultaneously in register by means of a three-lens projector, each objective of which is provided with its appropriate colour filter. Effects of parallax are, of course, inherent in this process, in the case of subjects containing widely separated planes, but by avoiding such subjects and by ensuring exact register of the chief part of the subject, the parallax errors pass unnoticed. Some years ago M. P. Ulysse demonstrated a somewhat similar process in London; in spite of some defects of detail, which might readily be overcome, it was greatly superior to the process first mentioned in this paragraph.

Experiments on Desensitisers.

MM. A. and L. Lumière and A. Seyewetz have carried out an extensive study of the desensitisation of photographic plates for the purpose of discovering the other types of dyes and descriptions of both organic and mineral compounds which possess properties similar to those of the safranines. After having found that almost all the red or violet safranines give results similar to those obtained with pheno-safranine—that is to say, a reduction of sensitiveness in the blue region of the spectrum to about 1-800th, and complete desensitisation in other regions—they have found that aurantia is also a valuable desensitiser. It is less active than the safranines for orthochromatic or panchromatic plates, but of ample effect for even the most rapid ordinary plates and more easily washed out of the film than safranine. Among other dyes and colourless organic compounds of small practical interest they have found that neutral chromates, e.g., neutral potassium chromate, have desensitising properties—not, it is true, of a high order, since the sensitiveness throughout the spectrum is reduced to about 1-40th—but sufficient for use with bromide papers, and sufficient also for Autochrome plates when the object is simply to permit a brighter dark-room illumination and not to carry out development by transmitted light. Immersion of the paper or film for about a minute in a solution of neutral chromate suffices for desensitisation, and there is no staining of the paper or gelatine.

Stereoscopic Projection.

At the meeting of the French Photographic Society, held on April 22 last, a very interesting experiment in stereoscopic projection was made by M. Maurice Miet. He used a positive transparency made from the ordinary stereoscopic negative without the usual transposition. The image to be viewed by the left eye was projected on the right of the screen, and that to be viewed by the right eye, to the left. Stereoscopic viewing was obtained by crossing the directions of the ocular axes, namely, by looking at an object held for an instant at a short distance from the eyes. The new feature, in this experiment of M. Miet's, consisted in using as this object a card in which a square aperture was cut. A card of about half-plate size, with a square hole about 2 by 2 inches, serves well when held in front of the eyes at about 1-20th of the distance of the eyes from the projection screen. Whilst this mask cuts off the two side images, which, in this mode of viewing usually enclose the central stereoscopic image formed by the superimposition of the two component images, it considerably reduces the strain of observation, and avoids the sudden separation of the superimposed images which readily takes place when this simple accessory is not used. The effect of relief produced in this way is positively striking, but is seen only by persons who have acquired the ability to see stereoscopically without a stereoscope. Moreover, it imposes a strain on the muscles of the eyes, as does the use of an improperly adjusted stereoscope. The members of the audience who, in these circumstances, saw the stereoscopic effect, were asked to raise their hands and were found to be in a minority. But there is no need to resort to projection in order to ascertain the absence of the power of seeing stereoscopically of the many people who prefer to close one eye when asked to look into a stereoscope. The process is so simple that it can easily be experimented with, and I think that its repetition would interest many photographic societies so long as the exercise is limited to not more than a dozen views on the screen, so that there may be no excessive strain of the eyes.

Film Negative Cards.

The continued high cost of glass is necessarily keeping the price of plates at a level which renders their use prohibitive for amateurs of moderate means. And, as in France, the great majority of amateur cameras are for the use of plates, much ingenuity is being devoted to finding a cheaper substitute. The latest new comer in this field is the Folio-Brom, placed on the market by the firm of Guilleminot. It consists of a card of about the thickness ordinarily used for sensitive postcards on which is a film of aceto-cellulose bearing a rapid orthochromatic emulsion of about 400 H. and D. In using these cards in dark-slides, a backing card of about 1/16 in. thickness serves to keep them in place and in register. After development, fixing, washing and drying, a strip is cut off round the card to the width of about 1-16th of an inch, using a pair of scissors or a sharp knife, and the film negative can then be stripped off.

Instruction by Cinematograph.

For several years past efforts have been made in France to utilise the cinematograph in teaching of various kinds, from elementary instruction to the technical and science courses in the Universities, where already the cinematograph is employed as an instrument of record and research. That these efforts are gaining ground is shown by the facts that the Paris municipality has just voted funds for the purchase of projectors and films, and that the Ministry of Public Instruction has added to the numerous sets of lantern-slides, which it circulates, a number of films for exhibition in the public schools. The free circulation of these collections by the postal service is a great boon to provincial schools, whilst many municipal authorities are beginning to acquire projection equipment.

Among the most recent attempts to apply the cinematograph to teaching must be mentioned the use which is being made of it by M. A. Bruneau, professor in the School of Decorative Arts in Paris. M. Bruneau makes his students draw their designs immediately after the exhibition of suitably-chosen films, which are shown at a slow speed so as to permit of analysis of the movements and postures in walking, dancing, sports and industrial occupations. The students are thus caused to select from their observation of the film the phases of movement which lend themselves to use in decorative compositions.

A Rapid Cinematograph Film Printer.

A cinematograph engineer, M. L. Lobel, who is well known in France, has recently completed the construction of an automatic film-printing equipment, the plans of which had been interrupted by the war. The machine consists, on the one hand, of a high-speed Prestotype printer without any intermittent movement, the negative film and sensitive positive band moving together horizontally at a uniform rate, which, without allowing for any masking, is from 1,500 to 3,000 images per minute. The printer is used in conjunction with a device which automatically varies the strength of the light according to the change of density in the negative band. This is done by providing notches in suitable positions on the edge of the negative film. The coming into position of a notch makes an electric contact which operates the light-varying device. The different strengths of light are produced by throwing an appropriate number of resistances into the lamp circuit, and these successive strengths of light are determined in advance by means of contact pins, which are fixed to a grating having eight vertical bars corresponding with resistances and forty horizontal bars corresponding with successive sections of the film negative. Errors are avoided in the positioning of these contacts by use of a perforated card which is laid upon the distribution table. This card is perforated to correspond with the densities of the various sections of the negative, and thus has only to be used, as a kind of stencil, in order to assure the necessary automatic variation of the light during printing.

A New Three-Colour Camera.

A new camera for the taking of the three-colour sensation negatives in rapid succession with one lens has just been constructed by M. H. Liabeuf, who has had a long experience in the making of cinematograph cameras, and during the war as a member of the Aerial Photographic Service invented an ingenious inclinometer for aerial cameras.

The three plates of 13 by 18 cm. size occupy the three faces of a prism of equilateral triangular section, the three screens being mounted on a disc, by which each is brought in turn in front of the lens. The special features of the camera are, first, the Maltese-cross mechanism, by which the plates and the screens are rapidly moved. In a portrait studio, under ordinary daylight (April), the three negatives have been made in two seconds on commercial panchromatic plates. The other feature is the daylight loading of the camera; the exposed plates can be removed and replaced by fresh without recourse to a dark-room.

L. P. Clerc.

DEATH OF MR. FRIESE-GREENE.

The daily newspapers have already given wide publicity to the sudden death, on Thursday in last week, May 5, of Mr. W. Friese-Greene, well known within the circles of photography, if not by the general public, as the inventor and maker of the first practical

The Late W. Friese-Greene.

cinematograph camera. Mr. Friese-Greene was present at a meeting of a film-exhibiting trade association, at which Lord Beaverbrook occupied the chair. He had risen to make a short speech, was taken suddenly ill, and expired within five minutes. He was in his 66th year.

There is no question that Friese-Greene was the pioneer in the creation of cinematography. The work of Muybridge, Marey, and others, which immediately preceded his invention, had for its object the recording of phases of movement. Various complicated cameras, usually fitted with a whole series of lenses, were designed for that purpose. The conception of means for the reproduction of movement, as perceived by the eye, was perhaps not original with Friese-Greene, but he certainly was the first man to make a camera which achieved this object. His patent specification, filed on June 21, 1889, in conjunction with an engineer named Evans, described the first practical instrument for taking photographs on an intermittently-moved flexible sensitive material. This camera was shown at the Bath Photographic Society early in 1890, and was exhibited by Mr. Friese-Greene at the Chester meeting of the Photographic Convention in July of the same year. It there attracted very little attention, for the contemporary reports described it simply as a camera for taking a series of photographs in rapid succession. Apparently the projector by which positives from the band negative were to be shown on the screen, and which Friese-Greene had already constructed during the early part of 1890, could not be used, on account of some derangement suffered in course of conveyance to Chester. The reproduction of the movement recorded by the camera, could it have been shown, would no doubt have demonstrated to members of the Convention the importance of the discovery. But already there were other inventors at work on the same problem, Edison in America, who was the practical introducer of perforated film; in France MM. Lumière, the inventors of the first efficient projecting machine, and Birt Acres, who was close on the heels of the French experimenters. A few years later it only remained for an imaginative Frenchman, M. Pathé, to conceive the idea of arranging for the acting of stories to be transferred to the cinematograph film. The technical work of Friese-Greene and those who followed him had then been done with sufficient completeness to allow of the cinematograph entering upon the enormous industrial development in the field of popular entertainment which the past few years have witnessed.

In a world of ideal justice, Friese-Greene should have made a handsome fortune; instead of which he died in poverty. Although we knew him well, and occasionally visited his workshops first at Chelsea and afterwards at Brighton, we knew little of the work which occupied him except that it seemed always to be connected with some fresh invention. Although he was an ingenious mechanician he had, so we judge, the very slightest acquaintance with the scientific elements of chemistry and physics. He impressed one as a child at play in a wonderful garden, made happy by discovering something fresh and incurably optimistic that some day and somehow or other fortune would fall into his lap. When it continuously failed to fall, a strain of oriental fatalism in his character preserved his cheerfulness; he forgot the disappointment and looked again to the future.

Apart from cinematography pure and simple his name is associated with early work in the production of stereoscopic cinematograph effects on the screen by means of viewing instruments fitted with filters of complementary colours. He was constantly engaged on experimental work in colour photography and colour cinematography, but as he scarcely ever wrote anything on the subject his labours can only be judged by the details published in patent specifications. One invention of his, which we believe was one of the most unfortunate from the financial standpoint, was that of inkless printing. It was proposed to impregnate printing paper with certain salts, which were decomposed by contact with metal type forming part of an electrical circuit. The decomposition products thus formed the impression on, or rather in, the paper. We believe a good deal of money was spent in the fruitless development of this invention, and, if rumour is correct, a certain disregard of company law brought the inventor into difficulties.

Naturally from those who in the cinematograph industry have made large fortunes, a debt of gratitude is due to Friese-Greene, and it is satisfactory to find that the cinematograph trade are interesting themselves in the circumstances of the dependents which he left behind. Posthumous honour has been more rapid than it is in most cases of this kind, but the tragic circumstances of his death have focussed attention upon the pioneer work of thirty years ago which, until a few days since, had almost been forgotten.

The Carbro Process.—An improved form of the Carbro process for the making of carbon prints from bromide prints or enlargements is described in a leaflet just published by the Autotype Company, 74, New Oxford Street, London, W.C.1. The working formulæ given in this leaflet are due to an amateur experimenter, Mr. F. Garon, and provide the improved facilities that the time of immersion in the bleaching or pigmenting both is now the same for all the Autotype tissues, with the exception of red chalk, namely, three minutes. Also, the quality of the resulting print is very much under control by simply varying the time of immersion in the second bath, which contains acetic acid, hydrochloric acid, and formaldehyde. A copy of the leaflet will be sent free on application.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

A Reliable Intensifier.

Although the usual mercuric chloride bleach intensifier, followed by darkening in either ammonia or sodium sulphite, has such a wide popularity among photographers, there are times when (either from the extremely poisonous nature of the mercury bath, or from the fact that negatives intensified in this way cannot be regarded as being anything like permanent) a reliable intensifier, giving absolutely permanent negatives, is required.

The method consists simply in making use of the ordinary ferricyanide-bromide bleach and sodium-sulphide sepia toning bath for intensifying negatives. Provided the negative has been thoroughly fixed and well washed, and the sulphide bath *freshly made up*, it will darken to a rich black image with identically the same degree of intensification as that given by the bichloride of mercury intensifier. It is very important that the sulphide should be obtained from a reliable source, such as Johnson's, of Finsbury (I have no ulterior interest in naming this firm), and also that the solution (normal strength) should be freshly made up. A stale sulphide bath, or impure sulphide, will only produce an image of a weak yellow-brown colour, with very serious loss of quality. In order that the bleaching may not take an unnecessarily long time, it is a good plan to make up the ferricyanide and bromide bleaching bath a little stronger than is required for toning prints. It goes without saying that, provided the negative is bleached right through, thoroughly darkened and properly washed, the results, after intensifying, may be regarded as being absolutely permanent. I claim no originality for this method, but it is not so well known as it might be. I therefore trust that fellow photographers will find it useful in their work.—A. J. Sweeney.

Exhibitions.

PORTRAITS BY WALTER THOMAS.

Mr. Walter Thomas, whose pictorial work has been a familiar feature at photographic exhibitions for as long as we can remember, is exhibiting at 147, New Bond Street (Davis Galleries) during the present month a collection of his sketches in charcoal and pastel and of portraits of legal luminaries. The latter are shown in special reference to Mr. Thomas's adoption, after a long life spent in legal circles, of professional portraiture, and particularly of at-home portraiture. In introducing himself to the public there is therefore a special fitness in his showing portraits of eminent lawyers, among them one of the Lord Chief Justice (Lord Justice Lawrence) taken a few days ago since his succession to Lord Reading. In landscape work, with pencil or camera, Mr. Thomas's style has always been that of the fresh, vigorous, outdoor school, taking a pleasure in the effects of Nature and, as regards his photographs, prizing the characteristic qualities of photography. That same outlook is exhibited in his portraiture. One finds here no indulgence in tricks and fakes of lighting such as may tickle a jaded palate, but often have the result of spoiling the portrait as a likeness. The lighting is in many cases evidently that of an ordinary room, yet—or should we say "yet"?—Mr. Thomas has obtained astonishingly virile and striking portraits, which owe their quality to the photography and not to retouching. A skilled technician as he is, Mr Thomas exhibits a sure hand in dealing with difficult subjects; for example, the portrait of the Lord Chief Justice shows marvellously fine technique in its monochrome rendering of the red robe and other insignia of office. Other portraits in the collection are those of Mr. Kemp, K.C., Recorder of Hull; Mr. Waugh, K.C., Recorder of Sheffield; Mr. Comptson, K.C., Recorder of Leeds; and Mr. Mitchel-Innes, K.C., Recorder of Middlesbrough. Men are evidently subjects in which Mr. Thomas takes a special pleasure, but the collection includes some charming studies of children, and is lightened by some of Mr. Thomas's pastel and pencil drawings of landscapes. The professional making of at-home photographs is a branch of portraiture which in this country has been largely neglected. Rightly or wrongly, from their point of view professional photographers have preferred to hold aloof from it. Mr. Thomas, however, intends to base his professional work on it, and since his artistic taste and technical skill assure beforehand the making of notable portraits, he has our best wishes in his enterprise.

FORTHCOMING EXHIBITIONS.

April 21 to May 19.—Hammersmith, Hampshire House, Photographic Society. Particulars from the Hon. Secretary, C. E. Altrop, 14, Southwold Mansions, Widley Road, Maida Vale, London, W.9.

April 27 to May 25.—Bury Y.M.C.A. Photographic Society. Particulars from the Hon. Secretary, A. Benson Ray, 8, Agur Street, Bury, Lancs.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, April 11 to 16 :—

Reproduction Process.—No. 10,586. Photographic reproduction. Daylight Film Corporation and E. C. R. Marks.

Apparatus.—No. 10,962. Photographic apparatus. J. Evans.

Preserving Sensitised Surfaces.—No. 10,847. Method of and container for preserving sensitised surfaces. F. P. McColl.

Colour Photography.—No. 10,773. Colour sensitised supports for colour photography, etc., and treatment thereof. M. Martinez.

Camera Stands.—No. 10,612. Folding stands for photographic cameras, etc. Newman and Guardia, Ltd., and T. Peacock.

Distance Photography.—No. 11,018. Means for enabling images of pictures, moving objects, etc., to be visualised and photographed at a distance. W. A. Powell.

Photogrammetry.—No. 10,635. Photogrammetric survey. U. Nistri.

Cinematography.—No. 10,824. Portable cinematograph apparatus. N. E. Barber.

Cinematography.—No. 10,551. Method of winding and using cinematograph films. A. C. Broom.

Cinematography.—No. 11,124. Cinematography, etc. H. E. Coston and Holam, Ltd.

Cinematography.—No. 10,954. Picture films and apparatus for direct observation and projection of the same. C. Lepine.

Cinematography.—No. 10,529. Cinematograph, etc., screens. A. M. McLeod and A. L. Turner.

£1,000 Professional Portrait Competition.—The competition which is being announced by Messrs. Wellington and Ward is something quite fresh in the annals of photographic contests. £1,000 is offered in money prizes for the most beautiful portraits of ladies. And the essentially novel feature is that the sitter will receive a substantial proportion of the prize. Thus, the first prize is of £300 to the photographer, and £200 to the sitter; the second £200 to the photographer, and £100 to the sitter; whilst the third is £150 to the photographer, and £50 to the sitter. The competition is open to all bonâ fide professional photographers carrying on a business in the United Kingdom. All photographs must be printed on Wellington papers, from negatives made on Wellington plates. Messrs. Wellington and Ward have thus had the object of interesting the public through the photographer, and their idea must certainly have the effect of stimulating an interest in professional photographic portraiture. It is specially emphasised that the prizes will be awarded for the beauty of the photographs, and not necessarily for that of the sitters. It is desired to lay stress on the fact that the ordinary sitter will have as good a chance of winning one of the prizes as the member of a beauty chorus. Full particulars of the competition are available on application to Messrs. Wellington and Ward, Elstree, Herts.

New Books.

Le Guide de l'Operateur dans la Photogravure. By Louis Villemaire. Paris: Dunod. 12 francs.

This is a strictly practical manual on photo-engraving in monochrome and colours. M. Villemaire is instructor in the Estienne School in Paris, where instruction in photo-mechanical processes is given to apprentices in the printing trade. Thus, his text is closely in touch, from first to last, with practical manipulation, though not to the exclusion of methods of calculation where these come within his province. For example, he devotes a chapter to the use of the slide rule in making the optical calculations required in copying to scale. For the most part, however, he applies himself to the preparation and handling of the wet collodion plate, printing on metal by the fish-glue and other processes, the use of the screen in the half-tone process and the details of negative making and printing in three-colour block-making. The book is a very complete formulary for the developers, intensifiers, reducers, sensitisers, etc., employed in these processes, and it is evident that throughout, the author is writing of methods with which he is familiar by daily use.

The Electrical Transmission of Photographs. By Marcus J. Martin. London: Sir Isaac Pitman and Sons. 6s. net.

The reproduction of a photograph or drawing from one part to another of an electric circuit, and still more the viewing of a distant object by electrical means, are inventions of the utmost fascination even to the non-technical mind, and every now and again are the subject of articles prophesying the speedy revolution of the present methods of producing illustrated newspapers. Mr. Martin, in this volume, gives a sober and not too technical account of the stages through which these processes have passed, and of the limits within which at the present day they are capable of application in practice. Those limits, determined by different causes, continue to narrow the scope of such processes to a very considerable degree. We have still a long way to go before the telegraphed photograph is a more rapid method than the conveyance of the exposed plate on a motor bicycle. Nevertheless, the subject is of such novelty, and the possibilities which it holds in view include such far-reaching effects, that this straight-forward story of the technical means, chiefly electrical, by which such results are possible, will be read with more than ordinary interest. In a final chapter the author gives sufficiently detailed instructions and drawings for the making of a machine for experimental use in photo-telegraphy.

Air-Brush Technique.—The current issue, No. 181, of the "Photo-Miniature," is a manual on the use of the air-brush, which we are sure will do much to popularise this tool of the professional colourist and "finisher" of photographs among amateur workers, and very likely will tell many an experienced user of the air-brush one or two things which he did not know before. Our little contemporary, as always, is practical, yet contrives to make even the technical exercises of air-brush colouring a species of interesting adventure. A brief historical introduction which it gives reminds us that the air-brush originated in the United States, about 1886. Apparently all the air-brushes which are in successful use are of American design. Our own Aerograph is not an exception, for its inventor, Mr. C. L. Burdick, is an American, who, however, has made his home here for many years, and has established air-brush work in many industrial directions. The manual before us, while not attempting the profuse illustration of that by Mr. Stine, which we noticed a few months ago ("B.J.," November 12, 1920), is a thoroughly practical little work which leads the colourist by easy paths, and moreover shows the usefulness of the air-brush in other photographic operations, for example, in applying sensitising solutions. The "Photo-Miniature" is obtainable in this country from Messrs. Houghtons, price 1s. 8d.; in America, from Messrs. Tennant and Ward, 103, Park Avenue, New York, price 40 cents.

New Apparatus.

Salex Folding Focal Plane Camera. Sold by the City Sale and Exchange, 54, Lime Street, London, E.C.3.

These are distinctive models of folding camera, distinctive in the sense that they are fitted with focal-plane shutters, and thus provide the user of a highly portable instrument with the facility of making very rapid exposures. Two sizes of the camera are at present available, namely, vest-pocket and 3½ × 2½. As the drawing shows, the lens front is held by the customary system of spring struts, and is exceedingly rigid. A direct-vision lens finder comes into operation by raising the plate seen on the camera front. When lowered this plate serves as a protective shield for the lens. The camera is fitted with an *f*/5.5 anastigmat, and in both sizes has a focussing scale. The shutter has a quick wind, and is very easily adjusted for its full range of speeds by altering the width of the slit. This is done first by bringing one edge of the slit against the thousandth second mark on the scale; a stud on the

camera back is then pressed in and the winding knob of the shutter at the same time drawn slightly out, when the slit can be made wider or narrower as required. The shutter can be opened to the full width of the plate for focussing, but is not made for time exposures. For these, a very handy little separate attachment, in the shape of a flap shutter is provided to fit on the lens, and is operated by Antinous release. In the case of the 3½ × 2½ size, the Antinous release of this attachment can also be used for release of the focal plane shutter. The cameras are made for the use of either single metal plate holders or film pack adapter, and at the prices at which the vest pocket instrument is supplied, six single slides, as well as a film pack adapter, are included. This price is £6 17s. 6d. In 3½ × 2½ size the price of the outfit, including six single slides, is £8 17s. 6d., film pack adapter, 15s. extra. The instruments are exceedingly portable, and we have no doubt that amateur workers anxious to extend their field of work beyond the capacity of the speed of between-lens shutter will find them an excellent choice.

Photo Glovlettes.—Messrs. Fallowfield, 146, Charing Cross Road, London, W.C.2, have just introduced an improvement on the ordinary glove in the shape of these so-called "Glovlettes," which are a kind of skeleton glove, that is to say, the parts of the glove which ordinarily cover the palm and back of the hand are cut away. The article thus consists of a set of four rubber fingers

and a thumb, which is held in position on the hand by an elastic round the wrist. The "Glovlette" is much more conveniently put on, and while it affords a full degree of protection to the fingers from contact with photographic solutions, leaves the hands freer and cooler in use. No doubt many who are unable to wear the ordinary rubber glove in consequence of "that stuffy feeling" will find no objection to this new pattern, which certainly can be recommended to anyone susceptible to the action of developing or other solutions. The "Glovlettes" are supplied in two ladies' sizes and three men's sizes, price 5s. per pair.

New Materials.

PORTRAIT MOUNTS.—In sending us the latest list of their mounts and mounting boards, Messrs. Bartons, Cosway Works, Finch Road, Birmingham, give us the opportunity once again of renewing our acquaintance with the many excellent styles of their design and manufacture. We have on many occasions in the past had to write in terms of warm commendation in noticing these productions, for Messrs. Bartons' plainly keep a very high standard before them and are constantly discovering fresh forms in which to embody their ideas of tasteful mounts. The present collection of specimens only serves to confirm us in the good opinions we have previously held. It includes a great variety of most pleasing styles, mounts which owe their æsthetic qualities both to the delicate colours of the mounting papers, their refined figuring, and the skilful reserve with which the minimum amount of embellishment is added. The mounts are chiefly of the folder pattern, in accordance with the prevailing fashion, but a number include a species of combination of the old cut-out mount with the modern folder. Many of them are specially adapted for the use of the double-weight printing papers now much in vogue. We can recommend any portrait photographer who is not acquainted with these manufactures to see for himself the very artistic mountings which Messrs. Bartons' provide.

Commercial & Legal Intelligence.

NEW COMPANIES.

PHOTO-WORK, LTD.—This private company was registered on May 3 with a capital of £1,000 in £1 shares. Objects: To carry on the business of photographers, artists, art dealers, enlargers, gilders, picture-frame makers, etc. The subscribers (each with one share) are: B. H. Richardson, 22, Briggate, Brighouse, solicitor, and W. G. Robertshaw, 22, Briggate, Brighouse. The first directors are not named. Registered office: 22, Briggate, Brighouse.

INTERNATIONAL FIREPROOF CONDENSER AND LENS CO., LTD.—This private company was registered on May 3 with a capital of £1,000 in £1 shares. Objects: To exploit a patent condenser invented by A. Wood, and to carry on the business of patentees, engineers, glass makers, manufacturers of glassware, optical instruments, cinematograph accessories, machines, furniture, etc. The first directors are: J. H. G. Cutts, 126, Kenilworth Court, Putney, S.W., theatrical and entertainment producer; J. A. Ottway, 17, Blakesley Avenue, Ealing, W., optical instrument manufacturer; and A. Wood, "Llanberis," Haslemere Avenue, West Ealing, W. Qualification: One share. Remuneration as fixed by the company. Secretary: W. H. Davies. Registered office: 122 and 123, Moorgate Station Chambers, Moorgate Street, E.C.

HULL PHOTOGRAPHIC SOCIETY.—At the annual meeting Mr. R. Proudlove, M.Sc., B.Sc., was elected president, and Messrs. Anthony Wright, 73, Lairgate, Beverley, and Edgar Mennell, 10a, Spring Street, Hull, joint honorary secretaries.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, MAY 17.

Portsmouth Camera Club. "The Cornish Riviera." J. C. Thompson.

Scottish C.W.S.C.C. (Glasgow). Lecturette—"Flower Studies."

WEDNESDAY, MAY 18.

Bradford Photographic Society. Excursion to Tong Park.

Croydon Camera Club. "Croydon Waters." J. A. Sinclair.

FRIDAY, MAY 20.

R.P.S. Pictorial Group. "The Choice of a Lens." A. C. Banfield.

SATURDAY, MAY 21.

Rotherham Photographic Society. Excursion to York.

Scottish C.W.S.C.C. (Glasgow). Outing to Bothwell Castle.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, May 10, the president, Dr. G. H. Rodman, in the chair.

A note on "The Theory of the Screen in Half-Tone Work," by M. L. P. Clerc, was read, or rather presented in a more popular form, by Mr. Renwick in reference to the presentation by M. Clerc of a model to the Society illustrating his theory. The note was a brief abstract of the method of charting the field of a plate, receiving an image through the cross-line screen of the process camera, in such a way as to indicate the form of the dot elements composing the image. M. Clerc's note, in fact, closely followed his exposition of this subject in his manual, "Les Reproductions Photomecaniques."

A paper by Professor The Svedberg was also read by Mr. Renwick. It dealt with the action on the silver-bromide grains of dry-plates of alpha and beta particles. Professor Svedberg prefaced his notes on this subject by a brief discussion of the possible ultimate causes of the characteristic action of light on gelatine emulsion, which is represented by the form of the H. & D. curve. One such possible cause was diminution of the light by successive layers of grains; another was difference in the size and sensitiveness of grains; a third was the characteristic property of individual grains, and a fourth the behaviour, in this way, of classes of grains, the curve thus representing the sum of the effects on grains affected in different ways. The paper contained a mathematical examination of these various theories and was illustrated by curves of experimental results.

Mr. Renwick usefully added some notes on the relation of size of emulsion grain to sensitiveness, and stated that from the experience of twenty years in the making and examination of emulsions he was convinced that these qualities were not inter-dependent; in other words, that extreme sensitiveness was not incompatible with great fineness of grain.

Then followed Mr. K. C. D. Hickman, who, with much wit and good humour, related the story of a failure in the attempt to work out a new printing process. Briefly, Mr. Hickman was asked to provide a substitute for the well-known papers, such as ferro-prussiate and others, used for the copying of tracings. He had light-heartedly conceived the idea of coating paper with a mixture of methylene blue, ferric salt and other substances, in the aim of causing the formation of a colourless leuco derivative of the dye, by the action of the ferrous salt produced on exposure to light. Such a paper would, therefore, give a copy in blue lines on a white ground when exposed to light behind an ordinary tracing or drawing. But in spite of heroic attempts continued for several months and mercifully terminated by a motor cycle accident which Mr. Hickman sustained, the process had been found quite impracticable, a failure which, as Mr. Raymond E. Crowther pointed out, was due largely to the characteristic properties of the leuco derivatives of the dye.

Votes of thanks to the contributors and readers of the papers brought the meeting to an end.

CROYDON CAMERA CLUB.

Extensively billed, last week Mr. W. L. F. Wastell trod the boards. Famous in conducting an ever-pleasant page in a contemporary, which in delightfully humourous fashion often camouflages real instruction, some of the newer members had never seen the "Walrus" before and expressed their utmost gratification at witnessing him in the flesh. It happens that the "Walrus" has

himself defined the members as "a weird collection of human oddities," which doubtless accounts for this manifestation of eccentricity.

Hunting about almost at the last moment for a subject, of course he must choose one recently demonstrated at Croydon. Such is luck, but he rose superior to fate, and held a highly successful revivalist meeting on "Transferotype." It was ably dealt with about two months ago by Mr. S. H. Wratten after an intensive training of an hour or so by Kodak specialists. The "Walrus" had no such assistance, but brought with him the same old friends in the shape of Kodak specimen prints. On the other hand, he boasted of more experience of the subject, and some ideas which had long been scintillating in his brain burst into brilliant coruscations for the first time. This was really nice of him as, properly padded, they were capable of assuming the form of a remunerative article, but sordid considerations make no appeal to a noble soul which can even and invariably rise superior to "free samples." This almost incredible statement is made on the authority of this unique specimen of humanity, but without his knowledge or consent.

He started with a complete description of the process, repeating with great exactitude what Mr. Wratten had said previously. Mr. Wastell, however, much prefers a ten per cent. solution of formaline instead of alum as a hardening bath, and only a mere rinse is required afterwards. Amidol was strongly recommended as a developer, and if the bromide bottle happened to be within reach a few drops from it were added, but it did not seem to make much difference. With a correctly exposed print, the flagging action of amidol towards the end of development is, he said, very noticeable, and exposure should always be such that the print requires development to this stage, or, practically speaking, to infinity. This period of exposure he defined as "normal."

The utilisation of these stripping films for making lantern-slides was next considered. Mr. Wratten had contented himself by saying that he had been told at Harrow they made excellent slides, but he hardly carried conviction. The "Walrus" splashed an emphatic affirmation. They make first-rate slides, he said, and one suitable for feeble illuminants to a powerful arc can be produced with ease and certainty, multiplying the "normal exposure" by two for thin slides, and up to three-and-a-half times for dense ones. The simplicity and cheapness of the process should appeal to all, especially if they could cadge some of the many duds from makers of the usual sort, and employ them as supports and cover-glasses. In his hands no noticeable granularity occurred, and a very full range of tones and colour was possible.

At a recent meeting of the South Woodford Society, with "experts" present (this word was used in no offensive sense), no one, he said, could detect Transferotype slides among others of regulation type. He then passed round several slides for examination, but this did not do for Croydon, and in a jiffy Mr. Walker had the lantern going and they were put to the test. They stood it right well, and by universal consent were of splendid quality. At a distance of a few feet no granularity could be seen if any existed, though Mr. Harpur, who here apparently utilised the lantern-sheet as an emergency pocket handkerchief, said he detected some.

Mr. Wastell said Transferotypes are also well adapted for reproducing negatives permitting of much modification if necessary. If made by contact, double the normal exposure is right for both positive and reproduced negative. Two reversals being effected, it is the right way round. For the making of combination positives, again nothing can beat the stripping film for ease of working. Taking a familiar example, that of printing in clouds, the landscape portion (with sky, if printable, shaded in the usual way) is first transferred to the glass. Any remnants of sky are then removed with a soft brush charged with ferricyanide reducer, taking care to hold the positive landscape end up. When rinsed and dried the landscape portion is painted over with celluloid varnish, following the outlines carefully, and when the varnish has dried the clouds are transferred. Holding the positive this time sky-end up, any overlapping clouds are removed with the reducer, the celluloid varnish resisting penetration to the landscape. A fine brush enables small objects protruding over the sky to be similarly cleared. A point to remember is to print the clouds on a piece of paper long enough to cover the transparency, so that the edge of the film does not finally traverse the pictures. A great advantage consists in the fact that the exact position of the clouds can be observed through the back of the transparency.

He then passed round a first-rate transparency made in this way, and it may be remarked that if on high magnification a little granularity should result, a slight diffusion of definition, usual in pictorial work and beneficial in most, would probably entirely dissipate any grain. When it is stated that Croydon expressed its emphatic appreciation of this coruscation of the "Walrus," enough has been said.

In the discussion, Mr. Vivian Jobling, with no special reference to the present dreadful trade depression, was of opinion that lantern-plate makers would shortly go out of business. Mr. H. P. C. Harpur then rose, not looking in the best of spirits, and there was some excuse, for he thinks nothing of spending hours in reducing a 15 × 12 negative to abject submission with a No. 0 camel's-hair brush, and is the club's authority on the subject. No essential had been omitted by Mr. Wastell, or statement made open to correction, which, naturally, was rotten. However, the speaker declined to admit that the very, very finest lantern-slides could be made the Transferotype way, adding that in this "all must work out their own glorification," in fluffless blotting-paper, judging from the actual words following. A most hearty vote of thanks for an evening of exceptional interest was accorded the lecturer, who apparently had suffered no ill-effects from a cigar kindly presented him by the president. Others in the immediate vicinity were not so fortunate.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Meeting held on May 2. Present:—Miss Grey, Messrs. Yerbury, Fergusson, Melrose, E. D. Young, Campbell Harper, George Balmain, Swan Watson, Moffat, Norman Thomson, John Thomson, Philip, and Drummond Shiels.

There were also present, as guests of the Society, Mr. and Mrs. Debenham, Mrs. and Miss McKay, Messrs. Charles D. Crooke, Wm. Halkett, Hutchison, and Ross.

Mr. E. D. Young, the President, in the chair.

The Chairman, on behalf of the members, welcomed the guests, and shortly defined the objects of the Society. He stated that one of these was to promote a spirit of brotherhood amongst professional photographers, and endeavour to raise the status of their profession. He invited those guests present to join the Society, and he assured them that it would be for the mutual benefit of their business.

The Chairman conveyed the hearty congratulations of himself and the members to Mr. Swan Watson on his appointment as President of the P.P.A. for the ensuing year.

The Chairman reported that he had been present at the Congress in London, held last month, and found it most stimulating and helpful. The exhibitions and lantern lectures were most interesting, and he had derived great benefit from the discussions at which he had been present, and also from his meeting with the members of the profession in England.

Mr. Swan Watson returned thanks for the Society's congratulations, and stated that he was proud of the honour which had been conferred upon him, not only on behalf of himself, but also for the honour done to Edinburgh photographers. Mr. Swan Watson emphasised the Chairman's remarks as to the great value of the Congress, and the particularly high order of the lectures and illustrations. He stated he also had learned something from an exchange of experiences of how his professional brethren in England carried on their business.

Mr. Moffat thereafter explained the Committee's report on the prices for commercial photography, and exhibited to the meeting a specimen invoice showing how he suggested an account for commercial photography should be rendered. It was pointed out that the costing tables which had been prepared by the Committee were merely a guide for fixing charges to enable members to find out, under simple conditions, what the actual execution of commercial work would cost. The scheme was unanimously recommended by the meeting as a basis for a trial, and it was proposed that after the members had had experience of it for two or three

months, to again bring it before the Society for their further consideration and approval. Mr. Moffat was heartily thanked by the members for the trouble which he had spent on the preparation of the tables.

The Chairman stated that he was to see Mr. McNally, of the Education Authority, and ascertain if a trade class for photography could be instituted at the night schools, and report to the next meeting.

The election of office-bearers was then proceeded with, and Mr. E. D. Young, retiring President, moved that Mr. Campbell Harper be appointed President for the coming session. This was seconded by Mr. Balmain, and supported by Mr. Swan Watson. Mr. Campbell Harper, seconded by Mr. John Thomson, proposed Mr. Moffat as a member of the Committee. Mr. Moffat proposed Mr. Fergusson, which was seconded by Mr. Norman Thomson. Mr. Campbell Harper proposed Mr. Coltart, which was seconded by Mr. Balmain, and Mr. Balmain was proposed by Mr. Fergusson and seconded by Mr. Yerbury. There being no other nominations, the gentlemen were appointed members of the Committee. The President moved the re-election of Mr. Lowson as secretary and treasurer, which was unanimously agreed to.

Mr. Charles D. Crooke, at the end of the meeting, congratulated the Society on the great value of the work undertaken by its members, and stated that if he had known, he should have joined it long ago. He was, however, ready to do so at once, and he, along with a number of the guests, heartily accepted the invitation to join the Society.

News and Notes.

Partick Camera Club.—New headquarters of this Glasgow club have been acquired at 51a, Peel Street. The new secretary is Mr. James Whyte.

"Technology," the journal of the Manchester Municipal College of Technology, has just completed its tenth volume, which contains recent original papers by members of the staff of the College, including one by Mr. R. B. Fishenden on the use of photography in the engraving of rollers for calico printing.

Sloane Square Bargains.—Still another large list of second-hand cameras, lenses, and accessories of all descriptions reaches us from the City Sale and Exchange, this time from the branch at 26-28, King's Road, Sloane Square, London, S.W.3. It is a volume of 168 pages, and will be sent free on application to the above address.

The Adherent Tissue Co. have opened an office and showroom at 294, Regent Street, W.1 (opposite the Polytechnic), where stocks of adherent tissue, art tint papers, and apparatus for every class of dry mounting will be held, and demonstrations given. The office will be under the management of Mr. E. Cope, late of the Autotype Company.

For Cleaning Lenses.—Messrs. W. Butcher and Sons have conferred a favour on lens users by issuing, in convenient book form, the extremely soft Japanese paper tissues, which, by their complete freedom both from fluff and from any suspicion of abrasive effect, are ideal for cleaning the surfaces of lenses. The tissues are supplied, price 6d. per book, and may be obtained from all dealers.

Guilleminot Plates.—A list of the revised prices of the plates and postcards of the French firm of Guilleminot, Boesflug and Cie has been issued by the British representative, M. Jules de Gottal, 17, Cecil Mansions, Marius Road, London, S.W.17. Plates are now priced at 2s. 7d. per dozen, $3\frac{1}{4} \times 4\frac{1}{4}$; 5s. 8d., half-plate, and 10s. 11d. whole-plate. Bromide and gaslight postcards are 50s. net per 1,000, with a reduction on quantities up to 10,000. Guilleminot P.O.P. is priced at 12s. per gross of 6 × $4\frac{1}{4}$ pieces; 26s. per gross whole-plate size.

"Pictorial Composition in Photography."—The volume of this title, by Arthur Hammond, which we reviewed some months ago ("B.J.," August 27, 1920, p. 533), is now issued in this country by Messrs. B. T. Batsford, Ltd., 94, High Holborn, London, W.C.1, price 21s. net. Messrs. Batsford are also publishing here another American work which we have noticed, namely, "The Book of the Dance," by Arnold Genthe, illustrated by a large number of reproductions of photographic studies of well-known classical and other dancers. The price of this latter work is £2 2s. net.

Business in Developing and Printing.—Messrs. W. Butcher and Sons have just issued some new pieces of literature for the promotion of business in developing and printing by photographic dealers. These are a series of four distinctive lists of charges for the development of roll-films, plates and film-packs, and for the supply of prints and enlargements. The prices are the minima adopted by the Photographers Dealers' Association, affording an adequate margin of profit whether the work is done by the dealer himself or sent to a trade firm. The lists are attractively produced in a coloured cover, and each includes also particulars of a few of the most popular of Messrs. Butcher's models of hand cameras. Inclusive of the printing of a dealer's name and address on the cover they are supplied at £2 2s. 6d. per thousand; a smaller number, at a somewhat higher rate.

A General Kodak List.—The new general catalogue just issued by Messrs. Kodak, Ltd., is a handsome volume of 250 pages, which fully describes the various models of Kodak, Brownie, Premo, Graflex, and other cameras, the many specialties of Kodak manufacture, and, of course, the wide range of plates and papers manufactured at the Harrow works. While goods of Kodak origin claim a large share in these pages, the manufactures of other firms which are handled by the Kodak organisation are fully specified, so that the list is a comprehensive one of photographic supplies. One feature to be noted in respect to the general interest now being taken in the development and printing of amateurs' films is that describing the appliances—developing tanks, printers and driers—for this branch of work. The catalogue also includes a dozen pages or so of the formulæ for development, toning, etc., to be used with Kodak sensitive materials.

Raw Paper Base.—In their report for the year 1920, Messrs. Wiggins, Teape and Co. state that owing to labour and other difficulties production was not commenced during year at the new photographic base paper mill at Wooburn Green, and the new capital raised in 1919 was in consequence unproductive. The construction, however, is now almost completed, and it is hoped that production of paper will begin in the course of a few weeks.

After providing for depreciation, debenture interest and directors' remuneration, but subject to taxation, the net profits amount to £191,016, which with £3,166 brought forward makes £194,182. Interest payable to vendor companies amounts to £2,432. The directors recommend appropriating for taxation £58,000, amount written off expenses of debenture issue £5,047, dividend on ordinary shares of 5 per cent., less tax, for year, carrying forward £46,507.

In view of the uncertain outlook directors are of opinion that it is necessary to conserve company's resources, although the profits would permit payment of a larger dividend.

For 1919 net profits were £112,175. Interest to vendor company absorbed £18,604. dividend on ordinary shares was 10 per cent., and £20,000 was placed to reserve.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

MEN v. WOMEN PHOTOGRAPHERS.

To the Editors.

Gentlemen,—It was to be expected that Madame Yevonde's lecture at the P.P.A. Congress would arouse some discussion, but your correspondent, "A Mere Man" ("B. J.," April 29), takes the matter much too seriously.

The "Chronicle" man naturally endeavoured to make good copy, and incidentally gave the lady a very nice advertisement. Those who were privileged to listen to the lecture entered into the spirit of fun and good humour which characterised the whole utterance.

The lady so charmingly "rubbed in" the various points she made, and accompanied the bitter she administered with such very nice sweets, that not a man felt inclined to demur, and this feeling continued in the brief following speeches by Messrs. Speaight, Adams, and Lambert.

If, however, the matter be taken seriously there is much to be said on the other side. The "Daily Chronicle" statement that photography is not a man's job is, of course, absurd, and cannot be substantiated, but some of the points in the lecture may be quite effectively countered.

Why should women have a great advantage over men in the photographing of children?

There are plenty of women doing quite good child portraiture, and more men doing it quite as well. The ability to become a maker of real pictures of children is—to quote Mr. Adams—a God-sent gift, and one that is bestowed without respect to sex. The various theories as to the quicker action of woman's brain, her greater tact in dealing with her sitters, her superior adaptability to their varying mental states would be difficult to uphold, and almost impossible of proof.

Experience shows that such mental and administrative qualities as go to make a successful portrait photographer are the possession of a gifted few, and certainly not the monopoly of either sex.

The slides shown at the close were, I think, not entirely convincing. Some of the examples were good. The bulk, however, I feel sure, did not do justice to the ladies whose work they represented.

In conclusion, may I suggest a competition which might have interesting results?

Let the P.P.A. find three subjects—man, woman, and child—each the worst procurable.

The child, fractious, ill-tempered and thoroughly spoiled; the man, one who hates being photographed; and the lady, one of those who has "been to numberless photographers and had never a good likeness yet." Send the trio round to some of the leading lady photographers, and also to an equal number of men, not more than four plates to be exposed, or half an hour to be expended on each subject. The subsequent exhibition of the untouched results and the allotting of the rewards would make an interesting feature of the next P.P.A. Congress. The male competitors should be whiskered.—Yours faithfully,

GRAHAM N. FITCHEW.

Southsea, May 2.

SOFT FOCUS WITH A SPECTACLE LENS.

To the Editors.

Gentlemen,—The article in to-day's issue entitled "The New Bergheim Lens" is of great interest, especially to amateurs like myself.

Many amateurs with pictorial ambitions are deeply interested in the numerous makes of soft-focus lenses offered for sale in the photographic journals, but very little information is available in accessible form, and many are debarred by prohibitive prices from the purchase of what is usually an unknown proposition.

In the article, reference is made to the use of uncorrected or spectacle lenses, once popular amongst photographers, and I venture to suggest that this type of lens, which, so far as soft focus is concerned, is similar in manipulation to the Bergheim lens, is likely to become once more popular amongst those amateur workers who are striving after pictorial expression.

It might be of interest if I briefly describe some recent experiments which confirm Mr. Thomas's article.

Having obtained a set of uncorrected lenses, I selected one of 20 c.m., i.e., about 8-in. focus, and fitted it to a spare lens tube with a maximum stop of 1¼-in. diameter, i.e., approximately aperture *f*/5.5.

Using this on a 3¼ × 2¼ plate, to obtain good perspective and to avoid distortion, I proceeded as follows with a portrait subject:—

Negative 1.—Orthochromatic plate exposed at visual focus. Result: Badly blurred image, due to the chromatic aberration of the lens.

Negative 2.—Ortho plate focussed to visual focus, then carefully racked towards lens until principal features became slightly blurred. The actual measurement was about ¼ in., which closely corresponds to the 1/60th mentioned in Mr. Thomas's article. Result: A clearly visible, but beautifully soft, image, retaining form and features without loss of structure.

Negative 3.—Panchromatic plate with K 2 filter exposed at visual focus. Result: A well-defined image of pleasing softness, but not so soft as Negative 2 with ortho plate.

The explanation of this is that the K 2 filter and panchro plate eliminate the violet and ultra-violet rays which form the so-called chemical as distinct from the visual focus.

Similar experiments on landscape with trees in foreground gave similar equally pleasing results.

Any degree of softness can be obtained at will on an ortho plate by regulating the amount of racking forward of plate between the limits of chemical and visual focus.

The purchase of an uncorrected or spectacle lens of a suitable focus, and an old lens tube to suit, places a cheap instrument in the hands of the amateur, with which he can obtain a pleasing variety of definition, and consequent breadth of pictorial expression.

Unlike many so-called pictorial lenses, in which the definition is regulated by the stops of the lens, this simple lens can be used at its full aperture, and any degree of softness can be obtained without altering the stop, and the single glass makes a very high-speed lens.—Yours faithfully,

HENRY N. HOLLAND.

13, Cawdor Road, Fallowfield, Manchester, May 6.

A SIMPLE SOFT-FOCUS LENS.

To the Editors.

Gentlemen,—It has occurred to me, in reading Mr. Walter Thomas's article in the "B.J." of May 6, that a soft-focus telephoto-combination which I made up some eleven years ago may be of interest to readers. Though I have not used the combination for some time, a few weeks ago I hunted out the components and re-assembled them, with a view to their use for landscape, having principally experimented in portraiture when previously using the lens.

Those who have followed the evolution of adjustable soft-focus lenses will remember those recommended by Messieurs Puyo and Pulligny, and the formulæ given for their construction, but, as Mr. Thomas points out in reference to the Dallmeyer-Bergheim lens, the character of the images obtained by their use was such as to make their appeal a somewhat limited one. The arrangement which I constructed, however, did not give excessively soft definition, and the Pulligny formulæ for their tele-anachromatic—constructed with a Petzval portrait lens of about 6- or 7-in. focus as positive, with an uncorrected negative element of about 3 in. diameter and of about two-thirds the focal length of the positive—gave a combination with which it was possible to obtain fairly long focal lengths without, of course, having to be provided with an equivalent bellows extension. My uncorrected negative lens cost but a few shillings, and I proceeded to mount it in a cardboard tube, lined with velvet, at the back of a lens panel, to the front of which the positive element was fitted, with the advantage that, being provided with a rack and pinion, one is able to adjust the separation of the elements, with, of course, a resulting variation in focal length.

The most suitable position for the negative element being ascertained for the conditions prevailing, it was found that for a large studio camera the ideal mounting was a square box of large dimensions, which hung on mirror plates inside the front panel, and allowed the usual studio shutter to work in its existing position.

There is some little difficulty at first in getting negatives of satisfactory definition where wanted, but after a few trials one soon gets used to the somewhat peculiar appearance of the image on the focussing screen. With this combination, however, there is not a large amount of variation of diffusion, except by stopping down for finer detail, and one hardly requires to do this on account of the already reduced aperture, due to magnification of the telephoto combination, but the lens still has the advantage of considerable variation in focal length, and consequently an enlargement or reduction of the size of the image without moving the camera.

To come down to practical details. I imagine there are numerous firms in the country who will produce a negative element of the required focal length, as optical glass working since 1914 has expanded very considerably here. As a guide to the selection of focal

length, I cannot do better than give an extract from my note-book which I copied down at the time for the construction of the Puyo-Pulligny tele-anachromatic, which data should apply quite well, though, as explained above, the definition will be superior by reason of the positive element being a corrected photographic lens:—

"The foci of the two lenses are in the ratio of 4 : 3, and that of the front lens F_1 is, say, 20 c.m., hence that of the back lens is 15 c.m. The actual focal length of this lens is $F = F_1 + \frac{4}{3}$ extension of camera; if the extension be 30 c.m., the focal length will be 60 c.m."

In order to obtain softer definition and greater speed in working it would be worth a trial to remove the diaphragm rings of the portrait lens entirely. F. E. HUSON.

21, Preston Road, Upper Norwood, S.E.19.

A PRINTED-OUT FILM CAMERA NEGATIVE.

To the Editors,

Gentlemen,—I enclose you a film which may interest your readers. It is from an exposure made with a V.P. Kodak at *f*/8, exposure six weeks (or more)? A local chemist put a roll into this camera, intending to take some snaps. He then forgot and left it aside, and his assistant put the camera in the window for ordinary display. (It was one of the stock cameras.) The assistant left the shutter open, and the camera was directly facing the house shown in film and print enclosed.

There it stopped for six weeks, when the chemist remembered, took it out, turned on roll to No. 2, and took his snaps. It was sent to me for development, and immediately I unrolled film I found the clear picture of house clearly printed on film (as a negative, of course), before it was even wet, and, strange to say, full development made practically no change in it. I thought, of course, it would go perfectly black!

Possibly it may be common for a picture to print out like this in such circumstances, but in ten years of developing for amateurs I never came across it before.—Your's truly, R. H. CHRISTIE.

9, Islington Avenue, Kingstown.

[The negative is dense throughout, but yields quite a presentable print.—EDS. "B. J."]

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

H. E.—It is our opinion that the glossy view card holds the market. We can't say why, but we certainly think it is a fact that retailers will not buy semi-matt, or rather, will not be able to sell semi-matt freely in competition with the strict glossy. For matt cards there is no doubt a certain market, but as you doubtless realise, it is not the choice of the masses.

M. T.—In no circumstances can the customer claim the negative, with the single exception of the case in which a special contract is entered into for the supply of the negative. Many photographers part with the negative for 10s. 6d., but we think the price is much too low, and that it should be at least £1 1s. We return copies of the correspondence, and, as requested, are sending "Photographic Copyright."

R. R.—With the exception of lead there is no metal that will stand long-continued action by the acid fixing bath without some protecting varnish, the best of which is the so-called anti-sulphuric paint, obtainable from dealers in electrical supplies. But we think it is best to dispense with a metal outlet on a fixing tank, or if you must have one, then you want to touch it up fairly frequently with varnish.

H. J.—Squeegeeing postcards is quite a matter of dexterity, and no great pressure is needed to expel bubbles, about two strokes with a flat squeegee being sufficient. Possibly you are hardening them too much in formaline, in which case use a weaker solution. It is necessary to squeegee right over the sink so that plenty of water goes on to the glass with the cards. Failing other remedy, you might change the brand of paper.

T. E.—(1) Nothing better than a plate of extra-rapid speed, such as the Imperial "Special Rapid." (2) Most makers supply a so-called "Press" plate giving still greater contrast than the usual brands. (3) No special paper can be said to be the best; we advise you to use the kind you are most accustomed to. (4) In our opinion nothing better than pyro-soda of the formula recommended by the makers of the plates. (5) R.R. lenses are made to give their best results with stop *f*/16.

F. J.—In the "Colour Photography" Supplement, which appears in the first issue of the "B.J." for each month, we have maintained, we think, a pretty complete record of what has been going on in colour photography, although progress has been almost at a standstill during the last five or six years. Both Dr. Smith and his "Uto" process are dead. The only book which covers the field is "Colour Photography," by Dr. Lindsay Johnson. It is a fairly good account of both theory and practice, and is reasonably up to date.

H. A.—The defect you complain of frequently occurs in tank-developed negatives, and is due to allowing the negative to remain undisturbed for too long a time. Try making two exposures of the same subject, develop one in a dish and the other in the tank, and compare results. The remedy is to move the rack up and down at least twice during development. It is not so easily detected in outdoor negatives, as when very light and dark parts come together there is usually a little halation on the shadow, and this hides the uneven development.

I. J.—The usual method of making silhouette portraits by photography is to pose the sitter in profile against a thin white sheet illuminated strongly from the other side either by daylight or artificial light. The camera is placed directly facing the side view of the sitter, and therefore also the light behind him (or her) on the other side of the background. The space between the sitter and camera requires the light to be almost completely cut off for the old style black-white silhouette, but some very excellent effects can be got by a certain amount of light on the shadow side of the sitter, sufficient to give a slight rendering of shape and details of clothes, the latter particularly in the case of women.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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Contents.

SUMMARY.

Mr C. Brangwin Barnes, in a short paper on the making and publishing of local view postcards, deals with a few of the factors which are often neglected by professional photographers embarking on this business in their own district. (P. 292.)

A contributor gives simple working instructions for making carriers to hold flat film of somewhat smaller size in the customary solid pattern of plate-holder. (P. 297.)

Mr. Ernest A. Dench, an American specialist in window displays, describes a few arrangements adopted by American dealers in photographic requisites for emphasising the attractions of photography as an accompaniment of anyone's holiday. (P. 291.)

Mr. J. I. Crabtree, of the Eastman Research Laboratory, has recently written a comprehensive little treatise on the causes (and preventives or remedies) of the stains which occur on negatives and prints. The first part of his paper deals with whitish and yellowish stains. (P. 294.)

The compound nature of the effect commonly described as "halation" in negatives is the subject of a leading article in which we endeavour to interpret the effect of different methods of development, which in practice are found to be of advantage in avoiding or reducing halation. (P. 290.)

At the Royal Photographic Society some time ago Mr. D. Charles reviewed the most recent improvements in methods of flashlight, and described particularly the advantages of a somewhat deep and narrow flash pan as regards obtaining a large area of flash which, therefore, needed much less diffusion than the more concentrated light produced in an open pan. (P. 298.)

For keeping specimens clean and fresh whilst in use on display in window and show case the passe-partout method of framing has obvious advantages. (P. 289.)

The oval shape of portrait is one less often seen nowadays, nevertheless, is a style which is often the most fitting for a subject. (P. 289.)

For copying-enlarging on a considerable scale, as, for example, single faces from groups, one or two small lenses should be included in the studio equipment. (P. 290.)

In making vignetting glasses it is best to use a black opaque pigment, since the effect on the print can then be better judged when preparing the vignetter. (P. 290.)

Working methods for the renovation of backgrounds are described by a contributor to "Assistants' Notes." (P. 300.)

An American correspondent, in giving some details of his experience in flashlight, asks for advice on the flashlight photography of large outdoor subjects at night. (P. 302.)

A pyro formula for black-and-white effects on self-screened plates is recommended by the writer of a letter to the Editors. (P. 302.)

EX CATHEDRA.

Passe-Partouts for Specimens.

Any method of displaying specimens which preserves their freshness, at small cost, is of interest to photographers, so that it is worth while recalling a suggestion made some time back by the late Mr. Essenhigh Corke. His idea was to make a passe-partout in which prints could be changed as required, and to do this he took the usual glass and back and bound them together at the top and sides with two mounts between, the lower edge being left open with a strip of the binding upon the face of the glass only. A thumb-hole was cut at the bottom of the backing card so that the mounts could easily be withdrawn. This method has the advantage of cheapness from the fact that all the work can be done at home and the material found in waste negatives and mounts. Narrow wooden frames have, of course, a better appearance if the cost be not objected to. If these are used they should be fitted with three-ply backs buttoned in so that no time need be lost in changing the prints. The metal Quadro frames are also effective, and when used for window display need not have the tabs glued down, the spring of the metal being quite sufficient to keep it in place if the inside is well packed up.

* * *

Oval Prints

There are fashions in photography, and prints trimmed or masked to an oval shape are now rarely seen. This is somewhat to be regretted, as this style has its merits in helping to make badly-posed figures, particularly bust portraits, presentable by cutting off the lower portion of broadened figure or an obtrusive bit of drapery. It also allows of the figure being brought into a better balanced position upon the mount than by keeping to the orthodox rectangle which in many cases would necessitate a serious reduction in size. It is quite easy to cut ovals with a swivel trimmer and zinc gauge with a little practice, although a few mishaps may occur till confidence is gained in handling the cutter. An alternative style is to use an oval mask and to cut the print square, either leaving the margins white or printing them by double printing. Effective border negatives, which give the effect of multiple mounting, may be procured from most dealers. The oval cut-out mount is now rarely seen, but for vignetted enlargements it is often very effective, an excellent effect being obtained by using a cream-toned rough-surfaced card for prints on white paper or *vice versâ*. Oval frames are again on the market, and these may often be used with advantage to vary the display in a showcase or window. Photographers in London who may have a desire to study the suitability of an oval shape to a portrait study cannot do better, perhaps, than pay a visit to the Wallace Collection simply for the sake of looking at the many Greuzes on the walls, almost all of them of this shape. We would add, too, the reminder

that when we are speaking of an oval, we mean a complete oval. We sometimes see specimens of prints or enlargements where a broken oval mask has been used and part of the subject vignetted out through the opening. We think there are very few subjects which lend themselves to this "fancy" style, which has nothing in the shape of purity of form to recommend it, and has been vulgarised very largely in the make-up of pages of portraits in the illustrated Press and in other ways. In short, if an oval is the choice, let it be an oval, and not a mixture of oval outline and vignetting.

* * *

Small Lenses. In comparatively few studios will be found any very short-focus lenses, yet these are frequently useful when it is desired to copy a small print, such as a head out of a snapshot group, or on the other hand to make a very small copy for a ring or locket from a large print. In the former case the difficulty is usually to obtain sufficient bellows extension and in the latter to avoid the flatness due to a long distance between lens and sitter. If a small hand camera with a lens of from three to five inches focal length is available it can generally be adapted to this work. If the lens and shutter cannot be detached it is not difficult to fix the entire camera with its lens *in situ* to the copying camera. It is often possible to obtain very small portrait lenses cheaply, and these are very suitable for enlarging, as their large relative aperture allows of easy focussing. We have even used the single lenses issued with the smaller Kodaks with considerable success when more elaborate instruments were not to hand for low-power photomicrography, one of three inches focal length upon a camera with an extension of a couple of feet giving a good degree of magnification.

* * *

Vignetters. Very useful vignetters may be made from waste negatives upon thick celluloid film by removing the image with a strong ferricyanide or cyanide and iodine reducer and painting the serrations and margin with opaque colour or, what is more durable, black varnish. It is not advisable to remove the gelatine coating, as the paint adheres much better to this than to the celluloid surface. Anyone who has had experience with oil colours can produce very soft gradations, which may be placed in contact with the negatives, by dabbing the colour with the finger round the opening. Such vignetters prevent the creeping of the light beyond the desired limits in the shadows of dark drapery, and also allow of closer vignetting than when all the softening depends upon the distance between the vignetter and the negative. It should be noted that a black or opaque pigment is better for making vignetters than a red or orange, as with the black the visual effect will be reproduced in the print, while with transparent non-actinic colours the light-stopping effect is greater than it appears. This was the fault of the old orange glass vignetters, which had soft graduation to the eye, but which printed with almost a sharp edge.

* * *

Portrait Proofs. There are one or two points connected with the showing of proofs which are worth the consideration of portraitists. It is a very general practice to submit untoned prints upon glossy P.O.P., an old custom which has much to recommend it. In the first place a good deal of time is saved, and in the second the gradations of the negative are faithfully rendered. The drawback is that when the finished prints are made upon bromide or gaslight paper there is often a loss at both ends of the scale of tones, giving an impression of hardness or sometimes heaviness. Care should be taken that as far as possible the proof should be printed to the same depth as the finished copies are intended to be, and, what is particular, the proofs should be trimmed to the exact size and shape which will be delivered. If more of the figure be included the composition may be spoiled, especially when oval or circular formats are finally used. If the extra cost and time is not a serious consideration there is no better way than to submit finished prints, which are counted as part of the order, if retained. These, too, often serve to supply immediate needs, and allow a little more time for completing the order.

HALATION AND DEVELOPMENT.

The volume of correspondence which has appeared in our columns during the past few weeks is a very clear indication that the drawback of halation is one which the professional all too frequently finds himself "up against." A perusal of the correspondence leads to the conclusion that benefit may be derived from a short and more or less elementary discussion of causes of the phenomenon. It may be admitted at once that our conclusions are arrived at as the result of practical trials, and that they can be accounted for by "theory" in spite of the low value attached by one correspondent to this latter element of science. Why do many of our practical professional brethren deride theory? Certainly "Experiment is the basis of Science," but we have no hesitation in affirming that many of our practical experimenters in photography would benefit enormously by the acquisition of such an amount of theoretical knowledge as would allow of the intelligent direction of their experiments and of the logical interpretation of the results of those experiments.

Let us begin by defining our subject, and in order to be the more readily understood we will call to our aid a practical experiment which many photographers must have made on the occasion of the recent eclipse of the sun. If an unbacked plate was used in snapping the partly-eclipsed sun, and assuming correct exposure to have been given at about the maximum phase, the negative will show a fairly-clear image of the crescent sun, surrounding which will be a clear space of practically fogless gelatine, this, in its turn, being surrounded by a ring or halo of deposit. It will be noticed that this outer ring is sharpest on its inner edge. If an efficiently-backed plate was used under similar conditions, the sun image will be but slightly sharper than that on the unbacked plate, but the halo will be absent. With film as the emulsion support the sun image exhibits the maximum (but not necessarily prohibitive) amount of unsharpness and only a very faint halo will be discernible at a very short distance from the true image. In the case of negatives made on thin film there will not be any clear space between the halo and the main image. Now, all these results can be theoretically explained, as will presently appear; our concern at the moment, however, is the definition of the term halation. It is generally agreed that the word may be employed to describe either the ring or halo phenomenon or the general spreading of the edge of brightly-illuminated objects. Since, perhaps, ninety-nine out of every hundred cases of halation met with are of a compound nature, there is no necessity to confine the term to one only of the two phenomena, even, although they arise from entirely different sources. The halo is caused exclusively by reflection, and has its origin in the support on which the

emulsion is coated, whereas the general spreading of the outlines of brightly-illuminated objects has, in the case of efficiently-backed plates at least, its origin exclusively in the emulsion itself, being the result of light-scatter therein. It is obvious that unless the emulsion is stained with a dye which absorbs actinic light, the more transparent the emulsion the greater will be the contribution of reflection effects towards the degradation of the image and the less will be the contribution of the scatter effects. With emulsions the gelatine of which is dyed, as is the case, for example, in screened orthochromatic plates, the reflection component of the halation is materially reduced, by reason of the fact that any light which eventually reaches the surface of the support is relatively non-actinic. Other things being equal therefore, a screened orthochromatic plate is preferable when dealing with subjects liable to give halated images. If such plates be efficiently backed, the reflection halation is reduced to its minimum, and the only degradation which can occur under normal conditions of working is that arising from scatter. This scatter may be, with some emulsions, sufficient to condemn the material; with most emulsions, however, it is a negligibly small factor.

Before turning to the influence of exposure and development, it is of interest to note that film base, largely on account of its thinness, considerably restricts the area of the reflected halation image, whilst at the same time somewhat increasing its intensity.

To understand the influence of exposure and development on halation, it is necessary to bear in mind that scatter halation spreads as the light passes into the sensitive film, whilst reflection halation spreads outwards from the bottom of the emulsion. It may be reasonably assumed that for all practical purposes it is impossible to confine the action of light during exposure to the surface of the emulsion, but it can be readily demonstrated that the minimum exposure of which the subject allows gives, *ceteris paribus*, negatives showing least halation. If we cannot confine the latent image to the surface of the film we are more fortunate when it comes to the matter of dealing with the developed image, although it is somewhat surprising what drastic steps have to be taken effectively to prevent depth development. The modern dry plate is so efficiently coated that only a thin film suffices for all general requirements—there is considerable variation in this respect amongst the various manufacturers' products—and this thin film is very rapidly penetrated by alkaline solutions, such as developers. The expedient of short development with highly-concentrated solutions is thus a delicate operation. The strength of the developer has to be such that less than a minute suffices for the operation; small time-errors under these conditions are of great importance, and in the hands of the average worker the alternative expedient of exceedingly weak developing solutions generally proves preferable. The weak solutions act by a differential "starving" of the most exposed areas, and provided they are used sufficiently dilute they allow of the development of all shadow detail before the halation image has gained prohibitive density. It will be clear that this type of development allows of great control, since five minutes' variation, one way or the other, makes no practical difference in the result. We see, therefore, that the advocates of both types of development are theoretically justified. A third method of confining development to the surface of the film depends upon the addition to the developer of such a viscous substance as glycerine or glucose, and practical trials show that this modification is remarkably efficient in depressing the development of halation. Another expedient to achieve the same object is that of developing with such an acid compound as pyro in two stages; the plate is first soaked in a plain sulphite solution of pyro for a minute or two, and then, after draining, immersed in a weak solution of sodium carbonate until the requisite density is secured.

Whichever method of development is adopted the halation is identical in amount for a given density of subject image, and in every case backed plates show marked superiority. It is, perhaps, worth noting that the Monomet sulphite developer, recently advocated by Crowther and Ermen, appears to allow of development of the true image to a greater density before the halation image is noticeable than any alkaline developer, whether the latter be employed as a highly concentrated or as an extremely dilute solution.

We have not touched upon the use of a physical developer—an acid silver solution containing metol, for example—because of the many pitfalls which its use entails, but theory indicates that experimentation with this process would be worth while, leading to images devoid of all halation.

THE HOLIDAY APPEAL IN CAMERA WINDOW DISPLAYS.

Now is the time to push cameras and supplies by trotting forth the old but ever new vacation argument. This can be presented in numerous convincing ways, if full use is made of your window display facilities

The Woodland Appeal.

The Earl V. Lewis Co., Los Angeles, Calif., U.S.A., made effective use of their window background facilities in introducing the necessary vacation time atmosphere. This took form in large framed photographs of woodland and mountain scenes, which were hung across the rear. Billows of grey velvet draped the floor, with cameras and albums placed here and there. In the middle was a trough, constructed of small cardboard boxes, over which folds of the grey velvet were draped. Planted in the trough were a row of greyish burr weeds.

Snapshotting the Family in the Garden.

The Emporium, San Francisco, Calif., were responsible for a charming garden setting, furnished with a garden bench. A woman wearing a pink afternoon dress reposed on the bench, while standing by the woman was her ten-year-old daughter in a pink dress. Over to one side father was posed in the position of photographing mother and daughter.

Favouring Her Friends

Olds, Wortman and Kings, Portland, Ore., employed wax figures to furnish a camera display with human interest. The background was a cluster of pretty pink flowers. Four figures were used in all. The first, an attractive sixteen-year-old girl, was posed at the left side in the attitude of operating a tripod camera. Her subjects at the opposite side were three much younger girls. Touches of individuality were imparted

to the figures by one of the girls with an open parasol; the second girl with her parasol closed, and the third girl with a camera case swung over her shoulder. The space elsewhere on the floor was devoted to neat arrays of cameras, tripods, albums, printing and developing sets, etc.

In the Whole Outdoors.

Woodard Clarks, Portland, Ore., conceived a window display that was very soothing to the city dweller on a warm summer day. The floor was liberally strewn with branches of trees and woodland plants and flowers over which cameras and supplies were placed. Placed between two growing palms at the rear centre was the following card:—

"The Whole Outdoors Waits for Your Camera."

On the floor in front of the yard were a bunch of snapshots of woodland and beach scenes.

Angling for Angles.

The Denver Photographic Co., Denver, Colo., made an especial appeal to anglers, whose number, of course, is legion. The centre attraction consisted of a large angler's basket, which was surrounded by several choice rods and reels. Cameras in all sizes were exhibited on the floor at each far side. On the panelled background was a six-part cartoon in the style of the comic papers. The subject matter of the cartoon visualised the enormous fish that Jones claimed he had caught. In direct contrast to this, the end picture showed the diminutive goldfish that his friends had photographed and presented to him.

Baby Out for an Airing

The Owl Drug Co., Battle Creek, Mich., caught the eye of the passer-by with a doll baby carriage, the sole occupant of which was a baby doll. These objects were being "shot" from a distance by a larger doll, with a vest pocket camera in her hands. The background was adorned with summer floral decorations.

A Window Trip to the Tropics.

The Gray Drug Co., New York City, brought the Tropics to Manhattan. The wallboard panels were painted with a white steamer cruising through a tropical inlet, with the palm-tree shores of some tropical land in the foreground of the picture. Several cardboard cut-outs of palm trees, covered with coconut fibre, with artificial palm leaves attached at the top, were "planted" in several prominent show window positions. The central location was occupied by the stump of a tree trunk, with a coloured cut-out of a lady tourist, camera in hand, seated on the trunk. Green tissue paper, shaved into tiny strips, provided the floor covering. A number of cameras and supplies were exhibited along the floor over sea-blue painted stands.

The Homelike Setting.

Ludwig Bauman & Co., New York City, have a display manager who believes in providing cameras with homelike surroundings. An excellent display of this order was made by Mr. J. Edward Rogers, an Englishman. The cream panelled background had a window effect in the centre, simulated by the hanging of a light-coloured cretonne curtain. The far left corner was occupied by a small, round wicker table, on the top of which reposed a vase of seasonable flowers, flanked on one side by a small camera, and a small portrait at the other side. Directly in front of the cretonne curtain was a large wicker rocker, with a soft cushion on the seat. A tripod camera was placed at each side. On a two-tier glass stand along the two sides—this was a corner display—were several camera models and films. A grass rug was laid on the floor at the front centre at a 45 degrees angle. Several small cameras and literature found a resting place on the rug.

For Use by the Golfer.

Bamberger's, Newark, N.J., enveloped the rear with yellowish brown draperies, with artificial grass as a floor covering. A rustic garden-seat centre held a camera, with a bag of golf sticks leaning against the seat. At each rear side near the middle a tripod camera was placed in position. Room was found at the far left side for a rustic pedestal, with a pot of trailing roses on top. This exhibit was balanced at the far right rear by a woman wax figure, becomingly clad in sports attire, with a camera strung over her shoulder. Cameras were set out on mahogany pedestals on the floor down in front.

Considering those Back Home.

March Brothers, Dexeter, Me., took a new angle of the vacation argument. A sign in their window offered the following suggestion:—

"Share Your Vacation with Those who had to Stay Home."

The centre part of the display showed a stereopticon, which was pointed toward a screen at the rear. The screen was one mass of Kodak snapshots, while groups of cameras and supplies were scattered over the purple plush-covered floor.

Ernest A. Dench.

LOCAL VIEW PUBLISHING AS A BUSINESS.

Most professional photographers seem to think that postcard publishing is too unremunerative a branch to tackle seriously, the more so as they are under the impression that what there is to be made out of it is already in the hands of one or two big firms. Hence, if they dabble in the matter at all, it is in a very perfunctory and half-hearted manner, just taking a dozen or so views of their own town and supplying prints to one or two local stationers, the net result being a pound or two extra on the takings every now and then. This work, what there is of it, is mostly done in spare time, and, in fact, the producer will tell you he only does it to fill in the gap, and that there is really nothing in it.

But once the business be embarked on in a really business and methodical manner, it will be found that the preconceived notions are erroneous, and that a really good livelihood may be made from the picture postcard business alone. One great point in its favour is that the initial outlay required is small, and that as the returns are immediate the amount of capital required is also small. Then it will be found on inquiry that the larger firms will not supply less than 500, or at the least 250, prints from each negative, whereas the average stationer does not care to stock anything like that quantity of a single subject; his usual order is for from one dozen to one gross of a subject, and rarely, if ever, for the same number of each, for while certain pictures such as, say, the famous view from Richmond Hill, will sell by the gross per week, others of perhaps the same series, while having a steady sale, will not possibly average a gross in the year. Really, it is only the multiple shop, *i.e.*, the stationer with two or more shops in the same district, or the man with a large business, who buys in quantity to redistribute to the smaller man at a slight profit, who can really deal with the larger firm of publishers.

Thus it will be seen that there is ample scope for the photographer who is ready and willing to supply the average retailer in quantities of which he can dispose in a reasonable time. For a business of this description a strip machine is all that will be required, or, as business increases, two or

three strip machines. Other necessary appliances are, of course, a good half-plate camera, with at least six double dark slides, a rapid rectilinear, a wide angle and a mid angle lens, the usual developing dishes, washing tank, etc., a supply of plates, cards, chemicals and glass for enamelling purposes. It is almost needless to add that, where sufficient capital is available, a good reflex camera is "it." Having all supplies necessary, a start should be made with a home series, that is to say, start as near home as possible. It will not be found necessary to duplicate, as used to be done when plates were comparatively cheap. A series of from twelve to twenty views of your own town to start with, then a series of the next or nearest village or small town, and so on, gradually taking in the whole of the surrounding district.

It will be found in practice that small towns and villages pay better than the larger towns, one reason being that they are not overdone, and a new series will always find a ready sale. Do not be too anxious to get to some outlying place until you have photographed all the district between you and that place; it saves trouble and money in the end to go straight on and miss nothing on the way. It must be borne in mind that the first set of orders is not going to be a very profitable affair, in consequence of the cost of plates and the time occupied in taking the views, but you must look forward to the after orders when the negatives are in stock, it is then that the real profit-making commences. It is, however, quite possible to get a bit of the initial expenses back by the sale of prints of suitable subjects to one of the illustrated papers, and anything ancient or historical is likely to command a ready acceptance, as may anything really rural, rustic, exceptionally pretty or artistic.

During the time occupied in getting together a full series of negatives there are sure to be some days either too wet or otherwise unsuitable for negative making, and then the time can be filled up by fitting up the dark-room and workroom and in preparing the negatives already in hand by titling and *varnishing*. There are numerous means of titling. The one in most general use among the larger producers is by having the whole series typed by a printer in sheets, and then producing a negative film of each sheet, from which each separate title is then cut out neatly and affixed to the film side of the negative. This method necessitates the scraping away of the negative film and the affixing of a border mark, and great care is required to ensure obtaining an even margin, as it must not be forgotten that the paper on which the print is to be produced stretches, and that only in one direction, and allowance must be made for this contingency.

The film negative, too, requires to be so accurately exposed and developed as to produce black letters on a ground sufficiently dense as not to print through. On the whole, this method is perhaps too complicated for the beginner, and one of the other systems at hand will be more probably to his liking. The German-made reversed rubber type rarely yields good results, as the letters are rarely anything like clean cut, and usually present a slovenly appearance as the gelatine film of the negative does not, as a rule, take the ink stamp at all evenly, and one or two of the letters are very apt to get out of the straight. Perhaps the best method of procedure is to print the titles direct on the negative by hand with a mapping pen and indelible Indian ink, which can be obtained at the artists' colour stores. The style of lettering should, for neatness, be small black letters, though for Christmas or Easter greetings a more ornamental style may be used. The artists' colour stores can supply a little book giving the various styles of lettering, and it is perhaps advisable to obtain such a book, so as to avoid mixing up two or more styles in one title. The tyro may think that writing a title backwards is a very difficult matter, but a little experience and perseverance will be sufficient to make it seem an easy task. Should the worker find this beyond his ability, he can get over the difficulty by printing the titles the right way round on a sheet of thin celluloid, cutting them out neatly and cementing on to the negative, lettered side down.

I strongly advocate varnishing all negatives intended for publication purposes, as there is no knowing how many thousands of prints may be in time required therefrom, and every precaution should be taken to prevent such negative from every possible chance of injury from scratches or damp. The varnish I would recommend is gum kauri, dissolved in methylated spirit, and applied in the usual manner. It will be found advisable to number the negatives consecutively throughout the whole series, one result of which will be a great saving of time when booking orders and looking out the negatives for printing. Some publishers number each town or district separately, but so doing often results in confusion, even when an initial letter is used to denote the towns. Thus, a customer might order "River view 14," or T14, or W14. As there are sure to be numerous river views numbered 14, and as T stands for Teddington as well as Twickenham, and W for Walton, Weybridge or Windsor, there would always be a chance of error in completion of order.

Each separate series should now be completed by the addition of a composite picture of from four to six of the principal subjects, and titled as "Greetings from ——," "Souvenir of——," or "Just a line from——."

The next proceeding is to obtain a good set of proofs, both black-and-white and toned, and to obtain and execute your first batch of orders. When soliciting the same, do not let any opportunity go by; let no establishment be too large or too small to call upon, and you will often find the best business accrue where you would have thought it most unlikely.

In conclusion, never buy a postcard publishing business, or you will probably find that the reason it has been sold is that the stock of negatives is years old and altogether out of date and worked out; all you really get for your purchase money being apparatus, accessories and a decaying goodwill. Once you start on a business of your own you can go on increasing it by taking in fresh towns and villages, and by adding Christmas and birthday cards.

C. Brangwin Barnes.

Sands, Hunter Lenses.—A large lens list, of 40 pages, has just been issued by Messrs. Sands, Hunter and Co., 37, Bedford Street, Strand, London, W.C.2, specifying the very large stock of objectives of all descriptions. With the object of reducing their stocks the prices of these second-hand lenses have in almost all cases been made pre-war, and further, a cash discount of 2s. in the £ will be allowed. There is evidently the opportunity for the professional photographer to add to his optical equipment on exceptionally favourable terms. The list includes scores of anastigmat portrait, R.R., and telephoto lenses as well as many objectives of the single landscape and wide angle types. Messrs. Sands, Hunter usefully list lenses in sunk mounts and in focussing mounts in sections by themselves. We can certainly recommend that the list should be obtained and studied.

Rotogravure Tissues.—The Autotype Company, 74, New Oxford Street, London, W.C.1, has just issued a booklet of notes on the rotary photogravure process, with special reference to the handling, printing and mounting of the tissue resist. The Company, as manufacturers of special tissues for this purpose, have made a thorough study of the process and are able to assist their customers in case of troubles arising from climatic and other causes. The booklet contains also a list of the tissues for gravure, including two new descriptions. In one of these, recently patented by Mr Braham, a dye is substituted for the usual solid pigment, permitting the progress of etching being more closely followed. The other is made to a special formula designed to give a resist in which the etching of the light tones will be under more perfect control.

STAINS ON NEGATIVES AND PRINTS.

[Mr. J. I. Crabtree is a member of the staff of the Eastman Research Laboratory intimately familiar with practical photographic work, and, moreover, with an aptitude for converting work of his researching colleagues which is susceptible to the process into the current coin of technique. A year or two ago we published a valuable paper by him on the making up of photographic solutions. The following article, from the "American Annual of Photography," deals in a similarly orderly and comprehensive way with the causes of stains on negatives and prints and on preventive and remedial methods.—EDS. "B.J."]

ALMOST every one of us has discovered that after storing away an apparently perfect negative, at some time later it developed an ugly brown stain, or after developing a batch of prints in the dark-room on turning up the white light the prints were seen to be stained yellow for no apparent reason. The prints were easily made over again, but the negative as far as we knew was ruined. Or we had the only existing copy of a valuable photograph which, in the course of years, had developed a stain and we wished to have several copies made but we did not know how to go about it. It is the purpose of this article to explain how and why such stains are produced, how to prevent them, and, whenever possible, how to remove them.

Broadly speaking, a stain is any deposit, foreign to the photographic image, which will absorb light, and is, therefore, capable of producing an image during printing, although in every-day language the word stain is usually associated with something coloured. A photographic stain can therefore be considered as a deposit on a photographic positive or negative whose colour is foreign to that of the photographic image. This definition would therefore include colured spots, irregular coloured markings, and general stain.

General grey stain or fog has been covered in a previous article on "Chemical Fog" ("American Annual," 1919). The matter of spots will be dealt with in a future paper so that in this article we will consider a stain as a fairly large deposit whose colour differs from that of the image, and which may be "local" (when it is not uniform) or "general," in which case it is uniform and of even density over the entire film.

For purposes of reference, stains have been classified according to their colour, and the remarks apply to all photographic sensitive materials, including films, plates, lantern slides, paper prints and motion picture film. All of these are coated with a gelatine emulsion which, after developing and fixing, consists of a layer of gelatine in which is imbedded an image of silver or one of its compounds. In the remarks below the word "film" has been used synonymously with such a gelatine silver image.

White Stains.

These may be of four kinds:—

1. *A White Powdery Scum.*—If this is removed by washing it consists of hypo crystals, and is due to insufficient washing of the film. If it is insoluble in water, and therefore not removed by washing, but is dissolved by sodium carbonate or acetic acid, it consists of aluminium sulphite. This solubility test can easily be made by placing a drop of a 10 per cent. sodium carbonate solution on the edge of the film and then washing by dipping in water. If on drying the film is clear, then the deposit is most probably aluminium sulphite providing an alum fixing bath was used.

The acid fixing bath most commonly used consists of a mixture of alum, acetic acid, sodium sulphite, and hypo, or in other words, a mixture of hypo and aluminium sulphite dissolved in acetic acid. If sodium carbonate is added to this the acid is neutralised forming sodium acetate, and as soon as the amount of acid in the bath falls below a certain critical value the aluminium sulphite comes out of the solution turning the bath milky and deposits as a white sludge, which settles on the surface of the film and is not removed in the wash water.

Since developer is carried over to the fixing bath by the film, only a definite number of plates or prints can be fixed before the critical point is reached and the precipitation of the sludge commences. At temperatures around 65 deg. F. usually a further quantity of acid hardener may be added to the fixing bath to compensate for this developer carried over, though in warm weather there is danger of sulphurisation (see below).

In order to prolong the life of the fixing bath and prevent the formation of aluminium sulphite it is therefore advisable to:

(a) Rinse the film between the developing and fixing so as to remove as much developer as possible.

(b) Use a developer containing a minimum amount of alkali.

(c) Use an acid stop bath between the developer and fixing bath. Stop baths should always be used with discretion, otherwise an excess of acid is carried over to the fixing bath which in turn causes sulphurisation.

A 2.5 per cent. solution of sodium bisulphite forms a useful stop bath, though the following hardening stop bath is to be preferred:—

	Metric	Avoirdupois
Potash chrome alum ...	15 gms.	½ oz.
Sodium bisulphite	15 gms.	½ oz.
Water to	1 litre	32 ozs.

In time this bath will deposit a sludge as a result of contamination with developer, when it should be thrown away.

If the aluminium sulphite sludge still appears after observing the above precautions, then either the acid hardener was not mixed correctly (probably too little acid was added) or the acid used was not up to strength, or too much sulphite was used.

Precipitation may take place on the print or negatives with a very alkaline developer even when the fixing bath is clear, if no stop bath is used. This is due to the fact that precipitation occurs before the developer has time to diffuse away from the film. A rinse or stop bath in such a case is absolutely essential.

In view of the solubility of aluminium sulphite in caustic soda, or sodium carbonate, the scum is easily removed by bathing the film for a few minutes in a 5 per cent. solution of sodium carbonate and washing thoroughly. If the temperature is above 65 deg. F. it is advisable to harden the film for 2 or 3 minutes in a 3 per cent. solution of formaline and then wash before the above treatment.

2. *Yellowish White Opalescence.*—This particular stain is usually visible only on negatives or transparencies, and gives the negative the appearance of having been made on opal glass or celluloid. The deposit is insoluble in water, acids, and sodium carbonate and is not removed by bleaching and redeveloping (see below). The stain consists of finely divided or colloidal sulphur and may be due to one or more of the following causes:—

(a) Too much acid or too little sulphite in the fixing bath. When acid is added to hypo sulphur is thrown down as a yellowish white precipitate, but this may be prevented by the presence of sodium sulphite which dissolves sulphur. If, therefore, the proportions of acid and sulphite are not correct in the fixing bath, or if impure sulphite is used or an excess of acid is added to the fixing bath, either directly or as a result of using a stop bath which does not contain sulphite, sulphur is gradually precipitated, and this precipitation takes place likewise in the gelatine film.

(b) The fixing bath is too warm. A correctly compounded fixing bath will keep for only a comparatively short time at temperatures above 85 deg. F. The only remedy is to renew the bath as soon as sulphurisation begins.

(c) The use of a plain alum bath either before or after fixing will often cause sulphurisation, because alum behaves like an acid towards hypo. If the alum bath must be used, the film should be washed free from hypo before treatment.

A fresh sulphur stain may be removed by immersion of the film in a warm solution of sodium sulphite. A 10 per cent. solution is satisfactory at a temperature of approximately 100 deg. to 120 deg. F. It is, of course, necessary to superharden the film by bathing for 2 or 3 minutes in a 5 per cent. solution of formaline and washing thoroughly before treatment.

3. *Silvery White Opalescence.* This peculiar stain is formed when drying negatives or transparencies by means of denatured or wood alcohol and especially if the drying is hastened by means of heat. This phenomenon has been attributed to various causes, including the use of impure alcohol, or alcohol containing rosin, insufficient fixing, or washing of the film, the presence of calcium salts in the wash water, etc., but although these factors may influence the amount of opalescence produced, they are not the determining factors, since it is possible to obtain severe opalescence by immersing a film of plain gelatine in pure grain alcohol and drying at a temperature of 95 deg. F. The amount of opalescence produced is greater the more rapid the drying and the higher the temperature of drying, but it rarely occurs even if the film is insufficiently fixed and washed if drying is conducted at 70 deg. F.

The opalescence is apparently due to precipitation of the gelatine by the alcohol to a dehydrated modification which is also produced by adding alcohol to a solution of gelatine in warm water. Hard gelatine is more readily precipitated than soft gelatine.

The precipitation is also produced by strong solutions of hypo, sodium sulphite, etc. When fixing a negative in a strong solution of hypo containing an excess of acid hardener, the fixed out film often appears milky, especially in warm weather, though the milkiness disappears in the wash water when the precipitated gelatine returns to the hydrated modification. This opalescence will often appear when removing sulphur stains with a warm solution of sodium sulphite (see above) but disappears on washing.

Immersion in water and drying at normal temperatures removes the opalescence completely. When drying with alcohol, opalescence rarely occurs if the film is thoroughly fixed, washed, immersed in a mixture of 90 vols. of alcohol and 10 vols. of water, surface dried, and then dried in a fan at a temperature not exceeding 70 deg. F.

To summarise: It is, of course, possible for two or more varieties of white stains to be present on the same film. To remove an unknown stain, therefore, the film should first of all be fixed in plain hypo, washed and bathed in a 10 per cent solution of sodium carbonate and washed to remove any aluminium sulphite. If a stain still persists this is due to sulphur, and is removed by first hardening the film for 2 or 3 minutes in a 5 per cent. solution of formaline, immersing in a 10 per cent. solution of sodium sulphite at 110 deg. to 120 deg. F. and washing.

4. *Yellowish White Stain.* The particular stain in question occurs only on old D.O.P. (gaslight) prints, the effect being a faded appearance chiefly in the high-lights where there is least silver, and the colour of the image is usually yellowish white. This stain, which develops with age, is due to the conversion of the silver image to a yellowish white modification of silver sulphide. That such a modification does exist can be shown by immersing a piece of well washed unexposed printing out paper, the emulsion of which consists essentially of silver chloride, in a 2 per cent. solution of sodium sulphide. Prolonged action of the bath produces a yellowish white image whose colour resembles that of the stain in question.

The formation of the silver sulphide may be due to either internal or external causes. Internal agents are usually insoluble thiosulphates left in the print from insufficient fixing and washing as explained above. Owing to the action of the atmosphere and moisture these thiosulphates are oxidised, and at the same time the silver image of the print is converted to silver sulphide.

If the print is fixed in a sulphurised bath which is slowly depositing sulphur, caused by too much acid in the fixing bath, or by the use of a too strongly acid stop bath (see Sulphur Stains above), the sulphur is left in the print even after washing, and this combines with the silver image to form silver sulphide. The comparative ease with which the silver image of a print is sulphurised as compared with a negative image is due to the fineness of grain of the print image.

External agents are sulphureous gases in the air such as sulphuretted hydrogen, while the hypo in the mount of a print may be decomposed and act in a manner similar to that of the thiosulphates left in the print as outlined above.

If prints are thoroughly fixed in a fresh acid fixing bath, which is perfectly clear and not depositing sulphur, and then thoroughly washed the stains may be entirely prevented.

The removal of the stains, or rather the restoration of the image to its original colour, is often a very simple matter but may also prove to be a complicated procedure.

The image of the stained print may consist of several substances, including unchanged silver, silver sulphide, possibly oxidation and silver stain (see below), undissolved thiosulphate, and possibly silver photo-halides. Usually bleaching and redeveloping, as in the case of the removal of oxidation stain (see below), will thoroughly restore the print, though in a severe case proceed as follows:

Remove all dirt from the print by dabbing with a piece of stiff dough made from wheat flour. Grease marks can be removed with benzol, or petrol, and the print finally rubbed over with alcohol. If the print is mounted, detach it from the mount by first thoroughly soaking in water, and then placing face downward on a sheet of smooth paper and tear the mount away from the print. This is important, otherwise if an attempt is made to pull the print away from the mount it will inevitably be torn. If the print is dry mounted, heat in a press and strip.

Now fix the print thoroughly in plain hypo to remove any undissolved silver halide, wash thoroughly, and then harden by bathing for 2 or 3 minutes in a 3 per cent. solution of formaline and wash. If the high-lights are stained this is due to silver stain, which should be removed in a 2 per cent. solution of potassium cyanide, removing the print as soon as the image begins to be attacked. (Cyanide is a deadly poison and should be used with great care.) Then wash thoroughly. The print should now be bleached in the permanganate bath and redeveloped as recommended for the removal of yellow stain (see below). The permanganate bath converts the image consisting of silver sulphide to silver chloride and this develops to a black silver image in the redevelopment.

Yellow Stain.

This may be of two kinds. (1) developer or oxidation stain, and (2) silver stain.

1. Developer or oxidation stain is caused by oxidation products of the developer which are transparent like a yellow dye. The stain may be either "local" or "general." Owing to the fact that printing papers are usually sensitive chiefly to blue light which is strongly absorbed by a yellow colour the stain acts as if a yellow filter were placed over the negative. Local yellow stain, therefore, causes the image on the print to be weaker in those spots where the stain is present.

General yellow stain which covers the entire film just as if the film had been uniformly dyed yellow has no harmful effect other than to increase the printing exposure.

Local Developer Stain. All developing agents, such as Elon, pyro, hydroquinone, etc., have the property of readily combining with oxygen, especially in alkaline solution, to form oxidation products which are invariably coloured yellow or dark brown, and which have the property of staining gelatine just like an aniline dye. When a developer is exposed to the air

oxidation takes place and the developer turns yellow more or less rapidly according to the temperature, the nature of the developer and the amount of surface of developer exposed.

The oxidation products, however, can in turn be reduced back again to a colourless condition by substances like sodium sulphite or bisulphite, so that if the developer contains an excess of sulphite the rate of formation of the oxidation stain is slow and usually proportional to the amount of sulphite or preservative present.

Apart from aerial oxidation, during development the developing agent is being used up, by virtue of its reducing action in changing the exposed silver salt to metallic silver, and in so doing it is oxidised itself, the product formed being usually identical with that produced by aerial oxidation. The amount of oxidation product formed in this way is, of course, proportional to the amount of silver, so that the photographic image is of a duplex nature consisting of a stain superimposed on a silver image. That such an image exists can be readily seen by immersing a pyro developed negative in Farmer's reducer, which removes the black silver image, leaving a yellow image which is composed of the oxidation product of development. The utility of this stained image is explained below.

Most developers form such a stain image, though with developers like glycin, whose oxidation product is readily decolourised by the sulphite in the developer, the stain image is very feeble.

The oxidation product, apart from being coloured, has the property of tanning gelatine, so much so that if a negative developed with, say, caustic hydroquinone, is placed in hot water, the gelatine in the clear and unhardened portions dissolves away leaving a relief image.

Local irregular shaped stains are caused by local oxidation of the developer which may be due to:

1. Careless handling of the film by incomplete immersion in the developer or fixing bath. A slight curl of the film or print, or too many films or prints in one tray, will leave some part of the surface exposed to the air, oxidation will take place and a yellow patch will appear corresponding in size to that of the portion of the emulsion exposed to the air. In motion picture work if the top of the film rack is not thoroughly submerged an oxidation yellow stain is produced which appears on the film at regular intervals. To prevent such stains it is obviously necessary to immerse the films or prints completely in the developer or fixing bath.

2. An alkaline fixing bath. Since a developer oxidises more rapidly in alkaline than in neutral or acid solution, as the acid in the fixing bath becomes neutralised by the developer carried over by the film, this developer oxidises more and more rapidly and stains the fixing or stop bath. When the fixing bath froths readily, it is probably alkaline and should be thrown away, though in some cases it is possible to renew the acidity by adding further amounts of acid hardener at intervals.

It is always important to move prints or films around in the fixing bath so that the alkali in the developer in the print is killed at once by the acid in the fixing bath. If the prints or films are simply thrown into the bath and allowed to remain at rest, the developer clings to the film and the acid in the bath is not strong enough to neutralise it completely, so that the developer oxidises and stains the film locally wherever there is an excess of developer, and especially if the film is locally exposed to the air.

An acid stop bath between developing and fixing is an almost certain cure for local developer stain (for formula see aluminium sulphite stain above). This neutralises the alkali in the developer in the film before it reaches the fixing bath, thus reducing the tendency for further oxidation.

General Developer Stain.—This exists uniformly over the entire surface of the film and is caused by:

(*a*) Old or discoloured developer or a developer containing an insufficient amount of sulphite or impure sulphite. General pyro stain is the most common on negatives.

In the case of prints, general yellow stain is produced if development is forced in a warm developer, or in a dirty tray, or if the prints are rinsed too long after developing and before fixing.

(*b*) The use of a plain alkaline fixing bath.

Developer or oxidation can be removed in two ways, (*a*) chemically, (*b*) photographically.

(*a*) If the oxidation product of the developer (oxidation stain) is treated with an acid solution of potassium permanganate it is oxidised further to a colourless substance which is soluble in water. Such an acid solution would dissolve the silver image also, but if sodium chloride is added, the bath converts the silver image to one of silver chloride while the stain is being oxidised. If the silver chloride image is now exposed to light and developed in a non-staining developer, the original silver image is restored free from stain.

To remove developer stain, therefore, proceed as follows:—

First harden the film by bathing for 2 or 3 minutes in a 5 per cent. solution of formaline and wash for 5 minutes, otherwise the gelatine is apt to soften and frill during the subsequent treatment. Then bleach in the following:—

		Metric	*Avoirdupois*
A	Potassium permanganate	5 gms.	75 grs.
	Water to	1 litre	32 ozs.
B	Sodium chloride (common salt) ...	75 gms.	2½ ozs.
	Sulphuric acid (Conc.)	15 ccs.	½ oz.
	Water to	1 litre	32 ozs.

A 5 per cent. solution of hydrochloric acid can be used instead of solution B; but as it is often of uncertain strength its use is not recommended.

The solutions A and B keep well if kept separately, but not when mixed, and for this reason the bleaching-bath should be prepared as required.

When preparing the solution A, be sure that no particles of undissolved potassium permanganate remain, for they will cause spots and blemishes in the negative.

The bleaching should be complete in about 3 or 4 minutes, when there is usually left a general brown stain all over the film due to manganese oxide, and especially in those parts previously occupied by the image. It is best to remove this stain by placing in a weak solution, say, 1 per cent. of sodium bisulphite. Then rinse and develop in a *strong light* (daylight if possible) with an ordinary developer, say Nepera solution one part, water four parts.

When removing stains by the above procedure markings caused by drying a negative without removing the drops of water (water markings) are usually removed also unless the markings are of long standing.

(*b*) Local yellow stains may be removed photographically by superimposing a deep yellow filter over the negative and making a positive from this in a printing frame on a panchromatic plate just as when making a paper print from a negative. A suitable filter is the Wratten G filter film and a suitable plate is the Wratten Panchromatic.

The panchromatic plate is sensitive to light transmitted by the G filter and in turn the G filter is of a deeper yellow than most yellow stains which are, therefore, eliminated providing the stain is completely transparent. If the stain contains any grey deposit the filter will, of course, only filter out the yellow colour from it.

An alternative method is to illuminate the negative by transmitted light as when copying or making an enlarged, reduced, or full-sized positive, and use a sheet of the filter film or a filter mounted between glass over the lens. In this case a piece of filter only slightly larger than the diameter of the lens mount is required.

Filter film consists of dyed sheets of gelatine and when not mounted between glass should be kept dry and free from finger marks.

After the positive is made it is a simple matter to make a duplicate negative on, say, Eastman. Commercial film or a Seed 23 plate in the usual way.

J. I. CRABTREE.

(To be continued.)

CARRIERS FOR FLAT FILMS IN SOLID-FORM SLIDES.

In these days of still enhanced prices for dry-plates, carriers to take a smaller size film in many cases possess advantages, and with hand-cameras usually fitted with a lens of somewhat short focus the enforced use of a smaller picture in portraiture ensures a more distant view-point, diminishing any tendency to violent drawing, the same remark applying in lesser degree to landscape work.

The Eastman flat film, now supplied in a variety of brands, offers itself advantageously for the purpose. The portrait film, despite its name, is well adapted for snapshot work, producing negatives with a fine range of soft gradation and ample density. Pinholes, due to particles of backing becoming disengaged and settling on the sensitive surface during a day's tramp, naturally are unknown, and the non-halative properties of these films enable one to face with equanimity subjects that would try a backed plate.

The fact that the films are not supplied in standard sizes smaller than 5½ × 3½ does not matter for our present purpose, as it is a simple matter to adapt postcard and half-plate films by cutting them in two, and in doing so a certain sense of satisfaction arises, partly due to the reflection on saving in cost and partly to a dim idea at the back of the head that the makers are being neatly circumvented at the same time. [Since our contributor wrote his M.S. sizes of Eastman portrait film as small as 3¼ × 2¼ in. have been issued. Eds. "B.J."]

There must still be in use a large number of 5 × 4 hand and folding cameras fitted with solid-form wooden dark slides, though this size for some time has been falling out of favour. For these, the half of a half-plate film, affording pleasing proportions, is admirably fitted. Masks on the finders, or lines on the focussing screen, will be the only alterations required to the camera.

Taking a type in which the plate is held by the rebate at the bottom and turn-buttons on top, fig. 1 shows the front of a 5 × 4 card carrier for the half of a half-plate film, which is retained by the rebate of the slide at the bottom, and by an attachment to the carrier at the top. It gives a picture size of about 4¾ × 3¼, allowing for the parts cut off top and bottom, and any ragged edges at the sides. The nick in the Eastman film, placed in invariable position to distinguish at a glance back from front, will in one of the two cut-down films be found at the side. It will also be found that the films are always cut under size, in their length sometimes very perceptibly so.

A piece of good quality millboard of suitable substance (cheap cardboard is poor economy) has black needle-paper glued on both sides, and is cut to fit the slide. On this are stuck, distant 4¼ ins. from the bottom, two very thin card strips *a a* made out of one thickness or more layers of stiff writing paper, and faced with orange paper to avoid reflection of actinic light on the bellows or walls of the camera. Orange paper is preferable to black, as easily seen when loading in the dark-room. Two further pieces *b b*, projecting from *a a* a full 3-16 in., are next attached in position shown, taking care they do not foul the path of the turn-buttons. To prevent lateral movement of the film, two strips of thicker card *c c*, equidistant from the sides of the carrier, are glued 3¼ ins. apart.

The carrier is inserted in the slide and secured; one end of the film is inserted in the bottom rebate, and the other sprung under *c c*. The space allowed (about ¾ in.) between the top strips readily admits removal of the film, without disturbing the carrier, by the insertion of a finger nail.

In the case of single metal slides, the distance between the focal plane and the travel of the shutter is too small to allow of the foregoing method of construction, and a modification becomes necessary. Fig. 2 illustrates the *back* of a quarter-plate card carrier to take half of a postcard film, affording a picture size about 3½ × 2½. An opening *d d* is cut this size, and two strips *e e* of card (no thicker than the film) are fixed, as shown, 2¼ ins. apart. On these are glued two thin strips (not shown in the diagram to avoid confusing it) of some flexible and elastic material, such as parchment paper, which

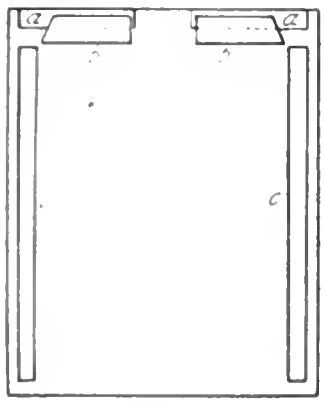


Fig. 1.

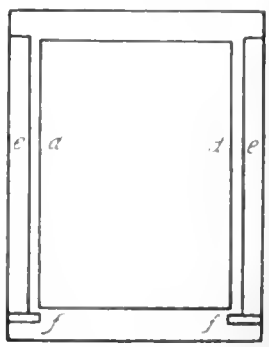


Fig. 2.

project towards the centre about ¼ in. The two pieces of card *f f* are merely stops and not strictly necessary, the film being slid in the other end. For the sake of clearness in the diagram the stops are shown clear of the lower edge of the aperture; in practice they should coincide with it. It is necessary that the fit of the film be a binding one to prevent it partially slipping out at the free end.

The carrier and held film are inserted in the metal slide in the same way as a dry plate; this results in the sensitive surface being about 1-16 in. behind the focal plane, which must be allowed for when focussing by scale. Even if the lens will not retreat beyond the infinity mark, rare are the cases when true infinity is demanded. If focussing be effected on a ground-glass screen, reversing it will be sufficient for all ordinary work.

Although such a carrier has not been tried for magazine hand-camera sheaths, doubtless it would answer well. By omitting the cut-out aperture and employing the carrier with the attached strips towards the lens, it is obviously equally well adapted for solid-form and book-form wooden slides. Apart from direct portraiture, such carriers may be of use occasionally in the studio for copying miniature prints, when half of a postcard film, or even quarter of a half-plate, can be pressed into service.

E. A. S.

ST DUNSTAN'S.—The annual report of the work of St Dunstan's and its allied institutions for the care and relief of soldiers and sailors blinded in the war, which has just been issued by Sir Arthur Pearson, shows the very successful records in the training of men for suitable technical occupations, and also the supervision which is exercised in endeavouring to enable them to make profitable use of their training as a means of livelihood. St Dunstan's still needs support by donations; it is almost pre-eminently the war-created institution which deserves to receive them.

CLIFFORD PHOTOGRAPHIC SOCIETY.—This Society has now changed its name to Forest Hill and Sydenham Photographic Society, and has appointed as secretary Mr. C. H. P. Nutter, 39, Warminster Road, South Norwood Park, London, S.E 25. Meetings are held on the first and third Monday in each month, from October to April, at Dartmouth Hall, Forest Hill.

IMPROVEMENTS IN FLASHLIGHT.

[The following paper, read before the Royal Photographic Society and now reprinted in the Society's journal, embodies much of the experience of our contributor, Mr. D. Charles, in flashlight work, and particularly in the use of a flashpan of rather narrow trough for securing a very great spread of the flash.—EDS. "B.J."]

THE possibilities of flashlight have always appealed to me very strongly. Whether one's photography is done for a living, or for pleasure, or whether one takes photographs without any ostensible reason, and merely as a habit, there are many occasions when the supply of daylight is inadequate, or even non-existent.

Packed in a few cubic inches we have here a source of actinic light suitable for any and every subject, available at a moment's notice, and really instantaneous in its action. Is there any other illuminant of which that can be said?

I propose first of all to trace the reasons why flashlight has been hitherto not so generally popular or successful as it deserves, and then to demonstrate how the difficulties have been overcome. It seems at first sight one of the simplest things in the world to set fire to a small quantity of inflammable flash-powder and allow the flare to shine upon the subject to be photographed. Many methods have been used, each of them offering certain advantages, and also some distinct disadvantages, and the difficulties of overcoming the latter have proved so troublesome that when a man has succeeded in finding a satisfactory method of ignition he feels that at last he has mastered the difficulties of flashlight work. I want to emphasise, as strongly as I can, that although satisfactory ignition has been the greatest obstacle of all, that is really only the first step to the production of really good photography. No one would suggest, for instance, that switching on an electric arc, or a few half-watt lamps, is all that is necessary to provide satisfactory lighting for making photographs, especially when the subjects are human faces.

I will ask you to bear with me while I describe various methods in general use, and while I cannot pretend that I have any epoch-making discoveries to show you, I hope to show you where the troubles really lie, and how far I have succeeded in overcoming them.

The first lamp I wish to show represents one of the earliest known flash-lamps. It consists merely of a clay pipe with some cotton-wool tied round the bowl, and a piece of rubber tube attached to the stem. While this is the crudest form of this lamp, improvements upon it are merely elaborations and are not real improvements as regards efficiency. Some plain magnesium powder is placed inside the bowl, and the wool is moistened with methylated spirit and set alight. On blowing through the tube the powder is forced through the flame and some of it is burned. Now the principal fault with this type of lamp was that the flame is far from being an instantaneous one. If one blows hard enough to make it rapid, much of the powder gets through without being burned. In any case the flame is a very small one, casting extremely sharp shadows, and plain magnesium produces a large amount of dense smoke and dust. When explosive powders were first placed on the market, the rule was to lay a quantity on a flat piece of tin, and to fire it by means of a strip of touch-paper. Now touch-paper is a very useful method of firing flash-powder provided one is not particular when the exposure is to take place, that is to say when there is nothing in the subject that is alive; but even that simple method has its own little difficulties. Touch-paper is very hygroscopic, and when damp burns feebly and jerkily, and often when the glow reaches the powder it goes out. To overcome this it should be well baked and kept in a little tin or in waxed paper, and when required for use a small strip should be folded along its length in this manner, and will then be found to burn in a much more energetic fashion.

However, most subjects that are photographed by flashlight do contain living subjects, and it was not long before it was realised that some means was desirable of firing the flash, not only at the exact moment required, but without giving the subject sufficient warning of the exposure to close eyes, or otherwise spoil the result. One of the earliest methods of achieving this was by means of a pin kept red-hot, which was released so that it should enter the heap of powder at the precise instant desired, and this remains to-day as simple and as certain as any method that exists. The lamp which I have here employs this idea, but it is intended principally for portrait work where a supply of gas is available for the Bunsen burner, and where it will become more or less a fixture. When the Bunsen is lit the pin becomes red-hot in a few seconds, and on a gentle pull being given to the cord from any point in the room the pin swings over and enters the pan through a small hole. In releasing the cord the pin swings back again into the flame, and the pan is lifted down for recharging. On replacing the pan it slips into correct alignment quite automatically. There it is, always ready for use, nothing to go wrong, and it will make portraits as well as any artificial light at a cost of about a halfpenny each for powder.

For igniting powder in the case of portable lamps paper caps have been a favourite means, and very good they are, although I understand they are rather difficult to get just now. The difficulties in their use have been two, and for those who take the precaution to keep them dry there has been only one thing against them, and that is the lack in lamps designed for firing paper caps of some provision for ensuring that the spot of explosive substance will remain where it will be struck. During the war some bright spirit discovered that a wax-vesta made a good substitute for the paper cap, but of course the same difficulty of keeping it in place was experienced, only more so. I found after some experiment that if vestas are well dried and then kept in a little tin, they are even more certain than paper caps to give a sufficient spark, but for this purpose they must receive a fairly sharp blow. A metal cap, as used in sporting guns, is now obtainable of very good quality indeed, and this is more rapid in firing than either the paper cap or the vesta, but it makes a much louder explosion. I have here a small lamp of my design made to fire with a wax-vesta. It may not be thought very pretty to look at, but it is not designed to that end. It is designed to make the photographs taken by its aid nice to look at.

The next lamp I shall show you will fire a metal cap, and by changing the small nipple for another kind will fire either a paper cap or a wax-vesta. This lamp packs into a comparatively small compass, and forms one of the handiest pieces of apparatus that a photographer can possess. I have on the table some of the experimental forms through which this lamp has passed, and I must confess to a feeling of achievement in showing you this instrument. There is a good deal more than meets the eye in a thing of this kind. For instance, take the little nipple that is used for a metal cap. A nipple as used in a shot-gun is quite unsuitable for use in firing flash-powder, and a whole series of experiments was necessary to determine the best sizes of the hole at each end as well as other points in its design; and this part, as well as other essential parts of the lamp, are made of the finest steel and hardened after making.

We now come to electrical modes of igniting flash-powder. A fuse across two terminals and fired by means of house-current is a favourite, but it has the obvious drawback that current is not available everywhere. Besides this the terminals need frequent cleaning, and the fitting of a fine fuse wire often is found a nuisance. I have also found objections raised on the part of many people to any such attachment being made to a house-supply, on account of the real or fancied risk of

blowing the main fuse, not a desirable thing where a public function is in progress. Fuses fired across dry batteries or accumulators have the disadvantage that they short-circuit the cells, which are therefore rapidly exhausted, and in that condition the fuse is very slow in getting hot and sometimes fails to ignite the powder altogether. I do not think that anyone who has used this method has stuck to it for very long. I have here a means of igniting flash-powder which has certainly been used on a very large scale for detonating dynamite in quarries, as well as for petrol ignition, namely high-tension spark, but hitherto there have been very great difficulties in getting it down to a reasonably small weight and compass for our purpose, and at the same time within a moderate cost. It is worked from accumulators or dry-cells, but absorbs very little current indeed, and requires no fuses whatever, so that a series of exposures can be made as fast as one can change plates and ladle on the powder. It also solves the problem, for the first time I believe, of firing several charges absolutely at the same moment, so that it becomes possible to arrange a series of lamps in various positions in a large building and fire them all with one pressure of a button, without the possibility of one flash going off before the remainder. The importance of this is seen if it is remembered that if there is the slightest discrepancy the first flash makes people blink, and the next photographs them in that action. As with other methods of ignition, this also has presented difficulties in adapting it for flashlight work.

Having shown, I think, that no difficulty now exists in setting fire to our flash-powder at the precise instant one wants to, I want to repeat that we have really only made the first step towards getting successful flashlight photographs. If one puts some powder on a flat tray, and fires it, by whatever means, the flare that results is about the most unsuitable as regards its shape for illuminating the subject that could be imagined. The shape of a flame obtained in this way is something like we are taught at school this earth resembles, a flattened orange, or in more scientific language an oblate spheriod. Most of the light shines straight upwards, and there is as much illuminating the surroundings as there is upon the subject, and the condensed nature of this flame is what causes the shadows often to be so harsh and dark. Of course, this is easily overcome by burning a great deal of powder so that the side of the flame shining on the subject is sufficiently large, but even if one is prepared to do this there is seldom really enough light to give adequate illumination in the shadows, and the amount of smoke produced will be very great, besides which flash-powder is not cheap enough to be thrown away in this manner. Fortunately there is a much better way out of the difficulty. You will notice that in each of the lamps I have shown you the pan is of a deep narrow section. The object of this may at first sight seem to be to prevent the powder falling about, but the real purpose is to act as a sort of guide to the explosion, and its effect it to extend the illuminating area of the flame to an extraordinary size. Some people suggest that this little front wall covers some light that might otherwise be employed in lighting the subject, but such is not really the case. An analogy is represented by firing a bullet. If one laid a bullet on a table with a little cordite behind it and ignited the latter, it is possible that the bullet might just turn over and die, but I rather doubt if it would move at all. By enclosing the explosion, and by the further interposing of thirty inches of friction, which might be thought to slow the bullet down, it actually is made to travel two miles. Perhaps I can further explain my point by showing this roughly crumpled sheet of paper, corresponding in shape to the flame produced by an open try. The effect of the deep narrow tray is to spread the flame into a flat sheet represented by a similar sheet of paper held up with its flat area towards you.

A large flame of this description has many advantages. The explosion from the centre forces the powder into such a large space that every grain of powder gets all the oxygen it wants for complete combustion, so that there is no dust from half-burned powder and all of it is used in lighting the subject. The flame at its edges is not so hot as a condensed flame, and there is really very little danger of setting fire to anything. With this shape of tray the flame is always upwards and outwards, never downwards on to the operator's hands, as is easily proved by examining a lamp that has seen a long service, the marks of the flame seldom coming more than an inch or so over the edge. Every photographer will recognise the advantages of a big light-source for getting roundness and for illuminating the shadows.

There is only one point now that I want to call your attention to in the matter of improvements, and that is in regard to very vague ideas that have been current as to the amount of flash-powder necessary for any particular job. Makers of powder have told us on their packages that so much was required for a portrait, and so much for a group, as if there were no such things as stops and plate-speeds. German manufacturers used to go a step farther by issuing tables of quantities, but these always took it for granted that one would carry a pair of scales to the scene of action and would be prepared to weigh out small quantities for each exposure. I have taken it for granted that flash-light users will employ the very fastest plates they can, and that being the case, exposures, that is to say powder quantities for average subjects, will depend entirely on two factors, namely the lens stop, and the distance of the subject from the flash. The position of the camera makes no difference unless one is taking a close-up picture such as a large head and shoulders portrait, when, of course, the usual rules come into force.

I have worked out a small table of stops and distances, but which will be found quite a reliable thing for all that, and along with it is a little ladle. This has a flat disc at each end, as it is found that a spoon is liable to retain some of the powder in it, and the idea is that if one gets as much as one can on the disc the quantity will be practically the same every time. You will notice there is one disc smaller than the other. The small ends holds just half what the large end does, and it is particularly useful in portraiture, as the quantity of powder it holds is right for the average portrait taken on an ultra-rapid plate with a lens at *f* 4.5.

Finally, a word regarding the smoke trouble may be desirable. Smoke trouble is practically a thing of the past. Provided that is that you do not want to make a long series of exposures in an unventilated room. I will just fire, to justify my statement, a couple of flashes in such a way that you will be able to notice the relative amount of smoke produced. The first will be a foot of magnesium ribbon. For a portrait with a very rapid lens and plate it would need quite three times this, so I will ask you mentally to multiply the result by three, which will give you some idea of the amount of smoke evolved by either plain magnesium or by old-fashioned flash-powders in the smallest quantity that one would ever use.

The next thing I want to show you is the amount of smoke given by a corresponding quantity of a modern high-class flash-powder. This time there will be no multiplication necessary, as the flash will be the actual quantity used for a portrait under similar conditions. If anyone wants to use flashlight as a regular studio dominant, I shall be very pleased to show him a simple and rapid way of getting rid of the smoke.

D. CHARLES.

FORTHCOMING EXHIBITIONS

April 27 to May 7. Bury Y.M.C.A. Photographic Society. Particulars from the Hon. Secretary, A. Benson Ray, 3, Agur Street, Bury, Lancs.

August 27 to September 10. Toronto Camera Club. Latest date for entries July 20. Particulars from the Hon. Secretary, J. R. Lesser, 7 Grand Street, Toronto, Canada.

A WOMAN PIONEER. According to the newspapers, there has just died at Lucy Cross Almshouses, Wells, Somerset, Mrs. Maria Budge, aged 82 years, stated to have been, with her husband, a pioneer of photography on a commercial basis in the West Country.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Renovating Backgrounds.

Now that the spring-cleaning of the studio is in most cases done, possibly the backgrounds are the only things that look a little shabby, and, as elaborately painted grounds are rarely found in a modern studio, it is not a difficult matter to put them in repair, whether stretched on frames or hung on rollers.

If on frames, tack down the canvas in any cases where it may have parted company with the frame, and if torn, a piece of old background, or other canvas, should be glued to the back, the torn edges being firmly pressed down from the front.

We will take a plain white background first. To prepare the paint, take 4 ozs. of size and boil it up with a pint of water. When the size is dissolved, take 6 ozs. of whiting and mix to a paste with a little of the size solution, finally adding the whole of the pint, and stir thoroughly. Then commandeer the ordinary household blue-bag, and give the paint a decided blue tint, remembering that it will dry considerably paler. If the blue is omitted, the paint dries a creamy tint, and will not photograph nearly so dead white. This should be applied evenly with a large distemper brush. The canvas should be first well brushed to remove all the dust.

To prepare black paint, take 5 ozs. of size and boil up with ½ pint of water. Then put ½ oz. of vegetable black into a bottle, adding ½ pint of water, and shake up vigorously. When thoroughly mixed, add to the size solution, and stir up well. Vegetable black cannot be mixed to a paste like whiting. Being so light, it merely floats on the surface of the water. A ground painted all over with this, when turned a little from the light, gives a good dead black.

By mixing the white and black, any shade can be made to match any rubbed or damaged places on painted backgrounds. As this mixture is rather deceiving while liquid, it is advisable to apply a little to a piece of old canvas and let it dry, to see the correct shade, if it is to match exactly. This mixture is also useful for renovating studio accessories, such as "stone" seats, etc.

The paint is a mixture rather than a solution, and should be stirred round with the brush every time a fresh brush full is taken, and works better if allowed to stand, with an occasional stir, for a day, or even longer.

As size sometimes varies both in strength and aroma, a little more should be used if the paint rubs off when dry, and a little turpentine will kill any objectionable smell. Prepared or concentrated size may be used; about ¼ oz. to a pint of paint.

An out-of-date, disused background can easily be converted into a new one, a soft, clouded effect being an easy matter. Unless perspective and drawing is your strong point, anything in the way of straight lines should be avoided.—R. H. F.

Enlarged Negatives.—Quite good enlarged negatives can be made either by the Kerotype method or by Kodak transferrotype. Such negatives allow of far more touching and working up than do those made on dry-plates. The cheapest method of making enlarged negatives is the old wet-collodion method, but it requires skill not often met with in modern studios.—O. P.

Reducing P.O.P.—Users of P.O.P. have often wished to save a print that has become hopelessly too dark, especially when of large dimensions, without degrading the final tone. The most successful reducer we have ever tried for the purpose is Griffin's "Parazone," used for negatives. A strong solution used after washing and before toning reduces the print so that the resulting gold tone is good and rich as usual.—M.B.

Using Desensitol.—This desensitiser may, as the instructions state, be used as a preliminary bath before development, or mixed with the developer. When using a developer containing hydroquinone, however, it is advisable to use the desensitiser as a preliminary bath, and not mixed with the developer. I find that when mixed with the developer named a precipitate is formed, and the developer is made unworkable. When the desensitiser is used as a preliminary bath, however, and the plate is rinsed afterwards, metol-hydroquinone works properly after it.—L. T. W.

Discolouration of "Matchless" Paper.—Users of the new "Matchless" sensitive paper may have discovered how very quickly the sensitive side of the paper discolours when laid in contact with cardboard, packing paper, newspaper, etc., even the placing of the sheet of instructions between two of the sensitive surfaces causing a discoloured patch. This, however, is no drawback to the paper, as the discolouration invariably disappears when the print is placed in the fixing bath and the whites are quite clean when the print is finished. One sometimes meets with the same kind of markings on matt self-toning papers, these disappearing in a like manner in the hypo bath.—L. T. W.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, April 18 to 23:—

Developing Films.—No. 11,432. Devices for holding photographic films when developing. W. Brookes.

Soft Focus Effects.—No. 11,592. Means for producing photographic soft focus effects. Hanovia Chemical and Manufacturing Co.

Film Containers.—No. 11,702. Containers for photographic, etc., films. G. Rivetta.

Film Spools.—No. 11,703. Spools for photographic, etc., films. G. Rivetta.

Containers for Exposed Plates.—No. 11,492. Containers for exposed plates, films, or cards from photographic apparatus. B. Sharp.

Developing Tank.—No. 11,319. Film-developing tank. T. H. Spencer.

Colour Photography.—No. 11,294. Colour photography. W. M. Warneuke.

Developing Tanks.—No. 11,247. Tanks for developing, fixing, etc., plates, films, etc. F. S. Witcomb.

Colour Photography.—No. 11,556. Colour photography and cinematography. E. Wolff.

Cinematography.—No. 11,165. Cinematographic projection and arrangement of cinemas. L. S. Palmer.

Cinematography.—No. 11,789. Motion-picture films. Pathé Cinéma anciens Etablissements Pathé Frères.

Cinematography.—No. 11,680. Cinematographic apparatus. J. S. Pocovi.

Cinematography.—No. 11,696. Cinematograph films. F. J. W. and P. A. Purton.

Applications, April 25 to 30:—

Optical System.—No. 12,462. Optical system for photographic cameras. S. M. Procoudine-Gorsky.

Cinematography.—No. 12,378. Cinematograph projection apparatus. C. E. Davies.

Cinematography.—No. 11,871. Cinematograph machines. H. A. Stockman.

Cinematography.—No. 11,892. Cinematography. C. H. Verity.

Colour Cinematography.—No. 12,327. Optical systems for a three-colour exposure cinematograph. Firm of C. Zeiss.

Applications, May 2 to 7:—

Trick Photography.—No. 12,883. Means for producing distorted effects in photographs, etc. C. J. Coleman.

Printing.—No. 12,903. Apparatus for printing photographic films. H. V. Lawley.

Negative Making.—No. 12,537. Production of photographic negatives. P. H. Wedmark.

Telegraphic Transmission of Photographs.—No. 12,746. Transmitting photographs, messages, etc., by telegraphy. E. W. Whiston.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

LUXOR.—No. 412,700. Photographic lenses. Taylor, Taylor and Hobson, Ltd., Stoughton Street Works, Stoughton Street, Leicester, scientific instrument makers. February 21, 1921.

AYRONA.—No. 412,797. Photographic papers. John Aeron-Thomas, Dolgoy, West Cross, Glamorgan, manufacturer. February 23, 1921.

THE AMATEUR PHOTOGRAPHER AND PHOTOGRAPHY.—(Title design.) No. B413,431. A periodical publication. Iliffe and Sons, Ltd., 19, Hertford Street, Coventry, publishers. March 15, 1921.

ZONA.—No. 413,311. Photographic papers. Thomas Illingworth and Co., Ltd., Cumberland Avenue, Park Royal, Willesden Junction, London, N.W.10, manufacturers of photographic papers. March 11, 1921.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

NEOL.—No. 408,742. Photographic developers included in Class 1. J. Hauff and Co., Gesellschaft mit beschränkter Haftung, Stuttgarter Strasse, 333, Feuerbach, near Stuttgart, Germany, chemical manufacturers.

VEDOL.—No. 411,452. Chemicals used for photographic purposes. Johnson and Sons, Manufacturing Chemists, Ltd., 23, Cross Street, Finsbury, London, E.C.2, manufacturing chemists.

TICOL.—No. 411,548. Chemical substances used in photography, photographic plates and photographic films. Thomas Illingworth and Co., Ltd., Cumberland Avenue, Park Royal, Willesden Junction, London, N.W.10, manufacturers of photographic papers.

TICOL.—No. 411,459. Photographic papers, photographic albums and photographic mounts, included in class 39. Thomas Illingworth and Co., Ltd., Cumberland Avenue, Park Royal, Willesden Junction, London, N.W.10, manufacturers of photographic papers.

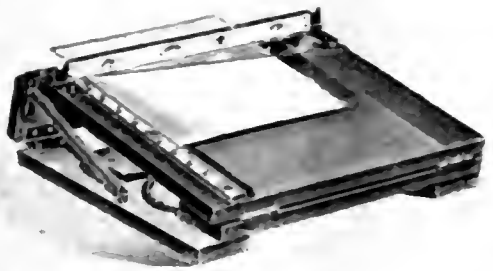
AERO.—No. 411,552. Photographic papers, photographic albums and photographic mounts included in class 39. Thomas Illingworth and Co., Ltd., Cumberland Avenue, Park Royal, Willesden Junction, London, N.W.10, manufacturers of photographic papers.

IMPEX.—No. 411,020. Photographic plates and photographic films. The Imperial Dry Plate Co., Ltd., Ashford Road, Cricklewood, London, N.W.2, manufacturers of photographic materials.

New Apparatus.

The Victo Full View Print Trimmer. Sold by Houghtons, Ltd., 88-89, High Holborn, London, W.C.1.

In this new pattern of trimming desk the user is given the facility of seeing the print right up to the extreme edge of the margin which is to be trimmed away. This is done by hinging the metal straight edge under which the print is held against the knife when



the platform of the desk is pushed down for making the cut. The straight edge is very quickly released from its normally fixed position by pressing forward a projecting stud. The straight edge can then be raised, a glance taken at the margin of the print which is to be trimmed off, and then the straight edge replaced by turning it down until it is secured by a snap catch. A thin celluloid sheet, inserted between the straight edge and the surface of the desk, serves to hold the print in place whilst the straight edge is in the raised position. The trimmer thus provides a facility which at times is of distinct service, whilst it involves no disadvantage when it is not found necessary to scrutinise the whole marginal part of the print when making the cut. The trimmer is very solidly and substantially made and has a platform of 13½ × 12 inches, the effective width of the cutting edge being 12¼ inches. The desk is sent out complete with a carborundum stone for sharpening the knife.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, MAY 23.

Bowes Park and Dis. Phot. Soc. "Art with a little A." J. Vacy Lyle.
Glasgow and W. of Scot. Amateur Phot. Assoc. Excursion to Aberfoyle.
South London Phot. Soc. "Photography—its Present-day Importance and Power." A. Dordan Pyke.

TUESDAY, MAY 24.

R.P.S. Scientific and Technical Group. "The Selection and Use of Illuminants for the Studio." Leon Gaster. "Illumination Problems in Cinematography." J. C. Elvey. "Methods of Light Distribution." John W. P. Walsh. "A Possible Standard of White Light." Irwin G. Priest.
Hackney Phot. Soc. Portfolios by W. Selfe and H. E. Wood.
Manchester Amateur Phot. Soc. "Pictorial Rendering of a Negative." Messrs. Carpenter, Denman, and Rothwell.
Portsmouth Camera Club. "Car-bro." C. S. Hopkins.

WEDNESDAY, MAY 25.

Croydon C.C. "Architecture with a Hand Camera." W. F. Slater.

THURSDAY, MAY 26.

Kinning Park Co-op. Soc. C.C. Open Night.
Kryn and Lahy (Letchworth) Phot., etc., Soc. 1918 Competition Prints, R.P.S.

SATURDAY, MAY 28.

Bradford Phot. Soc. Excursion to Adel.
Hammersmith (Hampshire House) Phot. Soc. Outing to the Zoo.

CROYDON CAMERA CLUB.

Last week Mr. Cavendish Morton was to have lectured on "Shaw, Shakespeare and Cæsar," and doubtless would have talked about something else in his customary manner. Unfortunately he contracted one of the many sore throats, accompanied by etceteras, which are being wafted around at the present time, and was unable to attend.

Mr. Sydney Lawler obligingly filled the gap with an interesting exposition on "Silhouettes." Beyond the fact that the finished picture can be photographed there is nothing photographic in the simple procedure. All that is necessary is to place the sitter in profile close to a sheet of cartridge paper ("Imperial" size) pinned to a board, and employ, as far off as possible, a small source of illumination, such as an arc or acetylene jet, to cast a sharp shadow on the paper. The shadow is traced round with a pencil, the paper is removed and the collar drawn in. Starting with a fine camel-hair brush, and finishing with a broad stiff one, the space is soon filled, straggling hairs being suggested at the edge with a flat hog's hair brush worked in airy fashion towards the centre. For a "black" he spoke highly of Stephens' ebony stain, mixing in the cat's saucer a little lampblack to obtain a dead matt surface. A most intense black was certainly obtained which, in the opinion of some, adequately represented the characters of the sitters. Quite an entertaining evening.

Prior to the start, the death of Mr. Friese-Greene was alluded to with expressions of regret. He was a life member of the club, and in the early nineties several demonstrations of the latest novelties were first given at Croydon by him. One of the many highly ingenious inventors who never struck oil.

Commercial & Legal Intelligence.

At the offices of the Official Receiver the first meeting of creditors was held of John Swaine, trading as Allan Swaine, 24, Elm Road, Leigh-on-Sea, photographer, against whom a receiving order was made on the debtor's own petition on April 9, 1921. He commenced business about October, 1915, with £80 capital. He purchased his business for £30, for which he obtained the remainder of a three years' tenancy agreement, studio fittings, and negatives. The landlord subsequently granted him a lease for 14 years from June, 1920, at £52 per annum, rising to £70. The business had gone down very considerably since the Armistice, and the Sheriff, who had been in possession, removed the whole of the stock, fittings, and furniture, although debtor was of the opinion that the business could have been sold as a going concern. Prior to going to Leigh-on-Sea he was employed by a firm of wine merchants at Frome, Somerset, for three or four years as under-manager and book-keeper. At the same time he carried on a photographer's business at Frome for four years doing copying, enlarging and artists' work in his spare time. He estimated his liabilities at £900 and assets £400, and attributed his present position to falling off in trade since the Armistice and lack of capital. The estate was left in the hands of the Official Receiver.

NEW COMPANIES.

Photographia, Ltd.—This private company was registered on May 7 with a capital of £5,000 in £1 shares. Objects: To acquire the business of a photographer, carried on by R. H. Townson, at 62, Cheapside, E.C., as "Photographia." The subscribers (each with one ordinary share) are: R. H. Townson, 62, Cheapside, E.C.2, photographer; F. Sharman, 26, Charing Cross Road, W.C.2, incorporated accountant. R. H. Townson is the first director. Registered office: 62, Cheapside, E.C.2.

Princess Dubarries Portrait Studios, Ltd.—This private company was registered on May 6 with a capital of £2,000 in £1 shares. Objects: To carry on the business of photographers and photographic artists, dealers in photographic goods, apparatus, chemicals and materials, etc. The first directors are: Mrs. Edith Plummer, 103, Bedford Street South, Liverpool; De Jornette Plummer, 103, Bedford Street South, Liverpool; A. Phillips, 25, Castle Street, Liverpool; R. R. MacConnal, 25, Castle Street, Liverpool. Qualification: £5. Secretary: Miss E. M. Edwards. Registered office: Grosvenor Buildings, Crescent Road, Harrogate.

Ashlee, Ltd.—This private company was registered on May 6 with a capital of £1,000 in £1 shares. Objects: To carry on the business of wholesale opticians, dealers in photographic apparatus, etc. The first directors are: J. Ashworth, Ash Bank, Riddings, near Alfreton; A. Lee, Rockmaye, Riddings, near Alfreton; H. W. Daykin, 5, King Street, Alfreton. Qualification: £1. Secretary: A. Lee. Registered office: Market Place, Riddings, Alfreton, Derbyshire.

News and Notes.

A Wigan reader, who addressed a registered letter to the City Sale and Exchange, 26-28, King's Road, London, S.W.3, without however, enclosing any name and address, is asked to communicate further with the firm.

Keeping Properties.—A correspondent in Bermuda, Mr. John J. Bushell, writes mentioning an instance in his experience of remarkably good keeping qualities of some Lumière Violet Label plates, imported by him several years before the war, and only recently exposed and developed with perfectly satisfactory results. In view of the hot damp climate of the West Indies in a large part of each year, he considers that this is an eloquent tribute to the keeping qualities of the plate. On quoting the batch number to Mr. T. K. Grant, agent for the Lumière plates in this country, we were informed that the date of manufacture was about April, 1912.

Montreal Industrial Museum.—A descriptive booklet of the commercial and industrial museum, 358, Lagauchetère Street East, Montreal, for the exhibition of native Canadian products and manufactures, and also of those of other countries which are considered of Canadian interest, is sent to us by the Director, Professor H. Laureys. The museum is attached to the Faculty of Commerce of Laval University, Montreal, and evidently aims to render service of a kind which has been organised on a very large scale by the Commercial Museums in Philadelphia. It is evident from the booklet that photographs are largely used in illustration of natural products and manufactures.

Hanging the Great Unhung.—The Great Unhung of the Royal Academy, of whom we have heard so much this year, are to be hung at the Guildhall Art Gallery in June, the exhibition opening on the 8th, and admission to be free. The event, if it is found to be a success (writes a correspondent), will no doubt revive the old-time agitation for an exhibition of the pictures rejected by the Royal Photographic Society and the London Salon. The original Photographic Salon of twenty-eight years ago was, it may be remembered, the outcome of the parent society's treatment of regular exhibitors, and the rather conservative Academy should take warning, as the Guildhall show may, if made an annual event, overshadow in course of time the proper show in Piccadilly. Anyway, the president of the Royal Academy appeare to have no fears of a serious rival, for in his letter to the Lord Mayer he says:—"I am sure that the Royal Academy would in no way regard the proposal in the nature of a criticism of any section of the Academy . . . rather welcoming it as an excellent opportunity for the public display of the works of those of established reputation who are not this year represented in the exhibition of the Royal Academy." The new show—which will remain open for four or five weeks—should be of particular interest to photographers, who, with others, will no doubt try to discover the reasons for rejection.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

FLASHLIGHT: EXPERIENCE AND A REQUEST.

To the Editors.

Gentlemen,—During the summer I hope to photograph several pageants and plays which will be put on at the College. As these will all be delivered at night, and all of the dress rehearsals will be at the same time, it will be necessary to use flashlight. All of the plays will be presented in an outdoor setting among shrubbery, etc., and I am in doubt as to the proper procedure to pursue. If any of the readers of the "B J." have had experience in this line of work I would appreciate hearing of their methods through these columns, and I am sure that the editors can find room for it.

As mentioned by a speaker at the Royal Photographic Society at a recent lecture, I believe that we are farther advanced in the use of flashlight than you are. There are not a few studios in this country who are doing all of their work with flashlight, and its use among the home portraitist is almost universal. And nearly every studio keeps one for use on dark days and for children. Personally, I prefer flashlight to almost any other form of artificial light when proper apparatus for its use is to be had. My preference is for a portable cabinet into which the powder is placed from the outside without letting out any of the smoke, and which operates by friction ignition and also has a connection to operate the shutter at the same time. There are many cabinets on the market here that answer these requirements. As to the method of igniting the powder, I have finally decided, after trying several bags using different methods, that there is nothing superior to the friction method. With proper care there need never be a failure from this source, and I have made as many as two hundred flashes without a single hold up.

Using this form of apparatus there is no trouble from the smoke, since it is held within the bag. I have made as many as sixty exposures, using the same bag without emptying the bag between times. Also there was no increase in the amount of powder necessary for the last exposures because of the smoke contained within the bag.

I favour the use of the bag close to the subject. For busts I rarely use the light farther away than 3 ft. from the nearest shoulder. For three-quarters and full figures the light is farther away—about 5 to 6 ft. Due to the fact that the entire inside of the cabinet is a reflecting surface and also that the cloth acts as a diffuser, the light is very soft and even, and little powder is required. I use a mustard spoon to measure out the powder, and find that one to two level spoonfuls is sufficient. This is about three to six grains.

I have never found that children are afraid of the flash. I never mention to the child that flashlight is to be used, but go on playing with him, making my exposure by the pressure of the bulb which operates both the flash and the shutter. I often find that the flash actually amuses the child and he asks for more.

Using the connection to operate the shutter and the bulb at the same time makes it possible to work in open daylight, and all of my work is done in the ordinary light of the studio. By working in this way I have no trouble with "flashlight eyes."

I firmly believe that flashlight is the most valuable artificial light that the photographer can have at his disposal. I have found its use an economy due to the fact that no plates have been lost through movement and incorrect exposure.

While I have used flashlight constantly in the studio I have never had occasion to use it out of doors, and as there is only one opportunity for me to obtain these pictures this summer I would like to hear from any who have had experience with the use of flashlight out of doors, and feel that there must be a few others who would be interested in an account of their procedure.—Yours very truly,

CARROL B NERLETTE,
Director, Division of Photography.
Penna State College, Pa., U.S.A.

PYRO FOR BLACK AND WHITE NEGATIVES.

To the Editors.

Gentlemen,—Makers of process plates no doubt do a wise thing in advocating hydroquinone for developing negatives of black and white subjects, and in giving us no alternative formulæ, as hydroquinone is an ideal developer for the work, but I think it should be known that with suitable exposures other developers work very well with most of such plates.

I have secured good process results even with a high factor developer like Azol when hydroquinone has not been at hand. Pyro, however, is what most of us use for every-day studio work.

Recently I had some old and very much yellowed documents to copy, and for these the process plates did not come quite up to expectations, because of the plates not being sufficiently sensitive to the yellowness of the old paper and parchment.

Obviously, isochromatic plates with a yellow screen, or self-screen plates, were the things to use, and I chose the latter, but with them I met with the difficulty, as one might expect, of getting good black and white negatives of "process" quality, giving the necessary clearness in the letterpress lines and sufficient opacity to represent the yellowed base. This trouble, however, was overcome after a few experiments with a pyro-soda developer, when the following was decided upon since it gave—with suitable exposures—black and white negatives of a passable "process" quality :—

Soda sulphite (anhydrous)	160 grs.
Soda carbonate (anhydrous)	80 ,,
Potassium bromide	10 ,,
Pyro	30 ,,
Water to	10 ozs.

The pyro is added last, and just before commencing to develop. The image comes up very slowly, but gradually attains great density with clear lines. When proper density has been secured the plate (which is kept from the air as much as possible) is washed for a minute or two under water and placed in a bath of weak citric acid (30 grs. to the pint) for about five minutes, washed again for a few minutes, and then fixed as usual in a hypo-metabisulphite bath.

In theory, I suppose the 160 grs. of anhydrous sulphite named in the bath could be replaced by 320 grs. of crystal sulphite, and the 80 grs. of anhydrous carbonate by 200 grs. of carbonate crystals, but it is my experience that blacker images are always obtained with the anhydrous sodas than with the crystals. Therefore, when absolute blackness is required, it is advisable to use anhydrous sodas, particularly the sulphite.

Your readers will find the above method of working invaluable when yellowed documents are to be reproduced, especially if the negatives are printed upon gaslight paper.—Yours faithfully,

L. T. WOODS.

MADAM YEVONDE'S LECTURE.

To the Editors.

Gentlemen,—This ought to put a few "wigs on the green." Surely these ferocious whiskered individuals are not taking this lying down. According to the lady and the "Daily Chronicle," photography is not a man's job. Indeed! There have been many jobs in the profession that women could not do. In the old wet plate days I had to go seven miles with dark-room tent, silver bath, collodion, iron developer, water tank, "and all" to photograph some buildings for a law suit. Starting at 4 a.m., I arrived at 5.30 and took six 15 × 12 negatives and developed them on the spot and back again by 10 o'clock, then sensitised, albuminised paper, and printed, toned, fixed, washed and mounted them and delivered one of each by 1 o'clock, thus earning six guineas in half a-day. Could a woman have done that? I think not.

The yarn about the Knut looking like a "silly ass" reads like a joke from "The Passing Show." The removing of several chins, and slicing of waists, and ankles, does not appeal to me. I should want pure and good results in the negatives obtained in the studio.

Now I happen to wear whiskers (this by doctor's orders), and I don't look ferocious, but, on the contrary, quite genial and benign. A while ago a child was brought to the studio to sit, and the mother said to the child (pointing to me): "Who is this, baby?" The child chuckled and said "Gwanpa." I laughed, and we were at home at once, and I got good pictures. (Re mere man's letter.) I don't understand the mentality of the foremost photographer who keeps away from the children and works behind a woman. When I was in business in London one of my advertising "slogans" was "perfect pictures of children," and children were brought for miles around to "The Children's Photographer." I got pretty poses, drew out expression with a wonderful collection of mechanical toys, and got exceedingly satisfactory pictures, and "all done" in whiskers, and no lady assistant. The late John Beattie, of Clifton, Bristol, with whom I was as a youth to learn the art, was a clever thinker and writer, and an expert operator with children, and made his name famous in the West of England, and—he wore whiskers. I don't agree that women are cleverer than men with children, my long experience is *against* it.

The photographer who came back from the war, and finding his women folk had carried on during his absence still allowed them to do it, is quite characteristic of the result of the Great War. It altered men's outlook and feelings, and in many cases caused in them a distaste for work. I would advise the men to stick to it and not be cast down by this scare about photography not being a man's job, but to study it and make it their hobby, and during the slack time put their house in order and be ready for the revival of trade.

Madam Yevonde's remarks about photography languishing and nearly dying, but for women, and Miss Dora Head's remark, "It is so easy to descend to the level of the sitter," is high falutin talk. Most practical photographers (I take it) have personality, tact, patience, intuition, a quick brain; anyway, I have all these myself, plus technique in posing, lighting, developing, and artistic mounting.

I have seen some examples of the ladies' work and I should be inclined to rule as "out of court" on the principle of "handsome is that handsome does," their right to talk to us men "in that

tone of voice." To suggest that men photographers are very small beer, and that it is really surprising that we remain in the profession—"This is, I think, the limit," so I protest against this attitude. If women come into the business, they should come in with a spirit of comradeship and fair play, and not as opponents with an ardent desire to push us off the earth. Well, we are not taking our marching orders from the ladies, knowing as we do that all the progress made through all the years in our wonderful art has been achieved by men, to name a few at random, Daguorre, Niepce, Fox Talbot, Sayce, Bolton, Archer, Swan, Poitevin, Woodbury, Pouncy, Abney Muybridge and our much lamented friend Friese Greene.

Why, sir, the men have it hands down!

35 YEARS A PROFESSIONAL PHOTOGRAPHER.

LENS APERTURE AND DEPTH.

To the Editors.

Gentlemen,—In the article in your issue of May 6, 1921, entitled "Speed Limits," you state:—

"It is only very rarely that a lens with a focal-length of over 6 in. can be satisfactorily used at an aperture wider than, say, *f*/5.6."

We quite understand, from what follows, that you wish your readers to be clear that depth of focus decreases as aperture increases, but we fear the sentence we have quoted is a little misleading.

Professional photographers, who do the highest class of artistic work, would get on badly even with the fastest plates if limited to lenses with apertures not exceeding *f*/5.6. We readily admit that the larger the aperture of a lens the greater the care and skill required to use it, but such lenses, especially when fitted with diffusion adjustment, are capable of producing the most beautiful results that cannot be obtained with smaller aperture lenses or in any other way.—Yours faithfully.

per pro TAYLOR, TAYLOR AND HOBSON, LTD.,
W. B APPLETON,
Director

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

F. R.—It is legal for you to trade under a fancy name so long as you register the business with the Registrar of Business Names, 39, Russell Square, W.C.1, at the cost of 10s.

M. D.—The mask need not be in contact with the plate, but can be fixed in the back frame of the camera, as close as possible to the rear side of this frame, so as to leave the minimum distance between the mask and the plate.

G. H.—The minimum length which is possible for average work in a studio is 15 ft., but that is really too short. You can best judge of what the length should be for different classes of work from the table, p. 544 of the current "Almanac."

J. W. — We are afraid nothing can be done with a negative which has become stained in process of mercury intensification. Usually the best that can be made of such a bad job is to make the best enlargement possible and to work out the markings by hand, that is to say if they are of such a kind as to permit of this being done.

W. A.—If the reflex is a really good one and in first-rate working order you need not have any qualms about being able to make a success of your first job with it, for a reflex is one of the easiest cameras to use. We are sorry we cannot ascertain the makers of the Flora dish. We remember it, but we think it has been off the market for some years past.

T. R.—So long as the distance between the frame and the back sight is approximately equal to the equivalent focal length of the lens, it is not necessary that the frame should be vertical over the centre of the lens. Also, the only other condition for the fixing of the two parts of the finder is that the sight should lie in the horizontal line passing through the centre of the frame. Such a finder gives quite misleading results if the front frame remains fixed when the lens is raised or lowered with reference to the plate.

T. W. E.—A 2B portrait lens would require to be considerably stopped down to define a full-length cabinet, and at full aperture would have no more depth than an anastigmat of the same F number. It may be that you are working with too great a distance between the sitter and the lamps. With the *f*/5.8 Beck lens you should be able to give shorter exposures than 3 seconds. If you care to send measurements of the distance and height of lamps with relation to the position of the sitter, we might suggest some means of shortening the exposure.

S. C.—(1) As regards mercury in bromide toning, we would refer you to the report of the lecture by Mr. H. W. Bennett, which appeared in our issue of January 14 last, page 26. (2) The Watkins factor is affected by variation in the strength of the pyro, but for a given strength of pyro we do not think there is much variation in the factor by increasing or reducing to a relatively small extent the amount of the alkali. Naturally, with a lesser amount of alkali the time of development is increased, and it doesn't require much reduction to make development very much longer.

G. D.—Referring to the formula page 179 of our issue of March 25, you could certainly add more sulphite, though we do not think it would serve any useful purpose to do so, and perhaps you could use somewhat less caustic soda. The 6 ozs. and ½ oz. are, of course, by weight. Carbonate of soda can be used instead of caustic soda, but in much larger proportion. We certainly think that for the development of motion-picture film a formula made up with carbonate is better than one with caustic, especially in your hot climate, since the caustic has a softening effect on the emulsion. A very suitable formula for both negative and positive film, and one which is largely used here in the cinematograph trade, is as follows:—

Metol	3 ozs.
Hydroquinone	1 lb.
Potass. metabisulphite	2 ozs.
Citric acid	2 ozs.
Potass. bromide	½ oz.
Soda sulphite cryst.	4 lbs.
Soda carbonate cryst.	2 lbs.
Water	65 pints.

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THE BRITISH

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Contents.

SUMMARY.

In a contributed article Mr. John H. Gear records the results of his very thorough tests of a new developing substance, or rather solution, D50, which has been worked out by British chemists. The energy, stainlessness and keeping qualities of the new preparation render it a universal developer for both negatives and prints. (P. 307.)

In a contributed article "Thermit" describes in detail a working system devised for the purpose of standardising, as far as possible, the exposures in copying various originals on different scales. The article also contains formula for a developer representing the unusual combination of pyro and amidol, and found to be of advantage in the making of copy negatives. (P. 308.)

Some elementary notes of practical application in the use of electric current for lighting and heating are contributed by "Electrician." They deal with the units in common use for the rating of electric consumption and pressure and serve to provide some guidance in the efficient use of resistances, choking coils, etc., in connection with the employment of arc and other lamps. (P. 313.)

In the further portion of his paper on stains on negatives and prints, Mr. J. I. Crabtree deals systematically with coloured stains from developers and other sources, and also with green and blue-green stains, the former most familiar as the so-called dichroic fog. (P. 310.)

In a leading article we refer to the great utility in many branches of photography of the focussing magnifier, an accessory which we believe is by no means as widely used as it deserves to be for ensuring the maximum degree of sharp focus. (P. 306.)

The twelfth exhibition of the London Salon will be held from September 10 to October 8. Last day for entries August 31. (P. 306.)

Small albums of prints of moderate size form a little speciality when the photographer can offer some good photographs of the interior and exterior of a private residence. (P. 306.)

Co-relation of mirror and focal plane shutter in a reflex camera, according to which release of the shutter is determined by the position taken up by the mirror, is the subject of a recent patent specification. (P. 315.)

Thorough cleansing of dark-room sinks is a hygienic measure of particular importance in hot weather, and can readily be done by permanganate of potash or other antiseptic. (P. 305.)

Glass which, when used as a filter, gives the visual effect of daylight with half-watt and similar lamps has its uses by the retoucher and colourist of prints. (P. 306.)

Flashlight, with or without daylight, is often the means of solving the difficulties of large groups in which young children figure. (P. 306.)

EX CATHEDRA.

The Sink in Summer. After a few hot days the dark-room sink, if not attended to, is apt to become somewhat offensive, if not actually dangerous, to health. This is due to the fact that a small quantity of gelatine, inappreciable in each negative, is dissolved and serves to make the sink and waste pipes foul and slimy. The method of cleansing depends upon the material of which the sink is made, stoneware being amenable to almost any solution from dilute hydrochloric acid to hot soap-suds, while lead or zinc-lined ones require more careful treatment. In most cases a good scrub with permanganate of potash solution, or, if this be not to hand, one of the commercial disinfectants, such as Sanitas or Milton, will remove all source of danger. When wooden grids are used they should receive specially energetic treatment and, in addition, if possible, put out of doors over the week-end. The subject may appear to be a trivial one, but as we are cognisant of several cases of throat trouble being caused or aggravated by foul sinks, it is of considerable importance. It is assumed that in all cases the sink outlet is properly trapped and that no sewer gas can escape, although in some old buildings it may not be done effectively.

* * *

The Salon. Particulars have now been published of the 12th Exhibition, arranged by members of the London Salon of Photography, which will again be held in the galleries of the Royal Society of Painters in Water Colours, 5a, Pall Mall East, London, S.W.1, from Saturday, September 10 to October 8. As in previous years entries must not be framed but may be mounted. If mounted, the mounts must be white or of light tone, and of one or other of the sizes, 15 x 12, 20 x 16 or 25 x 20. The Salon committee will themselves arrange for the display of accepted exhibits under glass. Pictures sent in by photographers outside the United Kingdom should be neither mounted or framed. The last day for the receipt of entries is Wednesday, August 31, on which day exhibits may be delivered by hand at the gallery. An entry fee of 5s. is charged and includes the cost of return postage. This fee covers any number of pictures from one exhibitor. The prospectus and entry form will be ready shortly, and will be obtainable from the Hon. Secretary of the Salon, at the address already given, but intending exhibitors, and particularly those overseas, who are unable to obtain an entry form in time, may prepare their own, provided that the usual undertaking is given to conform to the conditions of entry. The chief of these have already been mentioned; practically the only others are that a commission of 15 per cent. is charged on pictures sold at the Salon, and that the committee do not accept responsibility for loss or damage during transit or at the gallery. Exhibitors are also asked to say if they agree to their work being

reproduced in periodicals approved by the Salon committee, the usual reproduction fee being paid to the exhibitor.

* * *

At-Home Photography. There is a wide field, as yet little worked, in the photography, inside and out, of private dwellings. From time to time a photographer gets a commission to make a series of views of a house of which the owner is proud, but from the domestic or sentimental point of view very little is being done. This is probably from the idea that only large-sized pictures are to be had, and that consequently an album of one's home is a costly luxury. We have just seen an album of half-plate prints, which suggested that a very profitable side line might be created in many "select residential neighbourhoods." Man is an imitative animal (woman has also a word), and once the fashion is started it is likely to spread. Six, eight or twelve prints, according to the possibilities of the subject, in a portfolio or simple album would be a suitable arrangement. Comparatively few professional photographers touch the Autochrome or other screen-plate processes, and these might well supplement other home-pictures where paterfamilias is an enthusiastic gardener. The claims of a rose garden with its pillars and pergolas and the herbaceous border are undeniable when a good specimen is shown.

* * *

Flashlight for Babies. There are some youngsters who defy all attempts at daylight working, and for these a rapidly-burning flashlight is extremely useful, since a fully-exposed negative can be obtained in a twentieth of a second or even less. It might be feared that the flash would alarm the baby, but we are assured by an experienced worker that this is not the case. The best arrangement, and one that is common in America, is to have the lens shutter and the flash lamp operated simultaneously by electricity, in which case the exposure may be made in bright daylight, with the effect of making the flash less noticeable. Only a few grains of powder are needed for a single figure, and if a suitable flash bag be used there is no trouble with the smoke. We heard lately of a large family group with more than a dozen grandchildren in it, many of whom were very young, which was successfully secured in this way, a job at which the stoutest might quail if it had to be done indoors by daylight. "At home" child portraiture should be quite a simple matter if worked upon these lines, and the child being in familiar surroundings would probably behave better than in a strange place.

* * *

Daylight Glass. A great boon to those who have to colour or even to finish in monochrome has been introduced by Messrs. Chance Bros. under the name of "daylight glass." This, while practically colourless, corrects the light of half-watt or other metallic filament lamps to such an extent that work executed by it will stand the test of examination by daylight. For many years engravers and retouchers have used blue-tinted glasses when working by artificial light, but these are useless for coloured work. With the new glass there is a slight apparent reduction of brightness in the light, which is, of course, due to the fact that the yellow rays, which are in excess in nearly all artificial lights, except the electric arc, are intercepted, and it is these rays which are strongest in their visual qualities. Outside photography the new glass should be of great value for the illumination of picture galleries, colour printing works, drapers' shops, and in all industries in which colours have to be handled by artificial light. We have not tried the experiment, but it is possible that goggles fitted with it might answer the same purpose as screens near the source of light.

AIDS TO FOCUSSING.

THE number of photographers who go through life without using a focussing magnifier is certainly very large, and still more certainly it is larger than it ought to be. For the focussing magnifier, which is ordinarily a Ramsden telescope eyepiece mounted so that it can be adjusted to any particular vision, and clamped in that position by means of a screw collar, is a very valuable as well as simple and inexpensive piece of apparatus. For special work a more powerful instrument may be needed, and can be improvised in various ways. The possessor of an ordinary terrestrial telescope has one almost ready to his hand in the compound eyepiece, consisting of the Ramsden eyepiece, plus the erector, which can readily be converted into a focussing microscope with the half of an adapter mount. A prism monocular, with a low-power microscope objective, set in an adjustable outer tube, substituted for the object glass, makes a very efficient high-power magnifier for special purposes. But for ordinary work a magnifier which enlarges the grain of the screen to a disagreeable extent is a nuisance rather than a convenience, and for any but the specialist the magnifier of commerce, preferably of the larger size, meets all requirements.

Apart from focussing, the magnifier is a useful little tool, as it enables negatives to be examined far more critically than they can be with an ordinary single lens, and if such examinations were made more frequently a good many disappointments in regard to enlargements would be avoided, and a good many misconceptions on the subject of, more especially, marginal definition removed. Also, of course, a magnifier is essential for aerial focussing with a plain glass focussing screen, as used in photo-micrography, or with the microscope cover-glass cemented to the ordinary ground screen, which some workers in this branch and in telephotography consider a useful compromise. As a matter of fact, anyone who is called upon at times to photograph very dark interiors will find his chances of success improved if he carries an alternative plain glass screen and a focussing magnifier.

But it is more especially in everyday work with the everyday ground screen that the almost habitual employment of the magnifier is to be recommended in cases where good definition at one point or another of the picture is desired. Many people have very loose notions as to what good definition really is, and many more do not realise that their eyesight is not good enough to enable them to say with certainty that such and such a part of the image which, as seen upon the focussing screen, they imagine to be well defined, will appear really sharp in the resulting negative. Here the focussing magnifier steps in and does all that is wanted with perfect precision, and without causing any delay or trouble worth mentioning. It is, of course, necessary that the magnifier should be adjusted to the worker's eyesight and to the thickness of the focussing screen in use. But the adjustment only takes a minute or two, a pencil mark on the ground side of the screen being carefully focussed through the glass with the magnifier pressed flat against the latter, and, when the requisite degree of sharpness has been obtained, the clamping collar is tightened. The instrument then remains permanently in adjustment for that particular operator and that particular screen. To

those accustomed to use focussing magnifiers reference to this elementary procedure may seem trivial, but our impression is that of the tens of thousands of photographers who trust to the "naked eye" for focussing a large proportion are under the impression that in the proper adjustment of a magnifier some special knowledge or skill is needed.

In working with a reflex camera magnifiers fitted to work inside the hood are often of great assistance, if only for the reason that large-aperture lenses are commonly used in this connection, and focussing has to be carefully done in order to secure really satisfactory results. The point of extreme sharpness in the image produced by a high-aperture lens cannot always be easily detected in an instant by the ordinary vision, unless the latter is exceptionally good, and, when *f* 3 lenses come to be more freely used on reflex cameras, it may be taken for granted that, in spite of, or, perhaps, one might more accurately say, because of, the increased brightness of the image, the special magnifiers designed for reflex work will be more generally fitted than they are at present.

In telephotography and photomicrography the focussing magnifier can hardly be dispensed with. When the aperture is anything from *f* 1·50 to *f*/250 any and every aid to focussing is welcome, more especially as, with the sometimes rather miscellaneous optical combinations in use in such circumstances, it is almost invariably necessary to focus at the aperture at which one is actually exposing the plate. For those who cannot or will not focus aerially it is a great help to smear the ground glass of the screen with a little animal fat or with lanoline, as sold in tubes for toilet purposes.

Among aids to focussing the focussing hood or "chamber" must be noticed, and, judging from the number of high-class portable cameras fitted with these contrivances, they enjoy considerable popularity among amateurs. They cannot be said to preclude the use of a focussing magnifier, as one specially made for hooded cameras is available. But it is necessarily not so efficient as the Ramsden eyepiece type, and for all serious purposes the latter, in combination with the homely focussing cloth—as a matter of practice it is generally used without it, unless the surrounding light is overpowering—is greatly preferable. As to focussing cloths, it is somewhat late in the day to attempt suggestions for the modification of this time-honoured article of equipment. But outdoor photographers would do well to provide themselves with waterproof cloths, which are not only useful for focussing and protecting the camera on rainy days, but may also be the means of saving the operator during an interval of repose from a bad attack of rheumatism or worse. It is not a bad plan to have a focussing cloth of whatever material it is made, fitted with a few conveniently-placed little pockets, into which a stone can be slipped so as to prevent flapping in a high wind. Another elementary instruction this, but how few focussing cloths are thus provided!

A NEW DEVELOPING SOLUTION.

Many years have passed since a new photographic reducing agent has been produced, changes have been rung around the old developing solutions, and they have appeared and reappeared in slightly different form, some under a new name and a different guise, but with slight, if any, modifications in their functions. Apart from other considerations it is, therefore, interesting to find that something both novel and good has, on this occasion, been discovered upon this side of the Channel.

D.50 is the name by which the new reducing agent will be known; its name, like its functions, is quite new to the photographic community.

Dr. Seyewetz, a little more than two years ago, when reviewing the knowledge, up to that period of the chemical principle which determined the formation of synthetic developers, gave a résumé of the relations between the various reducing agents, and stated as his opinion that it is improbable that any sensational discoveries will be made of new developers of practical usefulness, since the best developing solutions as regards energy are those of the simplest constitution.

With that conclusion one would generally feel disposed to agree, but when synthetic productions are involved it is never safe to prophesy, as at any moment some great improvement may possibly be evolved and something of much greater usefulness be the result. From the latter part of 1914 to not many months ago, a great part of the sources of supply of synthetic reducing agents was materially affected, if not for a time entirely cut off. British chemists stepped into the breach and we carried on at greatly enhanced prices. English production was undoubtedly stimulated, and amongst the research work D.50 came to light; in D.50 we shall find the nearest to a universal developing solution than has been made. It is certainly capable of doing more than any other single developing solution that we have yet handled, and I think that it can justly lay claim to that wide term "universal." We are told that it is a mixture of compounds (some of which are new to chemical science) of the phenolic type, but which in consequence have never been previously used for photographic developing purposes.

It has many strong points to commend its use to photographers of all grades. I believe it will be very popular, for all those with whom I am acquainted who have used it have been most enthusiastic. I have had the opportunity, extending over a period of several months, to make a long series of measured tests and subsequently of putting it to daily tests in practical use. It undoubtedly considerably obviates the necessity for the large number of bottles usually required upon the shelves of the dark room, as the same formula answers very satisfactorily for the development of plates, bromide papers and gaslight papers, an advantage of no mean importance. That however, is not the only recommendation there is much more to favour its adoption.

It is the most economical developing solution I have handled; it can be used over and again for either plates or paper (without much loss in energy) to a far greater extent than any other I know of, there is a perfect immunity from stain on plates, papers, dishes or fingers; also, it is so very stable that I have developed with 5 ozs. of the mixed solution half a dozen plates 5½ by 3½ exposed upon interiors, the last negative being equal to the first in every respect. Its energy is greater than the majority of developers now in use, and consequently a shortened exposure is necessary. The negative is free from colour, has a long scale of gradation with great transparency, yet if desired the density of that given by pyro. can be easily produced. It does not cause chemical fog, and for that reason more than ¼ grain of potass bromide to the ounce is unnecessary; in fact, I have developed grossly under-exposed rapid plates without a trace of bromide, raising the temperature of the solution to 70 deg. Fah. with excellent results.

For portraiture it cannot fail to find favour; the reduc-

tion of exposure is an important consideration alone, but its other characteristics make it valuable for portrait work.

For bromide prints and enlargements it is equal to the best developers, and possesses other points of decided merit not found in any other single developing solution with which we are familiar.

For gaslight papers it removes the one great anxiety, viz., the liability of staining; with the papers I have used I have found that it gives a longer scale with an excellent range of tones, by direct development with a suitable exposure warm black to a true sepia colour is obtained.

I have given but a brief sketch of its characteristics, but sufficient, I think, to stimulate the interest of others to investigate for themselves.

Recently I had the pleasure of conducting some experiments upon high-speed photography in conjunction with Dr. Adolphe Abrahams, O.B.E., B.Sc., etc., and cannot do better than to give his opinion in his own words:—

"I was much interested in Mr. Gear's investigation of a new developing agent, and, at his invitation, gladly co-operated with him in examining its properties with special reference to minimum exposures, the familiar concomitant of high-speed work. The exposures, some five and twenty or so in number, varied between '1/400' sec. and '1/800' sec. Whilst a fair proportion was comparatively well exposed, at least 25 per cent. suffered intentionally from gross under-exposure. The developer was slightly modified to deal with the latter, the bromide being omitted. I was very favourably impressed with the results. The developer appears to me to combine all the advantages of an ideal reducing agent; the velocity of development is high, development is rapidly conducted, and gradation is well maintained. Hitherto I have pinned my faith to a dilute solution of pyrogallic acid in which comparatively protracted development is necessary with the corresponding disadvantages of tediousness and of the unavoidable staining of the film. But it seems to me that equally good results may be obtained by the use of this new reagent in concentrated form with a short period of development and most acceptably clean negatives. I intend to experiment at some future date with admittedly under-exposed plates, varying the temperature of the solution and the degree of concentration, although I know that Mr. Gear is all in favour of concentrated developer and comparatively brief development for such exposures. But the observations I have already made with Mr. Gear enable me to unhesitatingly acclaim it as of very high value for the type of work in which I am particularly interested."

The formula recommended is:—

A.

D.50 concentrated solution	240 minims.
Water to make	10 ozs.

B.

Sodium sulphite, cryst.	400 grains.
Sodium carbonate, cryst.	250 grains.
Potassium bromide	5 grains.
Water to make	10 ozs.

For use take equal parts.

I have found in practice that the above can be made up in one solution, and have used it repeatedly for a week quite satisfactorily, certainly there was a slight reduction in its energy towards the latter part of the week; however, with a slightly prolonged development there was no disadvantage. I took the precaution of rinsing the sodium sulphite crystals before dissolving them.

JOHN H. GEAR, Hon. F.R.P.S.

A PRACTICAL METHOD OF COPYING.

WITH many photographers the making of a copy negative is largely a matter of hit-or-miss guess work, and it is a common thing to find both photographers and customers who believe that a copy must of necessity be inferior to the original.

This is due to the fact that often no system, either scientific or practical, is used in copying. In workshops and studios where such system is adopted it is generally possible to obtain results quite equal, and often superior, to the originals. In my experience I have known only two places where a system was practised; one of these systems I worked out some two years ago, and having proved its use I propose to describe it for the benefit of practical workers who may be attracted by the possibilities of a simple method of dealing with batches of mixed copying.

The principal considerations are the camera, the lens, the easel, the plate or film, and the light. Almost any camera with a fair extension will serve for copying, but the types that are specially built for this work offer many advantages. A copying camera need not, however, be built by a camera maker, the adaptation of a strong field camera being quite within the power of the average photographic handy man. The main thing is a rigid, level board of 5 or 6-feet length, ribbed on the underside to prevent warping with time and use. Cleats or grooves are required on the top to enable the camera to slide along in a straight line and to keep it permanently at right angles to the easel. Swing back, rising front and swing front are very seldom of use in copying, and can be readily dispensed with to simplify matters. If they are retained the movable parts should be marked at the normal positions, so that errors due to want of squareness or perpendicularity in the camera do not occur.

Anastigmats are the best lenses for all-round copying. There is no ideal focal length for general use, though 6, 7, or 8-inch will be found to cover most work comfortably. I have used for some time a Cooke of 8-inches, supplemented by a wide angle lens of 4½, and I find that on a 6-feet board I can cope with a very large variety of work, including the reduction of 3-feet drawings to lantern slides. With wide angle lenses there is a risk of illuminating more than the plate, the extraneous light being reflected from the bellows and causing fog. This can easily be prevented, however, by the use of a mask in front of the lens.

The easel is best built to the base board, and, if made in two parts, much trouble in squaring up and centering will be avoided. The easel stand can be formed of a piece of thick plank, slotted half-way down its length, and fixed firmly at one end of the base board. The easel board must be smooth and flat. A drawing board answers well for this purpose. A bolt is put through the centre and the head sunk level with the surface of the board. A large washer and nut on the bolt will allow the board to be clamped in any position on the easel stand, and if a wing nut can be obtained, raising, lowering and tilting are very rapidly done. The bolt should be firmly fixed in the board to prevent turning, and eventually wearing through. A coat of dead black will improve the board photographically.

Some studios use the same plate for copying as is stocked for portraiture. Others stock a very slow plate specially for copying work. Neither of these methods is ideal. Copies vary like amateur negatives, and no one would print an assortment of negatives all on one grade of paper if the best results were required. To obtain a rich negative on a fast plate,

and from a flat copy, is next to impossible, and to obtain a soft result on a slow plate and from a chalky picture is no easier. Eastman Process Film is the only medium I know which can attempt these tricks with any measure of success. I am speaking from a busy, practical standpoint, and exclude experimental calculations, which enable much to be done that cannot be accomplished with certainty in practice. I find that an "ordinary" plate, a rapid plate, and Eastman Films, Commercial and Process, cover everything. The plates are chosen with a view to avoiding halation, a fault which is more prominent with some makes than others. Film negatives are preferred by certain customers, and are no different to work.

After trying various schemes of lighting, I consider the four-lamp frame which is supplied with some copying outfits is the most serviceable for the average copy. Roughly described, this is a square box placed on the base board with the open side facing the easel. A 20 or 40 c.p. lamp is fitted in each corner and the inside is painted white. The bottom or back of the box is cut away and fitted with negative carriers from whole plate down. With all carriers removed the opening is about 10 inches square.

The camera slide must obviously be large enough for the largest negative that is likely to be made, therefore carriers will be in use for other work. These should fit exactly, and if they cannot be made to do so a rule should be put in force by which the carriers are always kept to one corner, and the guide lines on the focussing screen must be arranged to tally with the set positions of the carriers. The value of this will be felt when copying a picture that is detailed up to its edges and it is required to fill the plate exactly.

I find it is a good plan to divide copies into four classes—normal, darks and sepias, very darks, dark sepias and reds, and light. The depth and colour of the copy are factors to be considered in calculating the exposure, of which more anon. I start a batch with a normal print, and one that is required same size, if possible. Failing this, I take the nearest to this type. Having pinned it to the board—I use haberdashers' "berry" pins in preference for this job, though there is no reason why any other effective way of fixing up the copies should not be used—by the extreme corners, or, if on a fancy mount, by strips of black paper across the ends of the mount. Pinning the paper ends to the board only, I size and focus up, and then consider if there is any necessity to vignette either in part or all around. Many defects can be hidden by vignetting. It is done by fixing white tissue or typing paper across the aperture in the light box. The depth of the vignette can be adjusted by reflecting light on to the side farthest from the lens from pieces of white mount placed leaning against the easel at each side of the copy. The correct effect is judged on the focussing screen. If no vignetting is required I close down the aperture in the light box with carriers until little more than the copy is visible on the screen. If no outside light is allowed to play on the light box, no light but that forming the image will reach the plate, and a clean result should be certain.

The exposing of a copy negative is not so simple as many think, if it is desired to give a correct rather than a hit-and-miss exposure. It consists of rather more than taking off and replacing the lens cap. At the same time, to expose a batch of mixed copies correctly without wasting plates or having recourse to continuous tests is not so impossible as I have heard it declared to be by more than one. Exposure here, as elsewhere, is governed by certain factors, viz., the reflecting power of the copy, the light-intensity, the stop, and the plate speed. If we knew all these the rest would be plain arithmetic, but they cannot be reduced to constant values, and an unpleasant amount of mathematical work would be entailed were we to examine them all each time we exposed. To get over this I have evolved a plan by which exposures can be found for widely varying copies in less time than it takes to make tests. I do, however, develop the first negative of a batch, as it is possible in photography for a factor that is correct for yesterday to be wrong to-morrow. Municipal electric current, for example, is not always at the same pressure, though civic authorities may differ on the point. For my purpose, though, I consider the light as a constant, and also the lens aperture, which I keep fixed. (One point less than full aperture is quite all right with any good anastigmat.) Changes in value, due to changing bellows extension, are covered by a simple factor, which at the same time allows for change in intensity of light due to changed distance of camera from copy. The exposures are calculated from a standard one, which must first be decided by experiment. This standard may fluctuate with new batches of plates and ageing lamps. It is the exposure necessary to get the best possible negative from a good average black and white print on a rapid plate, the copy being the same size as the original. The formula for copies not answering to the standard description is: $SE \times \frac{FL}{SFL} \times CC \times G$, where SE is the standard exposure, FL the focal length, SFL the standard focal length (twice the ordinary or principal focal length of the lens), CC the class of copy, and G the grade of plate. The result of the expression is multiplied in the case of larger than same size copies by 5/3, and, when reducing, by 3/5. In other words, when FL is greater than SFL, multiply by 5/3, and when SFL is the greater multiply by 3/5. The classes of copies are valued as follows:—Light, 2/3; normal, 1; dark, 1½; very dark, 2. The ordinary plates, the commercial film and the rapid plates are as 2, 1½, and 1 in relative slowness.

An actual example will explain the working of the system better. Three negatives were required from a small print, one same size, one to fill a half-plate, and one for a locket. As the print was a normal one, and an ordinary plate was to be used, the exposure was twice the standard. The SE at the time was 30 secs., so 1 minute was given. The formula for the second negative was $30 \times \frac{FL}{SFL} \times \frac{1}{1} \times \frac{2}{1} \times$ by the factorial fraction. The lens being an 8-inch one, SFL was 16 and FL in this case was 22, therefore we get $30 \times \frac{22}{16} \times \frac{1}{1} \times 2 \times \frac{5}{3}$, which equals 177 secs. This exposure was given. The third case gave the formula $30 \times \frac{9}{16} \times \frac{1}{1} \times 2 \times \frac{3}{5}$ which equals 20 secs. (ignoring fractions). This exposure was given, and the three plates were tanked for the same length of time together. The resulting negatives were identical in density and printing quality.

I should say here that the factors $\frac{5}{3}$ and $\frac{3}{5}$ are purely empirical, and for FL's of only slight disparity with the SFL they are high. When the difference between the FL and the SFL is not more than 1 in 12, a factor of $\frac{5}{4}$ or $\frac{4}{5}$ will give a more accurate result.

In recording the focal length, no great accuracy is necessary. If we rack out the bellows sufficiently to focus a copy same size, a distance equal to twice the principal focal length can be marked on the front and back panels of the camera, and all future measurements can be taken from the two marks. In the case of a projecting lens, or one having its node in front, a sufficient distance will not be obtainable between the panels of the camera. This can be got over by fixing a small slip of thin wood to the side of the front in such a way that it projects out forwards. The front mark can be made on this slip.

Special calculations for changing light-intensity are not necessary if the light-box is used in a fixed position with regard to the easel. With large copies which necessitate a new position for the light-box, in order to get even illumination, a new standard exposure must be found. Orthochromatic and panchromatic plates used with screens are best treated as individual cases unless a number of similar originals are

being copied with the same screen and platee, in which case, provided the standard exposure for such screen and plate is known, the system can be used with confidence.

Any developer and any development system that is understood can be used for copy negatives. In fact, this class of negative is about the easiest to develop. I have recently been experimenting with a compound of amidol and pyro, which I find gives all the advantages of both agents, and is exceptionally good for avoiding empty or clogged negatives if development is done by junior assistants. Negatives developed with this mixture are invariably of very good printing quality, even if deliberately under- or over-exposed. I have been unable so far to find a way of compounding the formula easily or so that it will keep. For those who are interested, I give below the best formula I have so far obtained. This will keep for a few days, but loses speed with age. The factor is, however, the same while the solution is good. For dish work the developer can be used repeatedly, without any difference being noticed in the quality of succeeding negatives. The formula is:—

Water	20 ozs.
Potass metabisulphate	10 grs.
Soda sulphite	1 oz. 6 drs.
Amidol	50 grs.
Pyro	20 grs.
Potass bromide	10 grs.
Water	10 ozs.
Soda hydrate...	10 grs.
Water to 40 ozs.	

When the first solution is made the caustic is dissolved separately, and the solution added slowly to the first. Both solutions should be quite clear before mixing. Any discolouration in either appears to indicate instability; the greater the discolouration the quicker the developer goes off. I find that with the undiluted solution, at 65 deg. F., development of 4 minutes is correct for most plates. THERMIT.

STAINS ON NEGATIVES AND PRINTS.

(*Concluded from page* 296.)

It is possible to remove almost any coloured stain from a negative or print in a similar manner by a suitable choice of filters provided the stain in question is not muddy as if it were mixed with a black medium. It is simply necessary to choose a filter such that on viewing the stain through the filter, the stain becomes invisible. Thus, a red filler should be used for a red stain and so on, taking care to use a panchromatic plate, which is sensitive to all colours. In the case of a blue black ink stain a blue filter will cut out only the blue. It is better to remove such stains by chemical means.

Although most photographic stains are objectionable, a developer stain image which is formed *in situ* along with the silver image during development, as explained above, is often of great value because it is capable of producing a print just in the same way that a print is produced by a silver image. Photographic papers are usually sensitive to blue light only which is strongly absorbed by a yellow stain, which therefore behaves photographically like a black image. Figs. 1 and 2 illustrate this point. Fig. 1 is a print from a pyro-stained negative. This negative was then placed in Farmer's reducer until all the silver was removed leaving a yellow stain image. Fig. 2 is a copy of a print made from this stain.

Of course, pyro is not the only develeper which will give a stain image. Developers such as hydroquinone, or oxyisocarbostyril, give warm brown and reddish oxidation products, and these can be utilized in obtaining warm tones by direct development.

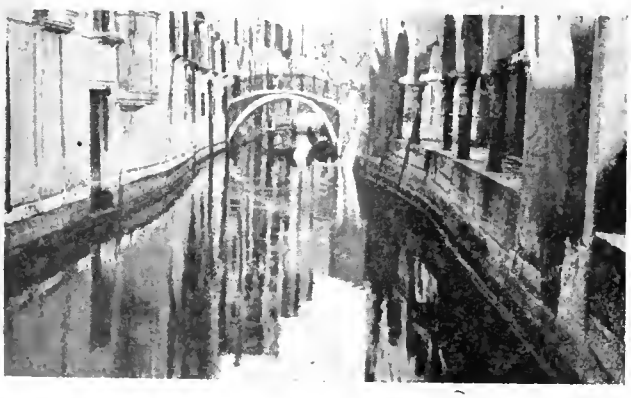


Fig. 1.

The oxidation products of a developer like monomethyl paramidophenol sulphate (Elon) are powerful fogging agents so that if it is attempted to produce a stain image with such a developer se much general fog, and therefore general stain, is formed that the stain image is entirely hidden.

Fig. 2.

The printing value of a stain image explains why an apparently weak-looking pyro negative will give good prints on a soft printing paper. This is because the stain which appears transparent and weak to the eye is really opaque photographically.

So far as it has been possible to determine, a pyro stain image merely intensifies the black silver image and does not otherwise alter the photographic quality, so that usually the same result in printing can be obtained by prolonging development of the negative, which result can also be attained by intensification.

The question is often asked, therefore, as to whether it is better to develop for a longer time in a non-staining developer like metol hydroquinone or for a shorter time in a staining pyro developer. If it is desirable to always duplicate results as in the case of developing motion picture film in a deep tank, a non-staining developer is desirable, because under these conditions it is impossible to duplicate results with a staining developer as explained below.

It is practically impossible to obtain a stain image which is free from general stain and *vice versâ*. The proportion of general stain to image stain depends on the following factors:—

1. The quantity of sulphite or preservative in the developer,

The greater the quantity of sulphite present, the less is the stain produced and *vice versâ*.

If the developer is old it rapidly becomes highly coloured and then produces general stain with little or no silver or stain image, because the developer has been largely converted to oxidation products which will not develop an image.

2. The time of rinsing between developing and fixing. A long rinse permits further oxidation of the developer by the oxygen dissolved in the wash water and this produces general stain.

3. The nature of the fixing bath. Since sulphite or bisulphite bleaches out stain and prevents oxidation of the developer, an acid fixing bath, therefore, destroys both general stain and the stain image. Hence, in order to produce the maximum amount of stain image, use a fresh developer, rinse quickly between developing and fixing, and fix in a large volume of fresh hypo.

The following pyro formula when used fresh will give a good stain image with a minimum of general stain :—

	Metric.	*Avoirdupois.*
Pyro	5 gms.	75 grs.
Sodium sulphite	2.5 gms.	40 grs.
Sodium carbonate	10 gms.	150 grs.
Water to	2 litres	64 ozs.

Develop for 6 minutes at 65 deg. F., rinse and fix in a plain hypo bath.

The above reasons explain why it is impossible to produce pyro stain with precision on a practical scale such as in deep tank work. As the developer becomes older the proportion of oxidation stain to stain image changes, which in turn changes the quality of the negative.

If a negative is stained too strongly, the stain may be reduced by first removing it entirely by bleaching in a permanganate-chloride bath as above, and instead of developing in a non-staining developer use a mildly staining pyro developer. This procedure usually gives more general stain, however, in proportion to the stain image than if the original emulsion had been developed with the staining developer in the first place.

2. *Yellow Silver Stain.*—Another form of yellow stain is due to compounds of silver left in the film after fixing and washing. It is difficult to distinguish silver stain from oxidation stain by ordinary observation, though it is usually less transparent and is more of a dirty yellow colour. Like oxidation stain it can be either local or general and may be due to one or more of the following causes :—

1. The use of an old and exhausted fixing bath containing an excess of silver in solution so that if the film is no sufficiently washed, some of the silver salt remains after drying. This compound is colourless, but is gradually changed to yellow silver sulphide on exposure to the air. To prevent such stains, therefore, it is important to use only fresh acid fixing solution.

2. Incomplete Fixing.—This can occur with a new fixing bath, if the print or film is removed from the fixing bath too soon. While the film is fixing, the silver halide in the emulsion changes first to a colourless silver thiosulphate (hypo is sodium thiosulphate) which is not readily soluble, and at this point the milkiness of the emulsion disappears. Further action of the fixing bath converts this difficulty soluble compound to a more soluble double thiosulphate of silver and sodium, which is readily washed out of the gelatine film. If, therefore, the film is removed from the fixing bath as soon as the milkiness has disappeared, which is the first stage of fixing, prolonged washing will be necessary to remove the relatively insoluble silver salt so that normally some will remain in the film and this in turn will be changed to silver sulphide by the action of the sulphuretted hydrogen in the air. Any undissolved silver halide will on exposure to light be changed to photo-halide.

The only safe rule is to leave all prints and negatives in the fixing bath for double the time necessary for the milkiness to disappear and then wash thoroughly. Very minute traces of silver left in the film can be detected by the sweetness on tasting a corner of the film.

3. If the film is not completely immersed in the fixing bath it may appear to be completely fixed, though in spots it may only be fixed as far as the first stage, with the result that on exposure to the air and light yellow stains appear.

4. A common cause of silver stain when handling roll film is developing and fixing with two lengths of film placed back to back. Although this may save space, it is false economy, because it is impossible to wash the backs of the films which stick together. The result is that hypo containing silver is left in the gelatine backing which turns to silver sulphide on exposure to air, so that while the emulsion side of the film is clear the gelatine backing is stained.

Removal of Yellow Silver Stain.—Silver stain cannot be removed by bleaching and redeveloping, as in the case of oxidation stain, because this has simply the effect of converting the yellow silver sulphide to silver chloride, and then to silver so that the yellow stain is changed to a black stain of metallic silver.

There is no way of always completely removing silver stain, though the following methods are frequently successful :—

1. After thoroughly washing to remove any hypo, bathe the film in a 1 per cent. solution of potassium cyanide. Remember that cyanide is a deadly poison, and a solution in water emits fumes of poisonous hydrocyanic acid, so that it should be used only in a well ventilated room. The cyanide will dissolve any silver thiosulphate present and some silver sulphide, though in time it dissolves the silver image so that the film should be removed from the bath and thoroughly washed as soon as any signs of reduction of the image appear.

In the case of an old negative treatment with a weak solution of acid permanganate, washing, and then immersing in the cyanide will often remove obstinate stains.

2. Copying the negative or print through a G filter as described above will reduce, but not always remove silver stain completely.

To summarise. A yellow stain may consist of one or more of the following substances, silver sulphide, silver thiosulphate, silver halide or photo-halide together with oxidation products of the developer. If it is decided to attempt its removal first make a copy through a suitable filter in case the photograph is ruined in the subsequent treatment. Then find out by a preliminary test the exact nature of the stain. This is done by cutting a narrow strip from the edge of the film, washing and bleaching and redeveloping as above. If the stain is entirely removed and is not replaced by a black deposit, the stain is pure oxidation stain and the entire negative may be treated in this way. If the stain is only partially removed, treat the narrow strip with cyanide as for the removal of silver stain, wash well, and if a transparent yellow stain remains treat this as for oxidation stain. The degree of success in removing the stains from the narrow strip will serve as a guide to the procedure necessary for the rest of the negative.

Yellowish-Brown Stains.

These are usually caused by contact with iron or iron rust. In the case of motion picture film if the iron film reel on which the film is usually wound is rusty the rust is scraped off during re-reeling and settles between the convolutions of the film causing the stain. The stain may be identified by placing a drop of a 50 per cent. solution of nitric acid on the stain and then adding a drop of ammonium thiocyanate. A deep red coloration indicates the presence of iron.

The stains are usually removed by bleaching and redeveloping as when removing developer stain.

Brown Scum.

This occurs in deep tank development when developing roll film or motion picture film. If the developer does not contain enough preservative, a layer of insoluble oxidation product of the developer forms as a scum on the surface, and this is picked up by the film.

The scum forms most readily on the surface of the fixing bath if it is allowed to stand for any length of time, for instance, over week end. When this is exhausted and con-

tains an excess of silver salts, the sulphuretted hydrogen in the air reacts with the silver thiosulphate at the surface of the liquid forming silver sulphide which floats as a scum. This is picked up when the film is immersed in or withdrawn from the solution.

The scum has a peculiar appearance under the microscope and is characterised by a series of cracks or fissures which

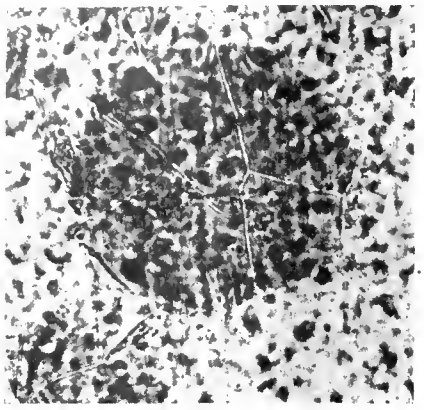


Fig. 3.

are formed when the scum is broken up on immersion of the film in the tank. Fig. 3 shows an enlargement of such a scum in which the cracks or fissures are very pronounced.

Green Stain.

This is another term for dichroic fog which appears as a yellowish green and sometimes reddish metallic sheen by reflected light or when looking at the film and pink by transmitted light or when looking through the film against a source of light. In view of this dual character it is called dichroic or two-coloured fog.

When examined under the ultra microscope the fog is seen to consist of ultra-microscopic particles which by chemical analysis have been shown to consist of metallic silver. The size of the particles determines their colour by transmitted light, those that are red in colour being smaller than those which are green and blue.

Dichroic fog is always formed either in the developer or fixing bath.

(a) In order that the deposition of fog may take place in the developer some solvent of silver bromide, such as hypo, ammonia, or an excess of sulphite or carbonate, must be present when under certain conditions the dissolved silver is reduced to metallic silver in a very fine state of division, particularly in the shadows or unexposed portions of the emulsion where no bromide is liberated during development. A pyro-ammonia developer is very apt to give dichroic fog, especially with fine grained emulsions for this reason.

Fine grained emulsions in which the grains of silver halide are very small, and, therefore, more readily soluble are most susceptible to this form of fog, especially if the development is forced.

(b) Dichroic fog is most generally formed in the fixing bath, especially if the fixing bath is not acid, or if it is old and exhausted, when it contains an excess of dissolved silver and spent developer. In such a case, as the silver halide is slowly dissolved out of the emulsion, it is reduced to finely divided metallic silver by the developer present. It is possible to get dichroic fog with a fresh fixing bath of plain hypo, because the silver salt is redeveloped back to dichroic silver by the developer carried over by the film to the fixing bath. This is especially true if the gelatine coating of the film is abnormally thick, and if the developing and fixing solutions are warm. The developer does not have time to diffuse out of the gelatine film before the hypo begins to dissolve away the silver halide, which is reduced *in situ* to dichroic silver. A slow fixing emulsion is apt to give dichroic fog for the above reasons.

The formation of green fog in the fixing bath is also facilitated by the presence of ammonia so that a fixing bath containing ammonium chloride (which is sometimes added to accelerate the rate of fixing) will give fog unless the bath is kept acid by virtue of the ammonia liberated by the action of the alkali in the developer carried over by the gelatine film.

Dichroic fog can also occur in a fresh fixing bath if two films or prints stick together face to face, thus forming local pockets containing developer. Such a condition is ideal for the formation of green fog, namely, an insufficiency of hypo in the presence of an excess of developer.

Stencil effects are sometimes produced in the shadow portions of a negative or print when another film with dense lettering adheres to the film in the fixing bath. The result is that the film is covered with dichroic fog except in those places where it was in contact with the lettering. This is because the developer in contact with the clear portions of the lettered ngative is comparatively fresh, but wherever the lettering occurs the developer is comparatively exhausted, so that no fog is formed in the region of the lettering, thus producing the stencil effect. The potassium bromide which is locally formed in excess in the region of the lettering (as a product of development) also tends to retard the formation of the fog, thus accentuating the stencil effect.

Prevention of Dichroic Fog.—Dichroic fog may be prevented as follows:—

(a) By keeping the fixing bath acid by renewing at frequent intervals and, if possible, rinse the film well before fixing, or use a stop bath between developing and fixing. In this way the quantity of developer transferred to the fixing bath is reduced to a minimum.

(b) By adding potassium idodide to the developer, say, 1.5 grams per litre or 20 grains per 32 ounces. This has the effect of converting any silver halide dissolved by solvents in the developer to silver iodide, which is reduced to silver only with difficulty, so that the tendency for dichroic fog to be formed is restrained.

Removal of Dichroic Fog.—Since dichroic fog consists of particles of silver in a finer state of division than the particles composing the image, they are more readily attacked, and therefore dissolved by solvents of silver, such as potassium cyanide, acid permangante, etc. Advantage may be taken of this fact in removing the fog as follows:—

(a) Bathe the film in a 1 per cent. solution of potassium cyanide and rub the film gently with a tuft of cotton. As soon as any visible signs of reduction of the image occur wash well in running water. (Note previous remarks about poisonous nature of potassium cyanide.)

(b) In place of cyanide the less poisonous thiocarbamide, or thio-urea, may be used. This works best in an acid solution, such as the following:—

Thio-urea	1 gm.	15 grs.
Citric acid	1 gm.	15 grs.
Water to	100 ccs.	3 ozs.

(c) Treat the film with a weak solution of Farmer's reducer made by adding a little potassium ferricyanide to a 5 per cent. solution of hypo, or with a weak acid permanganate solution.

(d) An ordinary acid fixing bath will slowly dissolve silver especially in warm solution. This can be readily seen by placing a print in a warm solution of acid hypo when the image will be appreciably reduced in a very few minutes. A hypo bath is, therefore, useful for removing dichroic fog. Allow the film to stand in the hypo bath if necessary for twenty-four hours or longer until the fog is removed, though the action can be hastened by gently warming.

Blue-Green Stain.

A general bluish-green stain is often caused by an exhausted chrome alum stop bath or fixing bath at high temperatures, especially with certain grades of matt paper. The remedy is

to use a fresh bath at normal temperatures because there is no known way of subsequently removing this stain.

Miscellaneous Stains.

Blue stains on sulphide-toned prints caused by particles of iron are in the class of spots, and will be dealt with as such.

Deep lemon-yellow stains are often caused by insufficiently fixing glossy prints developed with a non-abrasion developer containing potassium iodide. The potassium iodide converts the surface layer of the silver bromide emulsion to silver iodide, which is deep lemon-yellow and which fixes much more slowly than silver bromide and does not darken on exposure to light.

Fig. 4.

The stain may usually be completely removed by bathing in a fresh fixing bath.

Stains due to aniline dyes, indelible pencils, and red and black writing inks are removed by bleaching and redeveloping as above or photographically. In the case of some samples of red ink a slight trace of stain remains after the chemical treatment, but this can be removed photographically. Figs. 4 and 5 illustrate how ink stains may be removed by chemical treatment. Fig. 4 is a copy on an ordinary plate of a photograph stained with "waterproof" red ink.

Fig. 5.

Fig. 5 is a copy of the same photograph after the red stain was removed by bleaching in the permanganate chloride bath and redeveloping. No sign of the stain is visible.

J. I. Crabtree.

ELECTRICAL FACTS FOR PHOTOGRAPHERS.

The writer, whose work brings him in contact with a large number of electricity consumers, photographers among others, finds that few have anything but a hazy knowledge of electricity and its terminology. In view, therefore, of the growing use of electricity both in studio and workroom, an explanation will probably be of interest, as it is generally difficult to extract any lucid information from either the man who comes to read the meter, or the electrician who is called in to attend to the installation.

It is a pity that those connected with the trade still persist in surrounding the subject with much mystery, though it must be confessed that ignorance of the science is often the reason for adopting an attitude of profound reticence.

An enormous amount of instructive literature has been published in connection with the artistic, chemical and optical side of photography, but the photographer anxious to experiment a little in electricity has had to content himself with meagre details. Many a man, though quite familiar with batteries, small coils, and bells has been afraid to attempt any experiments with the supply obtained from the public mains, because his initial effort resulted in a sudden and alarming pyrotechnical display, the blowing of the main fuse and consequent total darkness in the house, and a plaintive appeal to the generating station to "send a man round immediately."

As an instance, a friend of the writer, fired by a desire for knowledge, permitted so much current to enter his premises with a rush as to blow the fuse in the nearest sub-station, with the result that several other houses were suddenly plunged in gloom. This feat required a good of explaining away to the mechanic deputed to investigate the affair, and, in fact, he quite failed to take a reasonable view of the situation until presented with several medallion portraits of the late Queen. Had the intrepid investigator possessed even an elementary knowledge of Ohm's law he would not have been led into this disaster.

The writer also remembers a dreadful experience he had when asked to work an arc-lamp projection lantern at a lecture given in a hospital. The lecture took place in a room not generally used for the purpose, and the responsibility of fitting a fuse large enough to carry the current rested upon a factotum who "knew all about electricity." Just before the students entered the room the writer, who had arrived in a hurry, struck the arc to see that all was well. It gave a splutter, a sickly gleam for a second or two, and went out! The factotum had also gone out, and so could not be found. Suffused with shame and perspiration, and thinking words that would have put a drill-sergeant to the blush, the writer dashed about the place in an endeavour to locate the fuse-board. It was eventually discovered in a corridor, 10 ft. above the ground, where it had evidently been placed by an insane contractor. A ladder and a piece of fuse wire of the correct calibre soon put matters right, but the eminent surgeon conducting the lecture cast a somewhat cold and unsympathetic eye upon the lanternist for the rest of the evening.

The consumer hears a good deal about volts, amperes, and watts, the first-named being often applied in the most haphazard way. In order, therefore, to explain these three terms as simply as possible (ignoring all considerations as to what really constitutes an electric current) it is convenient to take as an analogy a pipe through which water is flowing. In this case the volt, the unit of electromotive force (E.M.F.), corresponds to the pressure of the water in the pipe, and the ampere, the unit of rate of flow, corresponds to the rate at which water is passing through the pipe at any given instant. It is popularly referred to as the "strength" of the current. The watt, the unit of power, is the product of the pressure and the rate of flow, i.e., watts = volts × amperes, as it is obvious, bearing in mind our analogy, that the power transmitted by the water is proportional to the rate of flow multiplied

by the pressure. In other words, supposing the water is required to actuate some form of wheel, it is clear that until there is a pressure to force it through the pipe no work will be done, and, assuming the stop-cock to be shut off pressure applied to the water without any flow will have the same result. This, however, is only true of direct-current circuits and of alternating-current circuits in which the load is a pure resistance one, such as glow lamps, radiators and (approximately) arc lamps, and if the load is associated with any form of magnetic winding, the watts will be less than the product of V and C.

Strangely enough, few electricity users grasp the fact that they are really purchasing power from the generating station, no matter whether the current is used for lighting, heating, or motors.

The watt is the basis of the Board of Trade unit, or kilowatt-hour (kilo=1,000), and is the equivalent of 1,000 watts passing for one hour, or conversely, one watt passing for 1,000 hours. It will, therefore, be seen that a current of 10 amperes at 100 volts flowing continuously for one hour would register one B.O.T. unit on the meter.

The term unit is sometimes misapplied by people who ought to know better. It is not uncommon for a salesman, in answer to a query regarding the current consumption of an electric heater to state that it "takes so many units." This has no meaning, unless the time is stated, as it might consume a unit an hour, a day, or a week. When inspecting such apparatus, one should nail the salesman down to a definite guarantee as to the number of units per hour. A simple calculation will then usually convince the prospective purchaser, unless he is very affluent, that he will adopt some other form of heating.

The watt is also used in the rating of metallic filament lamps instead of candle-power, which term is confined to carbon filament lamps. The former take about 1¼ watts per candle, and the latter 4 watts, so their relative economy may be readily calculated. The most recent development, the half-watt (gas-filled) lamp, takes, as its name implies, about half a watt per candle.

Electricity meters were generally marked "units" above the indicating dials, but a few years ago the Board of Trade desired the words "kilowatt-hours" to be substituted. This distinction without a difference probably confused many consumers, as doubtless they were unaware of the terms being synonymous.

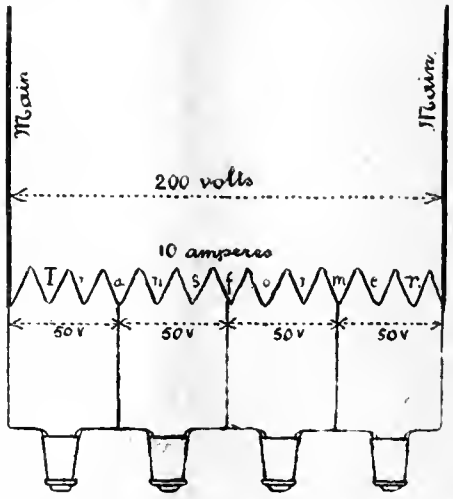
There is also a type of instrument, known as an ampere-hour meter, which indicates the number of ampere-hours. A little consideration will show that such a meter registers only the quantity of electricity passing through it, and takes no account of the voltage. Provided the voltage remains constant it will correctly indicate the watts, and the consumer will therefore be charged fairly for the power used. Should the voltage drop, however, he will still be charged the same, though the actual power will naturally be less.

Reverting to the question of electric heating, it may be that the photographer wishes to take advantage of this method for a special purpose owing to the absence of fumes. For drying plates, etc., or other occasional use, the high cost might be counterbalanced by the advantages. It is therefore well to note that electric heaters are of two kinds, radiators and convectors.

A "radiator" is strictly a heater which throws out radiant heat like that from the incandescent coals of a clear fire. Such heat passes through the air without warming it. A "convector," on the other hand, is a heater at a much lower temperature, and acts by warming the air which passes over it. Actually an electric radiator as sold combines both methods, and the larger part of its heat is distributed by convection.

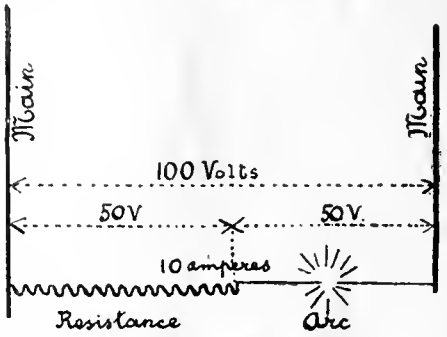
It is perhaps difficult to form a mental impression of the volt and ampere, but it may be mentioned that when in good order the Daniell cell gives rather more than one volt and the bichromate cell about two volts. The current consumption by the average street arc lamp is about ten amperes. A 50-watt metal filament vacuum type lamp takes half-an-ampere on a 100-volt circuit. In the latter connection it is well to observe that on a 200-volt circuit the lamp takes only half the above current, and it will therefore be apparent that thinner wires can be employed in carrying out installations of higher voltage, thus saving a considerable sum in cost of copper.

It is perhaps hardly necessary to explain that used in connection with a dynamo or other generator the



Arrangement of four arc-lamps and auto-transformers.

term voltage means the electrical pressure supplied by the machine. Station engineers know that should a steam turbine "run away" owing to an accident to the governor, the voltage of the generator will rise with such fearful rapidity that before steam can be shut off the internal parts will be fused into a shapeless lump. In connection with lamps one often hears the query "Is it of the right voltage?" and a great many consumers fail to understand that in this case the term is used to denote nothing more than the voltage of the circuit on which the lamp may be *safely* used. The amount of current that will pass through the filament is determined by the resistance of the filament and the voltage of the circuit. The amount remains constant so long as these two factors are unaltered. The lamp-maker therefore adjusts the length and thickness



of the filament so that at a certain voltage the right amount of current passes to secure the highest efficiency with a reasonable life of the lamp.

ELECTRICIAN.

(To be continued.)

FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries, August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, May 9 to 13.

DAYLIGHT DEVELOPMENT. No. 13,343. Daylight development of roll films without paper covering. H. G. Chaney.

CAMERA HOODS.—No. 13,673. Hoods for photographic cameras. T. Peacock.

DRY-MOUNTING.—No. 13,352. Plates for dry-mounting of photographs. J. H. Stean.

DEVELOPING.—No. 13,212. Developing-tanks for photographic films. F. Torkington.

STEREOSCOPY.—No. 13,300. Mechanical stereoscopy. J. W. F. White.

APPARATUS.—No. 13,499. Apparatus for developing, fixing, toning, washing, and drying photographic films. P. L. Burger.

APPARATUS.—No. 13,640. Photo-printing apparatus. R. P. Clarke and H. C. Dering.

COLOUR PHOTOGRAPHY.—No. 13,534. Multi-colour screens for photography. J. H. Christensen.

CINEMATOGRAPHY.—No. 13,511. Cinematographic devices. J. H. Corthesy.

CINEMATOGRAPHY.—No. 13,157. Film and process for representation of cinematograph pictures. B. Hutter.

COLOUR CINEMATOGRAPHY.—No. 13,637 (or 13,631). Manufacture of multi-colour screens, films, etc., for natural colour cinematography, etc. J. Camiller and A. Hay.

STEREOSCOPIC CINEMATOGRAPHY.—No. 13,125. Stereoscopic cinematograph camera. S. Hockly and A. S. Willmot.

CINEMATOGRAPH-PHONOGRAPH.—No. 13,383. Reproduction of sound and synchronisation with projection of moving pictures. G. D. Lemon, C. E. Tidswell, and C. E. Tidswell and Co.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

REFLEX CAMERAS.—No. 158,194. (September 20, 1919.) The complete release of the shutter for instantaneous operation, and the release and arrest of the shutter in its open condition for time and bulb exposures, are determined by the position or positions taken up by the mirror after release and preparatory to an exposure, the release of the shutter being effected by detent mechanism actuated by the mirror.

The mirror 17, fig. 12, is normally under the influence of a spring coiled on the axis 21, tending to raise it, and is held in the focussing position by an arm 30, fig. 5, on the axis 21. The arm 30 has a series of projections 31, 32, 33, the projection 31 engaging a spring catch 34 on a detent arm 36 when the mirror is set for focussing by the handle 90. The arm 35 is operatively connected with a release and timing lever 36, which has a catch 94 to engage one or other of the stops 31, 32, 33, on the arm 30 according to the setting of the roller-blind shutter for a "B," "T," or "I" exposure.

The mirror pivot 21 also operates links 26, 28, 27, 29, fig. 12, whereby, when the mirror rises for an exposure, the link 29 engages the spring pawl 80 which holds the shutter in set position.

The movement of the mirror controls the shutter for different exposures according to the setting of a pin 42, fig. 5, attached to a plate 140 having shoulder stops 98, 99, 100, which limit the angular movement of the release lever 36. For an instantaneous exposure the pin 42 is moved to the "I" position and brings the shoulder 100 opposite a projection 41 on the lever 36. On operating the release 37 the arm 30 and mirror are released, and the latter moves right up to a horizontal position against the stop 101, the shoulder 100 holding the lever 36 and catch 94 thereon clear of any of the projections 31, 32, 33. The arm 29, fig. 12, then releases the shutter pawl 80.

For time exposures the pin 42 is moved to the "T" position and brings the shoulder 99 opposite the projection 41, so that on operating the release 37 the catch 94 on the lever 36 engages the stop 32 on the arm 30, and on the return of the release 37 the catch 94 engages the projection 33. The corresponding movement of the arm 29, fig. 12, is to release the shutter pawl 80, but to be

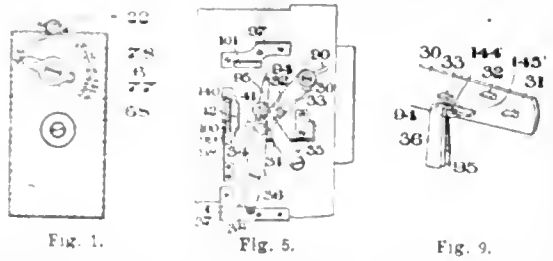


Fig. 1. Fig. 5. Fig. 9.

held in the path of a projection 96 on the gear wheel 66 of the shutter arresting it in open position until the release 37 is again actuated to release the mirror from the catch 33.

For bulb exposures the pin 42 is set in the "B" position bringing the stop 98 into position to arrest the projection 41. On operating the release 37 the catch 94 arrests the projection 31, on the arm 30 and the corresponding movement of the arm 29 is to release the shutter pawl 80 and engage the projection 96 holding the shutter open as long as the release 37 is held.

To cushion the impact of the mirror lever 30 with the stops and its movement after an instantaneous exposure the lever 36 has a yielding leaf spring 95, fig. 9, which snaps into position under the stops when they are engaged by the catch 94, and in

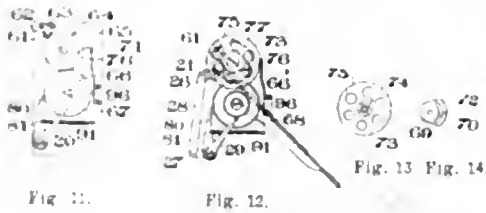


Fig. 11. Fig. 12. Fig. 13. Fig. 14.

the case of an instantaneous exposure a stop 145 engages the catch 94 when the arm 30 reaches the horizontal position.

To allow the mirror to be reset a cam 144 on the arm 30 moves the spring 95 into an inoperative position when the release lever 36 returns to normal position.

The shutter comprises two blinds, one 43, fig. 17, with an aperture 47, and wound on a spring roller 46 and the central part 45 of an upper roller, and the other wound on a spring roller 48 and with tapes 44 wound on rollers 49, 50, adjacent to and on the same spindle as the upper roller. The roller 45, fig. 15, is keyed to the spindle 51 and the rollers 49, 50, are connected to the spindle 51 by internal clutches each consisting of a ratchet member 52 keyed to the spindle 51 by a pin and slot 144, 145, fig. 16, and pressed into engagement with a freely mounted companion

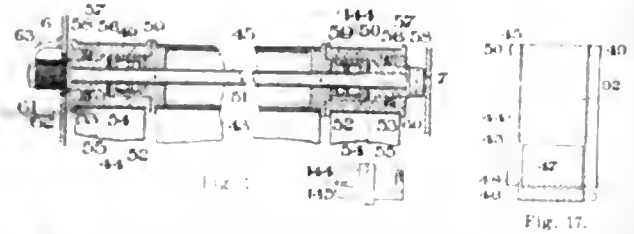


Fig. 15. Fig. 17.

member 53 by a spring 59. The members 53 have shoulders 54 gripping the rollers 49, 50 under the action of spring washers 56 held in place by screws 58 and washers 57.

The shutter is wound by a knob 68, figs. 1 and 12, which rotates wheels 69, 61, the latter gearing with the pinion 61 on the spindle 51. The rotation of the spindle and the roller 45 carries with it the side rollers 49, 50, through the friction of the spring washers 56. When the blind 44 has been fully unwound from the spindle 48 the apertured blind 43 can be further wound on the roller 45 to an adjustable extent forming a slit of

pre-determined size. On running down for an exposure when the blind 44 is fully re-wound on the roller 48, the blind 43 continues to wind on the spring roller 46 to re-close the slit by the action of the clutch members 52 overrunning the members 53, the rollers 49, 50, remaining stationary.

The setting of the shutter is controlled by a setting knob 77, figs. 1 and 12, which positions a notched disc 73, fig. 13, freely mounted on the shaft 65 of the wheel 64 and held by a spring catch 76. The disc 73 has a pin 74 extending into a slot 72, fig. 14, of a plate 69, which is also freely mounted on the shaft 65 and itself carries a pin 70. This pin is normally adjacent to a pin 71 on the pinion wheel 64. On rotating the winding knob 68 and the pinion 66 the blinds of the shutter are wound, and after one revolution of the wheel 64 the pin 71 engages the pin 70 on the plate 69, and the blinds are further wound to the extent allowed by the slot 72 and until rotation is stopped by the pin 74 on the setting-disc 73 integral with the knob 77.—P. G. Mason and Newman & Guardia, Ltd., 17, Rathbone Place, London.

COLOUR CINEMATOGRAPH CAMERA.—No. 135,169 (November 9, 1918). This invention relates to a camera fitted with light filters and capable of working at a speed suitable for the production of negative images of different colour sensations for use in the manufacture of pictures in natural colours by the three-colour system.

The invention has for its object the provision of an apparatus in which the three serial negative images of different colour sensations are taken through one and the same objective as quickly as possible after each other; the closing and opening of the shutter, the changing of the requisite light filters and the displacement of the film stock being automatically effected, while the operating speed may be varied within wide limits for example by the regulation of a tension spring.

The shutter disc carries uniformly arranged selective light-filters, adapted to rotate and by means of cam-shaped surfaces on its periphery operates the intermittent film-moving mechanism which comprises a U-shaped frame having latches, pawls, or claws which engage in the perforations in the film in such manner that the film is drawn forward by a length corresponding to that of a picture surface and is brought to rest before the next exposure takes place.

Cam-shaped surfaces on the periphery of the shutter disc correspond in number to the light-filters, and engage a roller at the end of an oscillating arm mounted on the axle member of another oscillating arm which is connected with the U-shaped frame by means of a link.

The latches or pawls are mounted on a frame sliding to and fro on the plate for guiding the film and which is connected to a link attached to one of the oscillating arms.

There is a shock-absorbing device for the shutter disc, comprising an air dash-pot and a spring-controlled hook which engages with a pin attached to the shutter disc. Serge de Procoudine-Gorsky, Granstad, Konnerud, near Drammen, Norway, formerly of Petrograd, Russia.

The following complete specifications are open to public inspection before acceptance :—

CINEMATOGRAPHY.—No. 161,545. Cinematographic screens. J. Elmington-Darling.

REGISTRATION OF COLOUR PRINTS.—No. 161,578. Process for causing single-coloured partial pictures to register on paper. Soc. Anon. per la Fotografia Autopancromatica.

FILMS.—No. 162,266. Process for the preparation of photographic films permeable to water. Soc. Anon. La Cellophane.

CINEMATOGRAPH-PHONOGRAPH.—No. 162,274. Apparatus for simultaneously reproducing optical images and sound waves which have been photographically recorded on a film. E. Reisz.

CINEMATOGRAPHY.—Nos. 162,278 and 162,279. Motion-picture films. Pathé Cinema Anciens Etablissements Pathé Frères.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

PASTINELLO.—No. 413,292. Projection screens for motion picture theatres and for other optical projection apparatus. The firm trading as Bardilis, 73, Great Titchfield Street, London, W.1, manufacturers. March 10, 1921.

New Apparatus.

The Thurlow Printing Table. Made by The Thurlow Manufacturing Co., Thurlow Street, Walworth, London, S.E.17.

THIS new pattern of printing machine is designed for making single prints up to 12 by 10 size, and also strip prints, either six postcards or four cabinets, on each strip. The apparatus is made in the form of a table occupying a floor space of 3 ft. 6 ins. x 1 ft. 9 ins., and of height (to table top) 3 ft. Below the negative bed, which is a glass plate, is the light-box, which is provided with means for raising or lowering the lamps for adjustment of the strength of light according to the density of the negative. Grooves are also provided in the upper part of the light-box for the insertion of ground glass, as required for thin negatives, or of vignetters.

Arranged to right and left on the table top are the necessary guides and stops for postcard or cabinet printing on the customary strips. Exposure is made by foot treadle, so that the hands of the operator are free for the manipulation of paper or cards. Moreover, the light in the box is switched on only by the final pressure of the treadle, obviating the possibility of accidental fogging. Interchangeable pressure boards and masks for postcard and cabinet sizes are provided; other sizes can be supplied to order. The whole apparatus is altogether of workmanlike design, and is substantially made in polished oak. The price is £14, carriage paid in England.

New Materials.

Barnet Matt Self-Screen Plates. Made by Elliott and Sons, Ltd., Barnet, Herts.

THERE was a mention some weeks ago in our columns respecting the usefulness of a negative plate coated on the glass side with a matt film for the purpose of facilitating retouching with pencil, stump, etc. Messrs. Elliott then informed our readers that they could supply a plate of this kind, and have now sent us a specimen in the shape of their well-known Self-Screen plate provided with the matt backing. There is no doubt that among both portrait and landscape photographers there is a considerable demand for a plate of this kind. The fine matt coating on the glass side provides one of the readiest means for carrying out hand work, and, moreover, is a measure against halation. If our memory serves us correctly, a plate with a matt surface on the glass side was issued many years ago, specially for its prevention of halation. That was before the present era of "control" in various forms, and now that the facility for hand work can be obtained in combination with alleviation of halation, very many should have good reason for taking advantage of the new introduction.

Verona Chloro-Bromide Paper. Made by Elliott and Sons, Ltd., Barnet, Herts.

IN this new grade of development paper Messrs. Elliott, by preparing an emulsion of only one-quarter the speed of bromide paper, have provided photographers, and particularly the makers of professional portraits, with a printing medium of most distinctive and beautiful quality. "Verona" is a paper of extremely delicate cream tint, yielding a warm black tone by straightforward development with an M.Q. formula. The tint of the paper base is of the faintest; it is, perhaps, an exaggeration to call it a tint, for it more closely resembles the mellowing with age which a pure paper undergoes. This quality, in conjunction with the warm black of the image, produces an effect very similar to that of a mezzotint engraving. And as regards the photographic quality of the image, the prints exhibit a fine range of gradation creditable to any development paper. The new medium is, in short, a notable addition to the many varieties of development papers, which are now offered to photographers, and worthily ranks—which is saying a good deal—with the distinctive papers which Messrs. Elliott have themselves issued from time to time. The speed of "Verona" is convenient for both enlarging and contact printing, whilst the manipulation in no way differs from that of a bromide paper. The tone given by the developer recom-

mended by the makers is of very pleasing warmth; a colder tone may be obtained by using a considerably smaller quantity of bromide in the developer; and if prints of extra warmth are required, the customary sulphide-toning process works excellently with the paper.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, MAY 29.

South London Photographic Society. Excursion to Headley.

TUESDAY, MAY 31.

R.P.S. "The Snow and Ice Scenery of Switzerland." Dr. C Thurstan Holland, F.R.P.S.
Hackney Photographic Society. Annual General Meeting.
Manchester Amateur P.S. "De Composition—An Analysis of Character in Nature and Art." H. Cadness.
Portsmouth Camera Club. "P.C.C. Outings." A. Harfield.
Scottish C.W.S.C.C. (Glasgow). "Composition"

WEDNESDAY, JUNE 1.

Croydon Camera Club. Members' Print Display.
Edinburgh Photographic Society. Sixty first Annual Meeting.

THURSDAY, JUNE 2.

Hammersmith Hampshire House P.S. Annual General Meeting

FRIDAY, JUNE 3.

R.P.S. Pictorial Group. "Eyes in Portraiture." Marcus Adams

SATURDAY, JUNE 4.

Glasgow and W. of Scot. Amateur P.A. Excursion to Blanefield
Hackney Photographic Society. Sports Outing.
Scottish C.W.S.C.C. (Glasgow). Outing to Glasgow Cathedral

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, May 24, the President, Dr. G. H. Rodman, in the chair.

A number of papers, dealing with the lighting of cinematograph and portrait studios, arranged by the Scientific and Technical Group, were read.

Mr. J. E. Elvey dealt generally with the types of lighting equipment in cinematograph producing studios and showed photographs of the installations used by notable producers of cinema drama films in this country and America.

A paper by Mr. Leon Gaster was read for him by Mr. J. S. Dow, and considered somewhat more specifically the conditions of efficient illumination in both portrait and cinema studios in relation to the type of illuminant and the sensitiveness of the photographic emulsion. The disparity between the maximum spectral intensity of artificial light-sources and the maximum spectral sensitiveness of plates was emphasised by curves representing these properties and stress laid on the necessity of plate-sensitiveness being brought into correspondence with the distribution of spectral intensity of the light-sources.

The third paper by Mr. John W. P. Walsh, of the National Physical Laboratory, dealt more precisely with the elements of the measurement of the intensity of light-sources, the illumination produced by them and the reflected light-intensities. Measurements of reflection coefficients of a number of human faces had been made and yielded an average of about 40 per cent., as against about 80 per cent. for white blotting paper and 3 per cent. for black velvet. The authors showed examples of polar curves representing the spherical distribution of light, and pointed out the information they gave of illumination of horizontal and vertical surfaces. They referred to the systems of distribution of light, either wholly by diffuse reflection, which was the most efficient, or by diffusion through a partly transparent medium. In an animated discussion which followed, Mr. Marcus Adams criticised most of the photographic work in the cinema studios for its over-lighting.

Mr. Angus Basil said that cinema photographers appeared not to realise that good lighting consisted in as close an approximation as possible to daylight, otherwise they would not employ powerful lights in so many different positions.

Mr. Ferguson pointed out that visual measurements of lighting were very little use; they wanted photographic measurements.

Mr. Renwick added that users of lighting systems needed a more rapid actino metric test than was at present available.

Mr. A. C. Banfield emphasised the fact that portrait photographers required to have a light-equipment capable of responding to extreme requirements, and at the same time of the utmost convenience in manipulation. For that reason he thought it was difficult to find a more suitable source of light than the half-watt lamp, but plate makers should devote themselves to making fast red-sensitive plates, preferably of minimum green sensitiveness for facility of development. Mr. Banfield drew a plan of his own installation of half watts, the lamps being hung in pairs down one side of the studio and having two lamps more widely separated high up on the wall behind the sitter. By using a given four or five of the dozen lamps he could obtain any type of lighting.

Mr. Rawson, as a cinema producer, spoke of the advantage of using arc lamps because the negative sensitive film had its chief sensitiveness in the blue. He would like to see a film of maximum sensitiveness in the middle portion of the spectrum, and then they could take advantage of the properties of the gas-filled lamps.

Mr. C. P. Crowther remarked upon the extraordinary differences in candle-power of electric installations which permitted equally short exposures. He thought that the size of the studio was the chief factor in such cases, reflected light from the walls being effective in a small studio, whilst it was lost in a larger one. He said that Mr. Pirie Macdonald, in his New York studio, arranged a velarium, and further confined the light by the use of movable screens arranged so as practically to create a studio within a studio.

Further discussion showed the considerable interest in the exchange of view between those engaged in the scientific design of lighting installations and those having to use them.

On the proposition of the chairman a very hearty vote of thanks was accorded to the readers of the papers.

CROYDON CAMERA CLUB.

Mr. J. A. Sinclair gave a lantern-lecture, entitled "Croydon Waters." Many as are the useful purposes water serves, notably as a heavily taxed commodity when in generous admixture with more cordial fluids, yet the subject, naked and unadorned, seemed somewhat inappropriate for Croydon. Perhaps even more so, when the revelation came that the River Wandle, which rises in crystal purity close to Croydon, and from association with less favoured districts finally oozes dirtily into the Thames at Wandsworth, was to be the theme. For, as the secretary expressed it, what manner of man was he who thought he could tell or show the members anything new about their own pet preserve.

Mr. Sinclair succeeded admirably in doing so, firstly with a highly interesting epitome of English history which happened along its banks, and secondly by unearthing many unknown beauty spots, and presenting them vividly and pictorially in a first-class set of slides, the majority of which had never experienced a lantern-warming. A capital lecture on the modest yet picturesque little Metropolitan stream, famous, he said, for an abortive attempt by Ally Sloper to reach the Croydon club by water. On the same unimpeachable authority one also learnt that Anne Boleyn lost her somewhat flighty head owing to an incurable habit of eating biscuits in bed from which, apparently, her husband derived no crumbs of comfort. Side-lights of history like this made the lecture rich in educational lore.

In the discussion Mr. H. P. C. Harpur expressed unqualified approval of the slides untainted with destructive criticism. Only when exhibiting his own has the auspicious occasion been equalled. Mr. Sinclair's slides, he said, were paramountly juicy; indeed, from the juicy standpoint they were the most juicily juicy he had ever set eyes upon. In addition, their atmospheric charm and "rescending" quality were superlatively gorgeous. As a slight counterblast, Mr. F. Ackroyd then measured up the lecturer for having omitted from the list of celebrities who lived at Mitcham the name of Mr. Mallaby Deeley. Mr. A. S. Newman, on being called upon to speak, contented himself with remarking that until he had seen his partner's pictures he had never realised the beauties of Mitcham.

Replying to questions, Mr. Sinclair said that the cameras used by him were the "Una" and a reflex respectively fitted with

3- and 6-inch lenses. A 9-inch f/6.3 "Telecentric" was also occasionally employed, excellently adapted for recording street groups, as the distant standpoint of the photographer did not attract attention. For this type of lens an aperture of f/6.8 was sufficiently rapid, and was indeed requisite for the sake of depth of field. He invariably used ultra-fast brands of plates, and some of the slides were from panchromatics, which could now be obtained of extreme speed. A most hearty vote of thanks was accorded him for a lecture which must have involved a lot of trouble to a busy man cheerfully undertaken for his many friends at Croydon.

A catastrophe threatened early in the evening owing to the absence of the honorary steward, and that both the secretary and his satellite had left their keys of the refreshment safe at home. The lock is a tricky one, but two experts, Mr. Vivian Jobling and Mr. A. F. Catherine, set their hands to the job and picked it with consummate ease.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held on May 13 at 35, Russell Square. There were present Mr. Swan Watson (president), Mr. Frank Brown (past president), Mr. R. N. Speaight (treasurer), with Messrs. Marcus Adams, A. Basil, A. Bennett, W. B. Chaplin, G. Chase, A. Corbett, C. F. Dickinson, Alfred Ellis, W. E. Gray, R. Haines, G. Hana, W. Illingworth, H. St. George, F. G. Wakefield, W. H. Wedlake, and Lang Sims (secretary).

Apologies for absence were announced from Messrs. Chapman, Chidley, Fry, Lambert Read, and Wheeler. Mr. Chidley congratulated the officers and Council upon the success of the Congress, and also expressed himself in favour of the title "The Institution of Professional Photographers" when the Association was incorporated.

It was necessary to appoint officers and committees under the old constitution, and Mr. Basil proposed and Mr. Chase seconded the re-election of Mr. Ellis to the chair, and this was unanimously agreed to. Mr. Illingworth proposed, and Mr. Watson seconded, the re-election of Mr. Speaight as treasurer, and this also was unanimously agreed to. Some doubt was expressed whether the secretary came up for election, but in any event, on the informal motion being put from the chair, it was agreed with acclamation that Mr. Lang Sims be asked to continue in that office.

It was agreed, on the motion of Mr. Frank Brown, seconded by Mr. Illingworth, that the Finance Committee should consist of Messrs. Chase, Corbett, Haines, and Wakefield, with Messrs. Ellis, Watson, and Speaight *ex officio*.

Mr. Corbett proposed, and Mr. Chase seconded, the re-election of the "Circular" Committee as follows:—Messrs. Adams, Haines, Hana, and Wakefield, and this was agreed to.

The secretary read the names of fourteen new members, twelve of whom had joined at the Congress.

The secretary reported that since the last meeting a number of further inquiries had been received with regard to the proposal of the Eagle, Star, and Dominions Company. A number of letters had also come to the Association thanking the Council for the excellence of the Congress arrangements. A dispute between two members concerning a question of copying was the subject of correspondence. One photographer had made an enlargement from a negative made by the other, and at the special request of the mother of the sitter (a soldier well known locally who had lost his life while fighting) had exhibited the enlargement in his window. The secretary was instructed to write urging that the exhibition in the window should not be continued except by arrangement with the photographer who did the original negative.

Two members wrote that they had been circularised by a photographer who suggested participation in certain local schemes which he urged would be remunerative. The particulars were only to be divulged on a certain small payment. The secretary was instructed to write asking the gentleman in question to furnish such information as to his scheme as would enable an answer to be sent to inquiring members.

A letter was read suggesting that the Association, after incorporation, should endeavour to secure that professional photographers, when called upon to give evidence in courts of law, should have a proper fee. It was suggested that the photographer should make his bargain with the solicitor before consenting to give evidence. One member of Council said that he had been paid three guineas a day in the High Courts, but it was necessary that the photographer should make his bargain beforehand, though, of course, this could not apply in the case of a subpœna.

Mr. Speaight presented the Congress balance-sheet.

Mr. Brown proposed, and Mr. Watson seconded, a vote of thanks to the treasurer and those associated with him in the financial arrangements, and congratulated him on a satisfactory result. A further vote of thanks to Mr. Speaight was carried for placing his studio at the disposal of sub-committees engaged upon Congress work. Mr. Adams was also thanked for his work in arranging the Exhibition.

The secretary reported that the Finance Committee had met and recommended for payment various accounts amounting in the aggregate to £192 3s. 6d. The recommendation was adopted.

Mr. Corbett proposed, and Mr. Speaight seconded, a vote of thanks to the editor of the "British Journal of Photography" for his excellent reports of the Congress proceedings, and this was agreed to. It was also agreed that the thanks of the Association should be sent to the various lecturers, to the Imperial Dry Plate Company for the loan of glass for pictures, and to any others who had assisted in the Congress arrangements.

The chairman said that the draft Articles were before the members of the Council, and would require very careful consideration. It was impossible to take this business, he believed, at any ordinary meeting, and he suggested that the members look through their copies, and send their comments to the secretary within a week or so, and that a special meeting of the Council be called for a fortnight from that day.

Mr. Frank Brown and others thought that another meeting of the Council within a fortnight would bear hardly on the country members. Eventually it was agreed to have a preliminary committee meeting to thrash out certain matters in advance, that members should send in their comments to the secretary by May 25, that the sub-committee should meet within a fortnight to prepare matters for consideration by the Council, and that the matter be brought before the meeting of the full Council on June 10.

The Committee for this purpose consisted of the following:—Messrs. Adams, Basil, Haines, Hana, St. George, and Wakefield, and the officers. It was agreed that the meeting should be held on May 27 at 4 p.m. at Mr. Speaight's studio.

Mr. Corbett moved in the name of Mr. Chidley a resolution that the secretary be instructed to make inquiries for the best Press Agency in London and their terms, with a view to making similar arrangements with such agency as had already been made with a certain company in the matter of insurance. Mr. Chase seconded.

After some discussion it was agreed that the matter should be put on the agenda for the next meeting.

It was agreed also that various suggestions remitted from the annual general meeting should be placed upon the next agenda.

It was further agreed not to publish another number of the "Circular" pending new instructions from the Council.

The Council then rose after a sitting of three hours.

News and Notes.

THE THURLOW MANUFACTURING COMPANY is the new title of the business formerly carried on as George S. Moore, at Denmark Hill, London, S.E.5, and specialising in strip-printing apparatus, etc. The Thurlow Company now carries on its business at Thurlow Street, Walworth, S.E.17; telephone number, Hop 3194.

TECHNICAL PERIODICALS.—Messrs. Henry Sotheran and Co., 140, Strand, London, W.C.2, have just issued a 56-page list of sets of scientific and technical periodicals which are offered for sale by them. The collection includes a large number of chemical and other scientific journals, and also a number of "runs" of photographic journals, among which are the "Photographic News," "British Journal of Photography," "Camera Obscura," and Eder's "Jahrbuch."

FLORA DEVELOPING DISHES.— In reference to a recent query, Messrs. Jonathan Fallowfield inform us that the Flora dish was formerly made by Messrs. Taylor, Tunnicliffe and Co., of Hanley, Staffs, but that its manufacture has long been discontinued. Messrs. Fallowfield can offer a few dishes of the whole-plate size at the price of 2s. each. These dishes are specially designed to enable two plates to be developed in the same quantity of solution as a single plate.

AERIAL SURVEY.—In connection with the surveys, which are being carried out in the Canadian North-West Territory by the Imperial Oil Co., aeroplanes are to be employed fitted with cameras for the purpose of obtaining photographic records of water courses and other features of the landscape of importance in the transport of labour and equipment. The photographs will also be of value to surveyors and others in mapping out the country without the use of the customary topographical methods.

LUTE FOR BOTTLES.—In reply to an inquirer for a composition for capping bottles, the following formula is given by the "Pharmaceutical Journal":—Gelatine, 1 oz.; gum acacia, 1 oz.; boric acid, 20 grs.; starch, 1 oz.; water, 16 fl. oz. Mix the gelatine, gum acacia, and boric acid with 14 ozs. of water, stirring occasionally until the gum has dissolved. Then heat to boiling, remove any scum, and strain. Mix the starch evenly with the rest of the water, mix with the gelatine solution, and heat until a uniform mixture results. Add any desired colouring, and pour to set in suitable bottles. When required for use, melt with gentle heat, and immerse the corked bottle in the warm mass. Zinc oxide may be incorporated with the above.

PICTURE-HANGING WIRE.—Mr. R. B. Marston writes to last week's "Nature": Some ten years or so ago I was advised to use twisted brass wire of five strands, which was then immensely strong, with a breaking strain of probably more than 100 lbs., but it has become so rotten as to break under a weight of a pound or two. This wire has been in use in a very dry room with electric light only. My own experience has proved that plain copper wire in one strand has lasted three times as long as the twisted brass wire, though bearing far heavier weights. Before the war a "wire" consisting of a steel core with some other wire braided over it was recommended, but it is soon affected by rust, and appears to be much stronger than it really is.

PHOSPHORESCENT PRINTS. — A recent patent specification, No. 160,739, not yet accepted, of J. H. Christensen, relates to a process for reproducing prints or photographs by means of a phosphorescent medium in which the action of red light in destroying the phosphorescence of the medium is utilised. The transparent phosphorescent screen or sheet is placed in contact with the print or photograph and illuminated or acted upon by coloured light. The sheet is subsequently placed in contact with a sensitive film to produce an image of the print or photograph. The translucent phosphorescent sheet may be coloured or the phosphorescent medium itself may be coloured. In preparing a translucent sheet the phosphorescent material is comminuted by mixing it with liquid and shaking it up with glass balls. The comminuted mixture is mixed with gelatine and glycerine and poured on to a glass plate covered with a film of rubber. After the phosphorescent material has settled and the film solidified, a coloured collodion coating is applied and dried, after which it is stripped and the phosphorescent surface exposed to strong light to render the material active.

Correspondence.

QUADRO PASSE PARTOUTS.

To the Editors.

Gentlemen,—We are very much obliged to you for your reference to "Quadro" frames in the article "Passe-Partouts for Specimens" under the heading "Ex Cathedra" in your issue of May 20.

If we may venture to do so, we would call attention to the additional advantage that, whereas, in cases of breakage, a frame of ordinary paper passe-partout binding is irretrievably damaged, with the "Quadro" frame it is only necessary to replace the glass.

We shall be delighted to send a sample of frame to any photographer who cares to write one and will mention the colour desired. You are probably aware that we produce in black, brown, and grey, and, for coloured pictures, in gilt.—Yours faithfully,

BARTONS' (BIRMINGHAM), LTD.

Cosway Works, Finch Road, Handsworth, Birmingham.

PARTIAL REVERSAL BY WHITE-LIGHT DURING DEVELOPMENT.

To the Editors.

Gentlemen,—Whilst developing a batch of snapshots of some steeplechases, when the negatives were about half-made an assistant accidentally switched on an electric (white) lamp over the dish containing the plates. The light was extinguished very

quickly; the result, however, was a freak, half negative and half positive. I enclose a print from the same.

It is the first time in 35 years' practice of photography I have seen such a result.

M. COOPER.

29, East Street, Taunton.

INTERESTING THE SITTER

To the Editors.

Gentlemen,—The rather caustic comments of your unsophisticated correspondent "35 Years a Professional Photographer" are most refreshing after the rather "high falutin' talk" we have had from and about lady photographers. As regards this widely-published "talk," I am of opinion that the statement made by one woman worker: "It is so easy to descend to the level of the sitter," calls for some explanation.

Does it mean that those who go to lady operators are of inferior intelligence, and that conversation has to be brought down to a sitter's level? And that after discussing French maids and the latest Parisian fashions with the dames of Balham and Upper Tooting, the lady photographer can say with perfect naturalness, and better than a man: "Oh! bli me, your fever is a treat. Not 'arf!" when Arry calls in from the East End to have her "photo took"?

I am reminded of a story of J. L. Toole—who was a good friend to photographers—who, after accepting an invitation to dine with Gladstone, found the company at table to consist of about a dozen of the leading literary and other celebrities of the day. Toole, in telling the story said: "They discussed German literature, old china, and dozens of other things I knew nothing whatever about, and the first thing I did after making my escape from the party was to find a policeman and have a gossip with him in order to find my intellectual level."

Women are renowned talkers, it is true, but not necessarily good conversationalists, and I cannot imagine any one of them in a studio interesting a man with intellectual talk such as a really good man operator can do. An experienced man operator's talk, when it is called for, may—to quote Dr. Johnson—"not always show the

minute-hand, but it strikes the hours very correctly," and, after all, customers do not attend a studio for idle twaddle.

Women photographers are merely a passing fad of a fickle populace, and as much out of place in our community as women barbers and police. But we shall have to endure them for a time, just as we have to put up with influenza and rheumatism. If we have patience, the whirligig of time will bring its revenges upon them and compel them to play the part in life Nature intended them to do, and nurse babies rather than grievances about whiskers.

A lady photographer will never have the courage to remain in the business for long, or to advertise her "many years' experience," and "35 Years a Professional Photographer" can continue to jog along (with his whiskers) in his old sweet way, and may rest assured that no woman photographer will ever be able to truthfully use his honoured nom-de-plume.—Yours faithfully,

ONLOOKER.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

J. W.—We know of no book dealing with the making of hand-cameras. You can buy brass and woodwork from the Photographic Supply Co., Shepherd's Lane, Leeds.

E. N.—There are processes of reversing a negative on bromide paper, but from a somewhat extensive experience of them we think we can say that none of them are reliable for regular use. Certainly none of them are as economical in use as making a positive transparency and a negative again from that.

M. W.—Kathol is one of the metol substitutes sold in America. No doubt it is still obtainable from any general dealer in photographic requisites, such as Messrs. George Murphy, 57, East Ninth Street, New York, but we think the formula would work just as well with any of the metols which are on the market in this country.

R. F.—There is no easy way of regilding frames. It requires a considerable amount of practice to get the even surface you require. The surface of the old gilding must be carefully smoothed, then a coat of special size applied, and when this is just tacky, gold leaf is laid on, and pressed gently down, if necessary, with a camel-hair brush and cotton wool. There are two systems, water gilding and oil gilding.

W. A.—(1) Nothing better than "Bildup," of the Vanguard Co., Maidenhead. (2) We are afraid there is no means of removing mountant stains without affecting the glaze. You might try a little pure spirits of wine rubbed on with a soft rag, but anything containing moisture will remove the glaze. (3) Dilute the varnish with a little boiled linseed oil. (4) If perfectly dry, papers and plates will suffer little damage by heat, but as usually they are not thoroughly dry, the effect of any damp is greatly aggravated by heat.

R. R.—The formula you require is on the lines of that given below:—

Water, to make	40 ozs. fluid.
Hydroquinone	½ oz.
Soda sulphite	4 ozs.
Soda carbonate	4 ozs.
Hypo	8 ozs.
Liq. ammonia .880	2 fl. ozs.

Addition of more ammonia to the developer gives more vigour. The plates develop (and partly fix) in two or three minutes. They can then be examined by daylight and fixed in plain hypo.

G. K.—There has been scarcely any literature on the making of Autochrome transparencies for several years past. Actually the very complete booklet of instructions issued by the British representative of MM. Lumière, Mr. T. K. Grant, 89, Great Russell Street, London, W.C.1, is the best instruction manual there is. There is certainly a great difference in the density of Autochrome lantern-slides, but the only "formula" that we know of for getting a clear, brilliant slide is exactly the right exposure of the plate in the first instance. Usually Autochromes for projection can do with just a touch of intensification in order to increase their brilliance.

R. T.—The following is a suitable formula recommended by Messrs. Houghtons for delevoper for quantity development of amateurs' films:—

Pyro	12 ozs.
Sodium sulphite (cryst.)	7½ lbs.
Potass. metabisulphite	15 ozs.
Sodium carbonate (cryst.)	3 lbs.
Potassium iodide	50 grs.
Water up to	10½ galls

The following instructions *must* be strictly followed, as the keeping qualities of this developer depend entirely upon the method of making up. Dissolve the sulphite in two gallons of hot, but *not* boiling, water. When dissolved add the metabisulphite, and then boil for five minutes. Cool down to about 70 degrees Fahr. and add the pyro. Dissolve the carbonate in one gallon of warm water, then add the iodide. Pour these two solutions into the tank, and then fill up with water to the top as usual. The most satisfactory temperature for developing is 65 degrees Fahr., and it should not be used below 60 degrees. When the developer is first made up, the time of development at 65 degrees is about eighteen minutes.

After the developer has been used for two batches, it will be necessary to strengthen it with every batch. The strengthening solution is made by dissolving the chemicals given in the following formula. Exactly the same methods must be followed as when preparing the first developer:—

Pyro	½ oz.
Sodium sulphite (cryst.)	5 ozs.
Potass. metabisulphite	5 drs.
Sodium carbonate (cryst.)	15 ozs.
Potassium iodide	8 grs.
Water up to	120 ozs.

As regards your fixer, no wonder it gets into a milky state, if you are simply adding acetic acid to plain hypo. You should make up the fixer with sulphite or metabisulphite according to the acid fixing formulæ in the "Almanac," for example, or in the directions given by almost every maker of gaslight paper.

THE BRITISH

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Contents.

SUMMARY.

In a contributed article Mr. D. Charles describes a number of recent experiments on halation, and endeavours to single out the factors among subject, plate, lens, exposure and development which are of chief importance in the prevention of this defect. (P. 323.)

The revised formulæ due to Mr. F. Garon for the Carbro printing process will be found on page 327.

In a leading article we seek to trace the psychological processes involved in the effective influence upon passers-by of a display of portrait photographs in the customary showcase. (P. 322.)

Formulæ for two further developers having a desensitising action on the residual emulsion have been recently given by Dr. Lüppo-Cramer. They are made up respectively with paramidophenol and glycin, in each case with phenosafranine. (P. 321.)

In the concluding portion of the article on electrical facts for photographers the writer deals chiefly with the running of arc and half-watt lamps. (P. 326.)

A correspondent raises the very interesting question as to whether, if studios and workrooms are exempt from the Shops Act, employees in these departments of a photographer's business can claim the benefits granted by that Act. (P. 331.)

The death is announced of Mr. I. F. Hammer, for many years a maker of dry-plates in the United States. (P. 330.)

A method of making a cardboard carrier for plates of smaller size than those accommodated by the full-size dark-slides of a camera will be found described in a note on page 322.

" COLOUR PHOTOGRAPHY " SUPPLEMENT.

Lt.-Commander H. E. Rendall, in some notes on the Raydex colour process, has a number of hints to give on practical points of manipulation. His article (P. 21) usefully supplements the official instructions of the Raydex Company.

The unfortunate experience of Du Hauron and of other inventors in the field of colour photography leads us to warn the ingenious of the somewhat remote chances of profiting in a substantial financial form from inventions in colour photography. (P. 24.)

Methods of securing full rendering of clouds in the Autochrome are the subject of a paragraph on page 24.

Patented processes for dye-toning in its application to the making of colour prints have been prominent of late. Mr. W. Van Dorn Kelley has claimed a copper-chromium bleach (P. 22), Dr. Traube has returned to the subject by describing a bleach compounded of copper salts for use with certain dyes (P. 23), and a further patent, with which the name of the late W. Friese-Greene is associated, describes a somewhat complex mixture containing both dye and bleach. (P. 23.)

Some notes on lighting and exposure in Autochrome work will be found on page 22.

EX CATHEDRA.

The Royal. The Royal Photographic Society announces the date of its sixty-sixth annual exhibition, viz., September 19 to October 29 next. The exhibition will again be held in the Society's house, 35, Russell Square, London, W.C.1, and admission will be free. The prospectus and entry form will be ready shortly, but in the meantime the following provisional particulars may be given. In the Pictorial Section the judges will be Messrs. Marcus Adams, Bertram Cox, J. Dudley Johnston, F. J. Mortimer and Hector Murchison. The section for colour transparencies and prints will this year be divided into a pictorial and a technical sub-section, an innovation which has long been needed and which will simplify the judging of these exhibits. In the pictorial sub-section the judges will be Messrs. F. T. Hollyer and W. L. F. Wastell. In the technical sub-section the work will come before the judges of the main scientific section, viz., Messrs. Charles R. Davidson, J. Willis Grundy, Hugh Main, Dr. Robt. Knox, and Dr. G. H. Rodman. The hanging of the exhibition will be undertaken by Messrs. G. Bellamy Clifton, C. P. Crowther, J. B. Portway, and T. H. B. Scott.

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Safranine in Developers. In the current issue of "Photographische Industrie" Dr. Lüppo-Cramer gives two further formulæ for developers containing safranine, and thus serving for development by bright yellow light owing to their desensitising action. The first developer of this form, viz., paramidophenol, is made up by dissolving 50 gms. potass metabisulphite, 20 gms. paramidophenol hydrochloride and 1 gms. potass bromide in 125 c.c.s. of water. To this is added with the customary precautions a solution made by dissolving 70 gms. pure caustic potash in 90 c.c.s. of water. Much heat is developed in dissolving the potash and the solution must first be cooled before adding to the first. To each 200 c.c.s. of the mixture, 10 c.c.s. of 1:100 phenosafranine solution is added. The dye is precipitated, forming a turbid mixture. The latter, therefore, requires to be well shaken when making up the working developer by mixing with about twenty times its bulk of water. For a glycin-safranine developer 50 gms. of potass metabisulphite and 20 gms. of glycin are first mixed together in a good sized vessel. Potass carbonate (200 gms.) is then added and addition made in small doses of 180 c.c.s. of water. In this way a thin creamy mixture is obtained of bulk about 250 c.c.s., to which is added 25 c.c.s. of 1:100 safranine solution. In this case also the dye is precipitated, but redissolves on dilution of the cream, to form the working developer, with 10 to 15 parts of water. If the glycin developer is to be used at a greater dilution for slow development the proportion of phenosafranine should be correspondingly increased.

Plate Carriers. There is often a difficulty in obtaining carriers for plates which are very slightly smaller than the slides in which they have to be used, for example, the half-plate in a 7½ x 5 or the 9 x 12 cm. in a 5 x 4 slide. It is, however, quite easy to make cardboard carriers which answer the purpose perfectly and which will stand a fair amount of wear, by using a thin card as a foundation and building up the margins. In the case of 7½ x 5 to half plate, we start by cutting a thin hard card, or even a ferrotype plate, the full size of the slide. The next step is to cut strips of card or very thin wood a shade thicker than the plate, which are fixed upon the card so as to form a cell into which the smaller plate will fit. At one of the ends is glued a strip of veneer overlapping one-sixteenth of an inch, and at the other end two small brass buttons riveted through with ordinary brass boot rivets. The heads of these rivets should be at the back of the large card, and the ends cut off and riveted on the buttons. If wooden strips be used very tiny screws may be used instead. An alternative plan is to use a thin cut-out card in front and to have one of the end slips movable so that the plate may be slipped in as a print is fixed in a cut-out mount.

PSYCHOLOGY OF THE SHOWCASE.

PRACTICALLY every photographer uses either a window or a showcase for displaying his work, and often the showcase is the only form of advertisement resorted to, either because the worker does not believe in window display, in connection with a studio, or if he does, he may not be fortunate enough to possess a window, owing to the construction of his premises. That publicity pays must be admitted, as we live in an era of advertising at the present time. A photographer's showcase is either a good advertisement or a bad one, and if neglected at once irritates the "public eye" and does more harm than good, while a well-planned display is a remunerative advertisement, bringing custom to the studio. Naturally, every display is of the worker's best ability when it is first arranged and put before the public, but how many *neglected* showcases we see about our towns to-day! When new, no doubt they did the worker great credit, but owing to neglect they are bad advertisements. The firms they represent may turn out real good work in every way, but strangers look at these showcases and judge the firm accordingly. It would be far wiser to rely upon "work turned out" than to own an unattractive advertisement. What is an advertisement? It is an announcement. A photographer's showcase announces something. It tells the public where the studio is situated and, above all, the class of work turned out. Hence the importance of making it a good advertisement and creating a good impression. Let us now go one step farther and think of the "elements," so to speak, of good advertisements. The chief points of a good advertisement may be summed up under four headings, as follows:—

1. It attracts.
2. It holds interest.
3. It creates desire.
4. It impels action.

These four points are based upon sound psychological facts. They act upon the mind. Let us now deal with each point separately as applied to our photographic showcase display.

As regards attraction, the first consideration should be "position." Usually the showcase is fixed at the studio entrance, and great care should be taken to use the best space for publicity. Sometimes a case on one side wall of an entrance may be passed almost unnoticed, while one on the other side may instantly attract the eye, on the same principle that a shop one side of a street may have a far more valuable position than a shop directly "opposite" in the same street. If a showcase be tried first on one side of an entrance for a short time and then changed to the opposite wall for the same length of time, a striking difference will be noticed in the number of people attracted to look at the display in each position. This point, of course, is only considered with displays inside the doorways, when there is no space available facing the street. The position, then, can be chosen according to its power of attraction. Then comes the question of height. The showcase should be at a convenient "viewing" height, so as to need no undue effort to view the display. Another feature to consider is lighting. If artificial light is required it may be either from the general light in the studio entrance or even lighted by miniature lamps fitted inside the showcase itself with a switch in some convenient place. Even in daytime, if the entrance is dull, it pays to keep the showcase lighted artificially, the main point being that "light" attracts.

Having attracted anyone to notice the showcase, what will hold their interest? If, on approaching closely, the display is found to be untidy or inartistic, the interest is not held, so the first thing should be an artistic case both inside and out. This does not necessarily imply an elaborate design; in fact, one, rather simple and well balanced. The backboards should be subdued and of good appearance. Art boards or canvas—in fact, endless varieties of material—can be used at little cost, to cover the backboards forming a ground for the prints. Some high-grade wall coverings cannot be beaten for effect, these, of course, being of the self-coloured variety, art shades or imitation canvas, etc. Now a word about the selection of "specimens." These should be interesting and topical. A recent wedding group, portraits of local celebrities, popular sports, concert or committee groups, all "hold interest." It is a very good plan to change not only the photographs but also the scheme of showcase dressing. The photographer of average artistic ability will have no trouble in devising fresh ideas, and anyone having noticed the showcase on a previous occasion is "attracted" by the change and interest is immediately renewed.

The creation of a wish obviously relates to the specimens on show. They should be carefully chosen, not only for quality but also for their suitability to the display. Taking it for granted that we have a number of good prints, the final arrangement should be well balanced as regards sizes, mounts, colour, and general key of effect. For instance, one display may be solid dark background work, while a change could be made to light vignette and sketch or coloured styles, the former being in a low key and the latter in a high key, with suitable case-dressing schemes to each in turn. Such arrangement of well-selected prints will be pleasing, and the desire is created to have portraits taken in the styles and processes shown because they are distinctive. "I want something like that," is what a customer thinks on seeing a pleasing style. Something distinctive—just the bit different from all others. To be distinctive one must show personality in his work, some power and character. This all creates desire and, which leads us to our fourth point, impels action.

What has been the process of our advertisement so far, step by step? First, to attract clients by the power of publicity. Secondly, once attracted, their interest has been held by the pleasing arrangement of display. Thirdly, being pleased, they desire to have something

like that which pleased them. Having the desire, they are naturally impelled to action—to make an appointment for a sitting. So, right from the start, one point leads on to the next, and that should be the chief aim of an advertisement. The four points we have studied in detail act upon the mind subconsciously and instantaneously, but if a sitter says to you, "I came to be photographed because I liked the pictures in your showcase," it is certain that person's mind went through the process we have analysed. In conclusion, if a public display of work is neglected the whole process is reversed and the bad advertisement is a vital danger to business, driving away instead of attracting custom. A little study of "psychology of the showcase" is well repaid.

PREVENTION OF HALATION.

Recent correspondence shows that the causes of halation are not yet thoroughly understood. Each writer has his own pet theory as to what gives rise to this trouble, and how to avoid it, yet expresses surprise that apparently opposite methods and conditions do not exhibit the annoying feature.

The truth is that there are many causes, and halation will not be obtained unless (as a rule) more than one of these is present. May it be said without giving offence that the apparently miraculous instances given of supposed halation-inviting subjects do not at all impress me, not because I have any claim to absolute immunity from halation in my own work, but because I have been able to make some amount of practical investigation of similar subjects, and have thereby been able to avoid the trouble completely in cases where the "invitation" has been considerably more pressing. It must, I think, be conceded that there are still cases in which halation cannot be entirely avoided, but even these rare cases can be handled so that its presence may be unnoticeable by any but the hypercritical.

To begin with it is necessary to make some definition, such as to state that by halation I mean any spreading of light around any portion of the image, and irrespective of scientific subdivisions, and by correct exposure I mean such exposure as will render a satisfactory amount of shadow detail by ordinary methods of development followed by printing on my favourite printing medium. That is to say, I propose dealing with the subject from the practical photographer's point of view with a reasonable amount of latitude of terms, so that I hope no one will want to quibble with me on points of definition, so long as the conclusions of my arguments are agreed to. For instance, when I state that I find halation difficult to obtain, I know perfectly well that it is quite easy to obtain by placing a plate in contact with a sheet of black paper in which there are some pinholes and exposing the same to a source of light for sufficiently long. The image of each pinhole will be surrounded by halation more or less defined according to the degree of diffusion of the light and the nature of the emulsion. What I mean by difficulty of obtaining halation is the difficulty of getting it in the camera, on subjects of quite "inviting" a character, when using my favourite plates and lenses, whatever developer I may use, or whatever its degree of dilution.

In that last sentence all the factors have been stated.—The subject, the plate, the developer, and what is so seldom suspected, the lens. In my opinion, when a bad case of halation occurs it is never due to one of these factors alone, and generally can be traced to more than two of them being present so that by noting the conditions of each of those factors it becomes possible in many cases to avoid the combination of circumstances which are likely to accentuate the trouble.

Of course it is the subject that usually is considered to be the principal source of halation, but beyond the very elementary proposition that without a subject one would be entirely free from the fault I am compelled to say that in a very great number of subjects which would seem to be predisposed to halation there is not the slightest sign of it, and where a worker finds the undesirable feature occurring frequently in such subjects he will usually find it also, though less pronounced, of course, in his general output. The kind of subject that is supposed to be "difficult" from the halation standpoint is naturally one with abruptly marked contrasts, such as an interior which includes windows in the view photographed, a nude sitter in evening-dress, and especially subjects which contain artificial lights whether diffused or unscreened. When surprise has been expressed at the absence of halation, or when merit is claimed for any special material or method it is always in connection with such subjects, but I wish to point out that although these do often exhibit the trouble in question it is comparatively few cases in which it is not preventible. It is obvious that a variety of subjects prone to halation contains detail in the high-lights comparatively over-exposed when compared with the detail in the shadows. That is to say, that if one were photographing those high-lights alone a fraction of the exposure given to ensure satisfactory rendering of the shadows would be sufficient. For instance, a large machine may contain black castings in shaded parts, while in a prominent position as regards light may be a dial consisting of white card bearing fine black lines (a volt-meter or pressure-gauge). If one were photographing the dial alone a quarter of normal (*i.e.*, meter reading) exposure would suffice, yet it is likely that six times the normal will not be overmuch for the black details. Therefore, the dial will have received quite twenty-four times the exposure that one would give it alone, and if any halation were present it would certainly obscure the fine black figures on the dial. Such a case as this is quite usual in the experience of every commercial photographer, who obviously cannot follow the advice of a correspondent who recommended that one should not expose so that any detail should penetrate the emulsion. He would be a fortunate man who could limit himself to subjects that did not compel him to do otherwise. It is not suggested that in a case such as the one described the dial will be rendered as clear and brilliant as though it had been taken by itself, but the writer has in his possession quite a number of such photographs in which the machinery is quite fully exposed and in which the dials can be read (with a magnifying glass in some cases) although the black lines in the photographs must be less than a five-hundredth of an inch in thickness. This description of subject is actually a greater test than the instances so often quoted of detail photographed against the light of factory windows. If these supposed remarkable instances are analysed it will be found in a great many cases that the difference between the exposure required for the subject itself is not greatly in excess of that needed for the view through the window if the latter were photographed with a dirty piece of glass in front of the lens as in the actual case in point. If, however, the subject be photographed against a window which is itself the only or, at any rate, the main source of illumination the case is very different, as the light which reaches the side of the subject facing the camera obviously is far weaker than the direct light shining in the lens, and the disproportion between the exposures that would be sufficient for the subject or for the window or view outside it are infinitely greater than in the examples suggested above. The disproportion is even greater than in subjects in which the source of illumination (whether

day or artificial light) is included, but arranged in a more normal way. What I am aiming at explaining is that the only sort of subject in which halation may be said to be inevitable or excusable is that in which not only is there a source of illumination but in which also that detail is over-exposed by some hundreds of times. Even then it will be found that if the other factors are favourable the halation can often be confined mostly within the illuminated area itself, and it will not be noticeable except in the rebate of the negative. The writer was asked recently to photograph a subject which might seem the very limit as regards halation-inviting. A network of wires, the latter less than a sixteenth of an inch thick, was suspended seventy-five feet above the ground, and further wires connected this arrangement to the earth. The whole was about a hundred-and-fifty feet in length, so that on reducing the subject to whole-plate the thickness of the wires could be seen on the ground-glass only as a very faint grey hair-line when examined with a powerful focussing-magnifier. The difficulty of the case was not diminished by the fact that the supports had to be rendered upright, so that a somewhat distant standpoint had to be taken and the axis of the lens was necessarily neither central nor square with the plate. In addition to this, the wires were moving slightly in the wind. Yet it was found possible to obtain a perfectly sharp map-like photograph of the wires, and in a couple of plates the surrounding landscape, both foreground and distance, was quite satisfactorily rendered also.

Being of an experimental turn of mind, and wishing to test my theories as well as those raised by various correspondents, I arranged a test subject intended to include all the problems likely to give rise to halation. A half-watt lamp of three-hundred candle-power was hung so that the etched lettering on it faced the camera. A large focussing-screen was supported in front of this, so that one of the sides of the wooden frame cut the image of the bulb but left the other half clear. On the ground-glass (which was only a few inches from the lamp) two negatives were fixed with lantern-slide strips, one a line and one a tone subject, still leaving part of the ground-glass clear, and some scratches were made in both negatives. Still further complications were introduced by shading half of this arrangement with a thickness of tracing cloth, and by sticking overlapping strips of translucent paper on the edge of the wooden frame. Close to the unobscured half of the lamp was arranged a group of objects that normally would be considered not an easy subject, taken as a whole, to photograph, ranging from a piece of cotton wool and a graduate half full of water to a bottle of Azol. A sheet of ground-glass, to reduce the intensity of the light, separated this group from a similar set, which, however, contained even darker objects. To add to the "difficulty," I pinned on the wall at the back a sheet of printed matter, this extending from the least illuminated portion to immediately behind the bulb itself. Thus the subject could be considered to consist of a very powerful direct light, as well as brilliantly illuminated "windows" of many shapes, sizes, and densities, many of them overlapping one another, as well as details of such nature and in such positions that if serious halation occurred they would be lost. Quite a number of plates were exposed upon this subject, both backed and not.

The plates were of two makes and of three varieties. It was found that with the stop which was used throughout an exposure of three seconds on a backed ultra-rapid plate gave not only a perfect rendering of the bulb with all the details immediately adjacent to it, but also everything else except the very faintest shadow gradations. Printed with care on a contrasty paper, this gave a very fair reproduction of the whole, and a quite perfect result of the lighter portions. There was no halation, except faintly round the filament itself, though there was a little diffraction in the form of a few tiny lines radiating from it across the wooden bar previously referred to.

All the plates used were about the same speed, and the exposures given ranged from the three-second one to three times as much, then forty times, and finally two-hundred-and-fifty times the original exposure. Of the latter four plates were exposed and developed in different ways and with different developers. Regarding the amount of halation, it may be said at once that in proportion to the detail image—that is to say, as seen in the prints—there is very little difference between any of these greatly varying exposures. What little there is, is only to be seen immediately around the lamp; and in all the negatives, and most of the prints as well, every detail of the lettering on the bulb is plainly readable, and very little of this is lost on any of the prints. The filament itself is, of course, reversed on all excepting the first three-second plate.

The modes of development were as varied as the exposures. For instance, two similar plates, both unbacked, were exposed for two minutes each, and developed in M.Q., but in one case the developer was used in concentrated form, and for the other was diluted so that the plate took ten minutes to develop to equal density. No difference could be detected. As a matter of fact an enlargement was made from the slowly-developed one to the size of the original subject, and in this the gradation throughout is distinct, from the detail in the bulb itself to the darkest shadows. The line subject can be plainly read even in the part of it that is seen through the glass of the electric lamp, and the writer was complimented on the quality of the texture of the details by one whose familiarity with photographs must be such as normally not to arouse any enthusiasm. In this case the bulb was over-exposed by forty times, and the other parts of the subject by six or eight times, and the plate was unbacked and softly developed. Of the plates which were exposed for over six times as much again as this one, one of them was unbacked and was of slightly greater speed. This "impossibly" over-exposed plate was developed in Azol of such dilution that at the end of an hour it had not attained printing density, so was finished off with a little stronger. There is actually no more halation in this than in any of the more normally treated plates and none in the "windows," and although the "quality" of the gradation naturally is poor no detail is lost anywhere. Of the backed plates similarly over-exposed, and developed normally for four minutes, prints show the best quality and gradation of any, though they are, of course, so dense as to make enlarging from them an utter impossibility.

I do not propose to argue from this that any exposure and any method of developement will not bring out halation, but it does prove that if one uses plates that are reliable, it seems to matter little how one treats them. I would suggest to anyone who is frequently troubled with halation to ask himself if he ever congratulates himself on the rapidity with which his plates fix out. I think it will be found that a plate which is liberally coated with emulsion, and which therefore fixes slowly, will be found far less prone to halation in any circumstances.

It is a fact that in the case of plates which do give halation rapid development with a normal developer, or one slightly stronger and *not cold*, will reduce this liability. In proof of this a client who had been trying his hand at outdoor night-scenes complained to me of the intense halation round every street lamp. I asked him how he developed? The answer, "Tank." On my recommendation he tried rapid development, and had entire success with the same make of plate. There is no difficulty about this if one employs the time-and-temperature method. Having developed a trial plate of a trying subject, at say, 70° by judgment, but noting the time, it is easy for any experienced photographer to decide whether for the future he will develop such subjects for a longer or shorter time, and to make a rule of doing so at that temperature.

Now I come to the last of my list of halation-giving factors, namely, the lens. And in writing this I can visualise the smile of derision on the faces of some of my readers. Yet I am of the opinion that, next to the plate, the lens is more often the cause of provoking halation than any of the other factors. This opinion is the result of experience in many carefully noted cases. While not pretending to any theoretical

knowledge of optics, I think that the way in which a lens produces halation of a brightly-illuminated area is by the images of such details being reflected from one surface of the lens to another, and such reflected images being still powerful enough to be projected by the lens along with the normal image, but not quite coinciding with it and, of course, very much out of focus. Besides this there is a certain amount of flare, or diffused light, produced by every lens when a brilliant subject is being photographed. It is well known that single lenses are the least liable of all to this sort of trouble, but the occasions on which they can be used are so rare, on account of defects in other respects, that they are ruled out by the practical photographer. Of lenses in general use I have found anastigmats made to work at a maximum aperture of *f*/8 most satisfactory as regards freedom from halation in results. It is not at all difficult to make comparative test of lenses as to their qualities in this respect without actually exposing any plates. The way to do this is to arrange a movable light of fairly large area, such as a lamp of any sort with a sheet of tissue paper or ground glass in front of it. Then, having focussed the camera on a subject containing some darkish details, not too brightly illuminated by some other light source, examine the image with a focussing magnifier, and, while doing so, get an assistant to bring the bright, movable light so that it comes into the field of view and away again, and note whether the brilliance of the detail examined is affected or not. If it is seriously affected, it is obvious that such a lens calls for the use of a hood when used on any subject in which any bright area is likely to shine in the lens, and should be avoided altogether for such as actually include brilliant portions. Even without going to such trouble as this it is surprising how the probability of halation is revealed by the use of the magnifier. For a considerable time I was worried with a distinct thickening of fine, white lines in a certain description of dark subjects. This was when employing either of two lenses I had then in use, and was shown both in making original or reproduced negatives of the kind of subject referred to though both appeared to give good definition otherwise, and I then attributed the fault to halation in the plates, but on trying a new anastigmat on the same plates was agreeably astonished to find the trouble vanish.

Another instance which will illustrate my point is when using a lens for enlarging, more especially in apparatus in which a condenser is used. When a dense negative is being enlarged from which a clear area is included, or when the clear rebate is projected, the developed image often will be marred by any such black portions being diffused on to the surrounding surface. This has been attributed by some to dust in the air, to "spread" in the emulsion, to anything but the actual reason. Yet if a really high-class lens be installed, and, still better, if the condensing lens, with its deep curves and optical faults, be done away with in favour of a reflector arrangement, the trouble referred to will vanish.

To sum up I think it may fairly be stated that provided one employs plates of a kind that is thickly coated with emulsion, and is backed with a really efficient backing, and one uses lenses (well hooded when possible) that show on actual trial to be free from flare, one may tackle the most extreme cases of "halation-invitation" with a care-free mind, and without taking any special measures as regards development. It may be added, however, that cases of apparent halation have been traced, in my own experience, to poor black on the inside of camera bellows, to dust or condensation on the lens, and in one case at least to faulty balsam in one combination of the lens. This defect was visible only on holding the lens up to a small source of light and looking through it in a slanting direction. It was then seen as a faint veil, but it had a very noticeable effect on the images of any bright points in the picture. Lenses should not be judged, in respect of the trouble mentioned, by their price or by the maker's name, nor by any theory as to any particular type of lens. The only way is by actual practical test of the individual lens.

D. CHARLES.

ELECTRICAL FACTS FOR PHOTOGRAPHERS.

(*Concluded from page* 314.)

WHERE alternating current arc lamps are used great economy can be effected by the introduction of a transformer, or a choking-coil, though this is apparently unknown to some photographers, as the writer knew a man who, having fitted up his own lamps, had run them for some years on an alternating supply with only a resistance in circuit, the consequence being that his electricity bill was more than doubled. Transformers differ in design, but the principle on which they act is the same. The separately-wound type consist of two coils of insulated wire wound on a laminated iron core. One coil, the primary, is connected to the supply main, and, on an alternating current flowing through it, an "induced" current is caused to flow in the secondary coil.

The voltage of the secondary coil is proportional to the ratio of the number of turns in the two coils, so that it is possible either to decrease or increase the voltage of the secondary. For arc lighting the former is almost invariably the case, the volts being brought down to about 50 for one lamp.

Great care should be exercised when connecting to the mains that the proper terminals are wired, or a dangerous accident may occur. If, in the case of a 200-volt supply with a secondary pressure of 50 volts, the secondary terminals were inadvertently connected to the mains, it is possible that the four-to-one ratio would result in a pressure of 800 volts being developed. In addition, the transformer would almost certainly be burnt up.

The higher the supply voltage the greater is the economy effected, as will be seen from a simple illustration. Assuming the supply to be 240 volts, and the arc to take 10 amperes, with only a resistance in circuit the consumption would be 2,400 watts, or 2 2·5 units per hour. By transforming the pressure down to 50 volts the consumption would be reduced to 500 watts, plus a small addition for the energy absorbed in the transformer, say, slightly over half-a-unit per hour. In arc-lamp circuits it is also very important that the cables and switches should be amply large enough to carry the current, as if they are too small they will get hot and waste considerable power.

The voltage can also be reduced by placing a choking-coil in series with the arc. It consists of a laminated iron core surrounded by a coil of insulated wire, and its action is due to the fact that the magnetism of the core produces an opposing electro-motive-force in the winding with wasting an appreciable amount of energy, as a resistance does. Some choking coils have a straight core, and by sliding this in and out the voltage can be varied. Others are made in either rectangular or ring form, the necessary adjustment being made by connecting to "tappings" or small loops of bare wire left sticking out at intervals, by which means a varying number of turns may be included in the circuit. A small choking coil is sometimes put in series with an arc lamp when the current is taken from a transformer. It has a steadying effect, and

serves the same purpose as a resistance while not absorbing as much power.

It should be borne in mind by those who wish to fit up their own arc lamps that to secure the greatest economy in current consumption it is essential to have a transformer or choker to suit the periodicity of the supply. This is the number of complete alternations or reversals of the current per second, and the different supply bodies vary greatly in this respect. If the periodicity is low there is a perceptible flicker noticeable in the light from an arc. It is said that in certain parts of the North of England the periodicity is as low as 25, and the flickering of incandescent lamps is then quite apparent. A transformer used on a circuit of considerable difference in periodicity to that for which it is designed will get very hot after working for some time, and the generation of this heat naturally represents consumption of power.

Transformers are usually marked with their primary and secondary voltage against the appropriate terminals, and the periodicity, the last being indicated by a wavy line, thus: 50~. When buying secondhand apparatus these figures should be looked for, as it is false economy to save on the initial outlay and incur continual extra running cost. A difference of a few per cent. is, however, generally unimportant.

If the supply voltage is fairly high it is best to instal an auto-transformer or compensator when more than one arc lamp is connected. For instance, on 200 volts from one to four arc lamps can be run in the cheapest manner, as is shown in the diagram, from which it will be seen that in principle the auto-transformer consists of one continuous coil. The winding of the transformer is divided so that each section gives 50 volts, and, assuming the lamps take 10 amperes each, that amount of secondary current will be available for one lamp, the whole four, or any combination. When all the lamps are working the transformer takes practically no current, the lamps then running in series. For the sake of clearness the switches, etc., for each lamp have been omitted.

Direct current lamps give more light than those working on alternating current, especially when designed so that the carbons are vertically in the same straight line. On direct current the top carbon is positive, and the major portion of the light comes from the crater formed at its tip. The light is thus cast down in the required direction, whereas with alternating current both tips emit light equally, and as much is directed upwards as downwards. There is, however, a type of lamp known as the "flame-arc" in which the carbons are inclined like a letter V, the arc being formed at the point. These lamps throw the maximum amount of light downwards, and there is not so great a difference between the results obtained by the two kinds of current. The makers of a well-known pattern give the following approximate figures:—Direct current, 4,500 c.p.; alternating current, 3,400 c.p., with a consumption of 12 amperes in each case.

There are doubtless many photographers who are fond of experimenting with various sources of illumination, but probably few appreciate how easily an efficient arc lamp can be made. If two carbons, from 9 to 11 millimeters diameter, are fixed vertically on a base of some insulating material, and are supplied with 10 amperes at about 50 volts, an arc can be started at their tips by connecting them for an instant with a piece of carbon held in a non-conducting wooden handle. This precaution should not be omitted, as there may be a leakage to earth somewhere on the system, in which case the operator might get an unpleasant shock. The arc will continue to turn steadily, and though the light is thrown upwards, a large reflector can be used to distribute a diffused light on the sitter.

The carbons can also be arranged horizontally, but they must not point downwards to any degree, or the arc will travel up and fuse the connections. It must not be forgotten when experimenting with a simple arc that, unlike a properly-constructed lamp, with its regulating and feeding coils, it must be controlled and kept stable by either a resistance, choker, or transformer. If a transformer is used, a resistance or choker of small impedence must still be employed to control the current taken by the arc. Otherwise there is no limit to the current that will pass, save, of course, the blowing of the supply company's fuse.

To find the amount of resistance wire necessary to pass the required number of amperes, use is made of the simple equation $R=\frac{E}{C}$, where R = resistance in ohms, E = voltage of supply to be absorbed, and C = current in amperes. The fact that the arc itself absorbs about 50 volts must not be lost sight of, as is indicated in the diagram. Assuming that it is desired to run an arc with 10 amperes on a 100-volt circuit, the resistance will therefore have to take up the remaining 50 volts, and the equation will be $R=\frac{50}{10}=5$ ohms. Reference to a price-list of resistance wires will generally show the maximum current that the wire will carry at a certain temperature, and the resistance in ohms for 1,000 yards. It is then easy to calculate the requisite amount of wire of the proper gauge. It is worth while to take some trouble in this matter, as a friend of the writer, leaving things to the discretion of a well-meaning shop assistant, was induced to purchase two or three pounds of thick wire when about 4 ozs. of a much smaller size would have been ample.

The high cost of labour and maintenance at the present time has resulted in the substitution of half-watt for arc lamps in many thoroughfares, with the result that it is often possible to buy the latter at a comparatively low price. These lamps are usually in perfect condition, and the writer has known them to be used to advantage for portraiture. In cases where cost is a consideration it should not be forgotten that the large bulb of a half-watt lamp is easily broken while a well-made arc lamp will stand a lot of knocking about. If purchased direct from a supply company full information will readily be given as regards suitability for the consumer's installation. Should the lamps be obtained through some other channel, care should be taken not to run direct-current lamps on alternating current, or *vice versa*. The writer knew one man who put two direct-current lamps in series on alternating current, the resultant lighting being very poor and the bill disproportionately large. Alternating lamps can be recognised by the holes in both carbon-holders or clips being the same size, while with direct lamps one (the positive) is larger than the other.

Lamps for series running are specially adjusted by the makers, and if it is intended to take advantage of this economical method of wiring it is best to obtain them direct from the supply company, as if bought second-hand from a dealer they may have been separated from others of the series. This precaution is not essential, but its observance will conduce to better working.

Always use the best carbons. Inferior kinds often give an unsteady light, and quite upset the mechanism of an otherwise perfect lamp.

In conclusion, it may not be out of place to say a few words about the danger from shock. The main switch, almost invariably of the "double-pole" type, should always be opened before making any alterations or connections to the wires. A double-pole switch isolates the entire installation, as it breaks contact in both the main wires, but the ordinary single-pole switch controlling one or two lights breaks contact in only one wire. Should there be an "earth" (a fault in the insulation by which current leaks out) on this wire it is still possible to get a bad shock if the other wire is touched, as the current would travel through the body, boots, floor, etc. Some leakage is inevitable, even with the most carefully-laid cables, though it may not be on the consumer's premises.

It must not be forgotten that though the voltage of a shocking-coil may be high, as indicated by the spark, the actual quantity of current is very small. With a public

supply there is practically unlimited current available, and this is what constitutes the danger. There seems no reliable evidence as to how much will prove fatal, though it has been put as low as one-fifth ampere. The quantity that will pass through the body is determined, as was shown in the case of the arc-lamp resistance, by the resistance in ohms of the body, which varies enormously, and by the voltage of the supply.

The writer has personally known of two fatal shocks at 105 volts. One case was that of a bath attendant who apparently encountered an earth when his hands and boots were very wet, thus reducing his resistance to the minimum. In the other case, some boys, for a joke, connected a brass door handle to the lighting service, with the result that the object of their ill-timed pleasantry was killed.

ELECTRICIAN.

THE CARBRO PRINTING PROCESS.

IN a recent pamphlet the Autotype Co. give particulars of recent modifications in the formulæ for this process, due to an amateur worker, Mr. F. Garon, who has extended the method of Mr. H. F. Farmer, of which full particulars were published in the "British Journal" of October 10, 1919. The advantages of Mr. Garon's formulæ are:—(1) The same time of immersion, 3 minutes in bath No. 1 is required by all Autotype pigment papers, with the exception of red chalk, and 2) the quality of the resulting print is very much under control by simply varying the time of immersion in bath No. 2.

The following stock solutions are required:—

A.	Potass bichromate	1 oz.
	Potass ferricyanide	1 oz.
	Potass bromide	1 oz.
	Water	20 ozs.
B.	Acetic acid, glacial	1 oz.
	Hydrochloric acid, pure	1 oz.
	Formaldehyde, 40 per cent. solution	22 ozs.

For use. Normal strength.

Bath No. 1. 6 ozs. stock solution A
18 ozs. water

Bath No. 2. 1 oz. stock solution B
23 ozs. water

The first bath may be used for some considerable time, but the second bath must be frequently renewed, as it is altered by the No. 1 bath transferred to it on each immersion.

First place the bromide print in cold water, then take a piece of pigmented paper cut about half an inch larger than the bromide, and immerse in No. 1 bath for 3 minutes, take out, and holding it by one corner, allow to drip for 15 seconds, then immerse in No. 2 bath for a varying time from 15 to 30 seconds, according to the result desired.

Withdraw from No. 2 bath and squeegee into contact with the bromide print previously placed on a sheet of glass, place between grease proof paper and allow to remain for 15 minutes.

Towards the end of the time of contact of bromide and pigment paper, take a piece of transfer paper cut slightly larger than the pigment paper, and soak in cold water for 2 or 3 minutes.

Complete wetting is necessary.

After wetting the transfer paper, lay it face upwards on the squeegee board. Now take the pigment paper and bromide, and by raising one corner of the former steadily pull the two apart. Place the pigmented paper face downwards on the transfer paper and squeegee the two into contact. Place between blotting paper with a book over them to prevent curling, and allow to remain from 20 minutes to one hour. The bromide print, now bleached, is put into a dish of cold water and washed by frequent changes of water for about twenty minutes.

It is then ready for re-development for further use.

The re-development should be thorough.

The development of a Carbro print is a simple matter, no chemicals being required. The pigment paper on the transfer paper is placed in a dish of warm water. Start with a temperature of about 95 degrees Fah. Keep the two papers, still adhering, well covered by the warm water, and wait until the pigment commences to ooze round the edges. As soon as this occurs, carefully lift one corner of the pigment paper, and, keeping the transfer paper under water, steadily strip the two apart. The transfer paper will now be seen to be covered with a thick coat of pigment.

Gently splash the face of the proof with the warm water, and as the picture begins to reveal itself, the splashing may be local, if it is desired to reduce any particular portion—should the print be too dark—the temperature of the water may be increased.

When development is complete, the picture is rinsed in cold water and placed in a 3 per cent. solution of alum until the bichromate stain has disappeared; it is then finally rinsed.

NOTES AND OBSERVATIONS.

The time of immersion in No. 1 bath of 3 minutes is applicable to all pigmented papers except red chalk, in which case 5 minutes is desirable. Under-immersion is indicated by heavy shadows lacking detail. The time of immersion in the second bath is a point of importance. Complete control over the brightness of the print is ensured by attention to this detail. Depth and brightness are the result of short immersion, an increase of time giving a proportionate increase in softness of the result.

It is not possible to give the exact best time, but 25 seconds when using a bromide of average depth is a good point of departure. Varying grades of bromide paper demand various times of immersion, but with all grades the rule is constant that longer time gives softness, too long a time gives flatness.

Olive Brown with normal bath is inclined to give weak prints. When using this colour it is advisable to make the No. 2 bath of three quarter strength, *i.e.*, 1 oz. of No. 2 stock solution, 31 ozs. of water.

It is desirable to pass the No. 1 bath through muslin after use.

New Books.

First Aid to the Amateur Photographer. By Will R. Rose. Chester: Minshull and Meeson. 2s. 6d.

THIS little manual has been in print for some considerable time, and therefore does not come within the strict definition of these reviews. But, as we ourselves only recently came to know of it, possibly many of our amateur readers are in a like position, and, therefore, we may usefully refer to it. We have the greater desire to do so for the reason that the book differs from the many manuals for the amateur both in its scope and method of treatment. It sets itself out to cater in the most practical way for the requirements of those legions of amateurs whose photography consists of making exposures with a film camera and leaving the rest to somebody else. There is very little about development; nothing about printing or enlarging; but the subject proper—the taking of satisfactory photographs—is dealt with in the clearest possible way, because the teaching is chiefly in the form of snapshot photographs, good and bad. Mr. Rose, in his business, has had extraordinary opportunities of observing the mistakes which are made in the use of a hand camera by the inexperienced; mistakes in lighting, exposing, focussing, and handling the camera; and he has shown extraordinary capacity in making the right and wrong ways plain to those who know next to nothing of photography. There are fewer technical terms in this little book than in any other we know, but nevertheless there is more instruction of the kind which directly serves the end of getting pictures. For the people whose photography begins and ends with the use of the camera, this is the one manual which they should have, for it tells them and shows them just those things which concern them, and in a way which they cannot fail to understand.

MR. E. F. GILBERT has rejoined the travelling force of Houghtons, Ltd., and will represent their professional department in the Southern and Eastern Counties—approximately from Yarmouth to Land's End.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, May 16 to 21 :—

MOUNTING PRINTS.—No. 14,094. Finishing or mounting photographic prints. G. E. Hadley.

DAYLIGHT DEVELOPMENT.— No. 14,092. Daylight photographic developing tank for roll films. E. Jack.

DEVELOPING BOXES.—No. 13,785. Photographic loading and developing boxes. S. S. T. Pratt.

STEREOSCOPY.—No. 13,902. Camera stereoscopic attachment. W. Worsnip.

COLOUR PROCESS.—No. 14,031. Process for producing colonred photographs. E. A. Lage.

NON-PHOTOGRAPHIC NEGATIVES.—No. 14,004. Producing negatives by other than photographic means. F. A, Pereira.

PROJECTION METHOD.—No. 13,862. Means for projecting images of objects on to screens, etc. C. F. Dussaud.

SHUTTERS.—No. 13,990. Device for operation of camera shutters. H. Whitehall.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

COLOUR PHOTOGRAPHY. No. 160,540 (December 20, 1919).—The invention consists of a toning solution containing potass ferricyanide, uranium nitrate, rose bengal, naphthol yellow, and acetic acid, together with iodine, and in addition to or in place of the iodine an isocyanine dye such as pinacyanol or Sensitol Red.—William Friese-Greene, 41, Portsdown Road, Maida Vale, London, W.9, John Newlands Thomson, 22, Brook Street, London, W.1, and Colour Photography, Limited, of 3, St. James's Street, London, S.W.1. [Formulæ recommended according to the invention will be found on another page of this issue in the "Colour Photography" Supplement.]

DYE-TONING.—No. 147,005 (February 1, 1906). The claim is for the process of converting a silver image into a copper compound and dyeing the latter with an organic basic dye.—Dr. Arthur Traube, 12, Rauch Strasse. Munich. (Further particulars of this specification will be found on another page in the "Colour Photography" Supplement.)

DYE-TONING.—No. 147,103 (December 3, 1918). The invention relates to an improvement in that described in Specification No. 147,005. By the invention the dyes are suitably selected, which is of importance for the success of the picture. While the otherwise very powerfully dyeing triphenylmethane dyes dye sufficiently, they do not correspond completely with requirements. It is necessary that the dye should dye well, not be dissolved away or only to slight extent by washing, and at the same time be possessed of sufficient colour intensity.

By the invention basic dyes of the following classes are used:—Thiobenzenyl dyestuffs for yellow, thiazines for blue, pyronines for red, safranines, oxazines, and acridines.

The members of the several dye classes can be mixed with each other, so that it is not necessary to use a single dye for each dyeing. Dyes of the same or different tints may be mixed.—Dr. Arthur Traube, 12, Rauch Strasse, Munich.

The following complete specifications are open to public inspection before acceptance :—

COLOUR-PHOTOGRAPHY.—No. 163,311 Multi-colour screens for photography J H Christensen.

New Materials.

Scaloid Vedol Developer. Made by Johnson and Sons, 23, Cross Street, Finsbury, London, E.C.2.

A TABLET developing preparation which is certain to find wide favour among photographers, on account of its snitability for every description of work, has just been introduced by Messrs. Johnson under this name It is made up in tablets, the normal working developer being prepared by dissolving one tablet of the developer and one of the accelerator in 4 ozs. of water. The developer works exceedingly cleanly—it seems impossible for it to produce stain under ordinary conditions—and gives density readily, the Watkins factor advised for normal negatives being 12, or 10 if a soft negative is required, or 15 if the aim is one of greater vigour. But what perhaps will appeal most specially to the amateur worker and also to the professional is the use of "Vedol" for time-temperature development by means of the very comprehensive tables published in the circular of instructions. These include a classified table of plates according to their speed of development. The developer is suitable for both bromide and gaslight papers, lantern-slides, and also for the special brown-black papers which have come so widely into use of late. By addition of bromide and extra exposure it likewise lends itself to the making of lantern-slides of a range of tones from brown-black to red. The developer is supplied in cartons containing tablets to make 100 ozs. of solution, price 2s.

SINGLE-SOLUTION INTENSIFIER.—The Henderson-Patton Manufacturing Co., 74, Dame St., Dublin, send us a specimen of a tablet intensifier preparation acting in single solution and very quickly yielding great intensification with reddish-brown colour of deposit. Apparently the intensifier is the familiar uranium formula, or something closely akin to it, for the intensification is completely removed by a weak solution of soda carbonate. It may be doubted if there is now any wide demand for an intensifier of this kind, particularly when issued without indication of its chemical basis. However, the tablets form an effective intensifier, the action of which we prefer to render slower by dissolving in about twice the quantity of water directed by the makers.

BARNET MATT PLATES.—On taking into use the Barnet matt plates, which we mentioned as a new introduction by Messrs. Elliott and Sons last week, we find that we were guilty of an error of description. The matt quality of the plate is obtained not by a coating on the glass side, but in the emulsion film itself, the surface of which allows of any of the retouching work which can be carried out on a matt backing and also of other descriptions, such as fine pencil work, to which a matt backing is not so susceptible. The exceedingly fine grain produced in the film provides for any description of printing, and, moreover, although for a somewhat different reason, is a preventive in very large measure of halation. It is therefore evident that any of those who may have obtained supplies of the plate on the strength of our description will not be disappointed in their use, despite the different manner in which the matt effect is produced.

VANGUARD GROUND GLASS VARNISH.—The Vanguard Manufacturing Co., Maidenhead, send us a specimen of a modified variety of their ground-glass varnish, namely, one yielding an extra fineness of grain and hardness of surface. The preparation certainly yields an exceedingly fine grain, dries very quickly, and yields a surface of such hardness that the ordinary hard retouching pencils can be used on it within two or three minutes after flowing on. The Vanguard Company advise us that owing to its altogether special composition it has the feature of becoming somewhat cloudy at times in warm weather, but that this has no effect whatever upon its practical employment. A further caution in respect to it is that it must on no account be mixed with any other matt varnish. The new product is evidently one which will find many users among those having occasion to carry out retouching work of any description on negatives. It is supplied at the same price as the ordinary matt varnish of the Vanguard Company, namely, 2s. per small bottle, 6s. 6d. per half pint, or 12s. per pint.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, JUNE 5.

Hammersmith Hampshire House Phot. Soc. Outing to Esher.
South London Phot. Soc. Excursion to Cobham and Stoke D'Abernon.

MONDAY, JUNE 6.

Bowes Park and Dist. Phot. Soc. "Home Portraiture." J. R. Smith.
South London Phot. Soc. "The Balance of Light." C. P. Crowther.

TUESDAY, JUNE 7.

Hackney Photographic Society. "Toning and Staining Bromides and Slides." E. C. Ridge.
Portsmouth Camera Club. Final Competition and Awarding of Prizes.
Sheffield Photographic Society. Annual General Meeting.

WEDNESDAY, JUNE 8.

Bradford Photographic Society. Evening Excursion to Hirst Woods.

THURSDAY, JUNE 9.

Hackney Photographic Society. Excursion to Chipperfield.
Hammersmith Hampshire House P.S. "The Negative." O. King
Kinning Park Co-operative Society C.C. "Holiday Hints."

SATURDAY, JUNE 11.

City of London and Cripplegate P.S. Outing to Cowley and Ivor.
Kinning Park Co-op. Society C.C. Outing to Old Kilpatrick.

ROYAL PHOTOGRAPHIC SOCIETY

Meeting held Tuesday, May 31 the president, Dr. G. H. Rodman, in the chair.

The president referred to the collection of radiographs on the walls. This second exhibition of radiography had been brought together with the co-operation of members of the Röntgen Society, and includes many prints of special interest. We must postpone detailed reference until a later issue.

Dr. C. Thurstan Holland then delivered a lantern lecture, "The Snow and Ice Scenery of Switzerland," and, for over an hour, held a large audience greatly interested in a series of photographs, not only representing magnificent technical renderings of very beautiful subjects, but illustrating the natural processes concerned in the formation of the Swiss glaciers.

On the proposition of the chairman, a hearty vote of thanks was accorded to the lecturer.

CROYDON CAMERA CLUB.

Mr. W. F. Slater, F.R.P.S., gave a lantern lecture entitled "Architecture with a Hand-Camera," previously tried and found good at the R.P.S. On an occasion like this, the club in its corporate capacity with peculiar modesty regards itself as a sort of Court of Appeal, which in this case emphatically upheld the prior decision. In fairness, however, it should be stated that the members individually are just as humble-minded as the average amateur photographer, no more and no less, though if modesty had to be expressed numerically, it must be admitted that the sum total derived from certain of the pictorialists would make but a poor show.

It cannot be said that the title of the lecture was particularly arresting, for in these days hand cameras may possess so many movements that architecture is well within their scope. Often in all essentials they are field cameras, but capable of being used in the hand. Equally capable of misuse, and many a plate has found oblivion by being hurriedly exposed with an adjustment out of adjustment. As an instance, one popular member who buys the most expensive cameras every few months finds in each fresh purchase new and glorious opportunities of adding to an unrivalled collection of disasters for which he is so justly famed. The cameras with which Mr. Slater worked were not of this sort, but Kodaks of the simpler type, not even fitted with a rising front, and some of the really splendid slides shown owed their origin to the best-known camera in the world, to wit, the "Brownie." They also well illustrated that the oft-despised R.R. lens is still capable of first-class results, though in most cases a 5-in. Cooke lens working at *f* 6.5 was employed on quarter-plate film. As many interiors require permits to photograph them, Mr. Slater prefers to dispense with a tripod, for, if reposing innocently on a chair or other support the camera is spotted by an attendant, a little friendly discussion permits completion of the exposure. The finder is only used for centring, as practice enables the amount of view included to be judged. Focussing is effected by scale, depth of field being calculated on a confusion disc of 1/250 inch, varying the stop as circumstances dictate. In many cases, he said, it is possible to give prolonged exposures by pressing the back of the camera against a wall or pillar, and frequently a Kodak scores by being able to be used in a position impossible for a camera on a tripod.

A rough guide to exposures for interiors, due to the facile brain-box of Mr. H. W. Bennett, the lecturer had found useful and reliable for Kodak film. In ordinary bright summer light, stop *f* 16, a modern domestic interior with light walls takes 1 minute; with dark walls, 2 to 3 minutes. Naves of churches, badly lit, 1 minute; cathedral aisles, 1 to 4, and choirs, 4 to 20 minutes. Of course, "time and temperature" were well rubbed in at intervals; the last factor was so sweilteringly obvious that dry-ginger and K3 cyder were in great demand.

The discussion was brief and highly appreciative, the president felicitously picturing the lecturer as a "typical London photographer." Occasionally one sees this type about, armed with tripod and attached mysterious contraption, whose main feature is a large pneumatic bulb fitted close, both apparatus and operators usually being sadly the worse for wear. To normal vision the genial Mr. Slater does not resemble them in the least. He was accorded a very hearty vote of thanks.

In last week's report of Mr. Sinclair's lecture, owing to a printer's error or mystic charm of the reporter's handwriting, it was stated that 3 and 6 inch lenses were employed. Lenses of 5 and 6 inch focus were actually referred to.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Meeting held Thursday, May 26. Present: Miss Bertram, Messrs. J. Campbell Harper, Swan Watson, George Balmain, E. D. Young and Moffat. Mr. William Hislop, of Messrs. Hislop and Day, Ltd., process engravers, Edinburgh, was also present on the invitation of the Society. Mr. E. D. Young in the chair.

The Chairman explained that Mr. Pirie Macdonald, of New York, who was known to them all as one of the premier photographers in the United States of America, was attending the Rotary Convention to be held in Edinburgh from June 13 to 16 next, and that several members had expressed a desire to do honour to him and to the profession by entertaining him to luncheon one day during the sitting of the Convention. The Chairman explained that he had cabled Mr. Pirie Macdonald on the 19th inst., inviting him, on behalf of the Society, to luncheon, and to name the day, but he had not yet heard from him in reply. The meeting unanimously confirmed the Chairman's actions, and the Committee were appointed to carry through the arrangements. It was resolved to invite ladies to the luncheon, and the Secretary was instructed to send out a circular to all the members inviting their support so that the Society may be fully represented.

Mr. Young reported that he had seen Mr. McNally, the organiser of the continuation classes under the education authority, and had received a very sympathetic hearing from him as to the formation of a class for chemistry and optics as applied to photography. He had framed a letter which he proposed should be sent to Mr. McNally setting forth the particulars of the proposed scheme. The secretary read the letter to the meeting. It was approved of and instructed to be dispatched.

Mr. Hislop, who had for the past sixteen years conducted the class for process engravers in the Heriot-Watt College, gave an outline of the work of the class there. He thought the project of the Society an admirable one, and if the Society were agreeable that process workers should be admitted to the class along with photographers, he was confident that their combined efforts would command success. He offered, should a sufficient number of pupils come forward, to undertake the tuition of the class, which it was resolved to limit to the process workers and photographers. Mr. Hislop was cordially thanked by the members of the Society for attending the meeting, and for the information he afforded the Society. He was also thanked for his kind offer to undertake the carrying on of the class.

An interesting discussion thereafter took place on the comparisons between the minimum prices charged for commercial photography by the process engravers and the professional photographers respectively, and it was agreed to invite Mr. Hislop to the next meeting of the Society, when the prices for commercial photography were to be approved of so that the members might have the benefit of his experience in fixing their charges.

It was resolved to give a donation of one guinea towards the prize fund for the retouching class at the College of Art, and the Secretary was instructed to remit the same.

A vote of thanks to the Chairman concluded the meeting.

Commercial & Legal Intelligence.

NEW COMPANIES.

Daniel Chinery, Ltd.—This private company was registered on May 25 with a capital of £1,000 in £1 shares. Objects: To carry on the business of photographers, photographic artists and printers, manufacturers of and dealers in photographic apparatus and chemicals, cinematograph film producers, etc. The subscribers (each with one share) are: C. W. D. Chinery, 3, Silverton Road, W.6, automobile engineer, and Mrs. F. M. Chinery, 3, Silverton Road, W.6. C. W. D. Chinery signs as "director." Qualification, 50 shares. Remuneration as fixed by the company. Registered office: 13, Eccleston Street, S.W.

News and Notes.

Focussing Magnifiers.—Messrs. A. W. Penrose write from their Glasgow offices, 347-349, Cathedral Street, pointing out, in reference to our article of last week, that they have just placed on the market a low-power fixed-focus magnifier with a sucker end, which readily adheres to the ground glass screen. A magnifier of this kind is particularly useful to the general worker, outdoors or in the studio. It is supplied by Messrs. Penrose, price 6s. 6d., post free.

Death of Mr. L. F. Hammer.—The death is announced of Mr. Ludwig F. Hammer, for many years a prominent manufacturer of dry plates in the United States and head of the Hammer Dry Plate Company. Mr. Hammer, who was a native of Germany, made his home in America in the first half of the last century, and after many years of success as a professional photographer founded the business which still bears his name. Throughout American photographic circles he was very greatly esteemed for his cordial and amiable nature, and his death, at the age of 87, removes a personality that will be keenly missed.

The Club Photographer.—Having cast its two previous titles our young and lively Liverpool contemporary has now appeared under the above title, chosen in reference to its representation of the interests of photographic societies throughout the country. It signifies this broad policy by devoting its literary and illustration pages solely to contributions by the Hammersmith (Hampshire House) Photographic Society. The members of this body contribute the articles and originals of the art supplement, notable among the former being a useful series of notes on the handling of panchromatic plates. Our contemporary is clearly showing its capacity to make a place for itself in photographic journalism, and should certainly make many readers both inside and ontside the ranks of photographic soc.eties. It is published from the headquarters of the Liverpool Amateur Photographic Association, 9, Eberle Street, Liverpool, price 3d. monthly.

Picture-Hanging Wire.—Mr. A. G. Stubbs writes to "Nature":—I have for many years past used and advocated the use of plain copper wire in preference to any other means of suspension. The only matter that calls for carefnl attention is avoidance of "kinks." With heavy pictures my practice is to have two entirely independent suspensions—screw eyes, wire, and wall nail or hook—the duplicate being entirely screened by the picture, and either actually or so nearly sharing the weight that should the other suspension fail it could take the whole load at once without jar.

If I use a (nailed-on) wall-hook I put a stout nail immediately beneath to provide against failure of the brass hook, and I have found it a good plan when using a brass-headed nail to drive in a wire nail at a steep angle beneath it so that the head of the wire nail lodges beneath the brass head. The wire nail acts excellently as a strut.

Handelchrome Portraits.—We have recently had an opportunity of seeing a number of examples of a new departure in oil portraits in colours which owes its origination to Mr. E. G. Handel-Lucas, doubtless well known to many of our readers both as a painter of repute and as a technician in photographic methods, particularly in relation to colour photography. For several years past Mr. Handel-Lucas has been engaged in perfecting what we understand to be a new technique in the making of oil portraits in colours. We do not know anything of the technical methods which are adopted, except that a photographic print is employed as the basis. But we are able to extend a very cordial appreciation of the results. The Handelchrome portraits are characterised by very remarkable freshness of colour and drawing. In the latter respect they immediately impress one as being striking likenesses of the subject. That may be due in part to the employment of a photograph as a basis, but we believe that Mr. Handel-Lucas makes it his practice to study the original sitter whenever that is possible. At any rate, it may be justly claimed for the Handelchrome portraits that they strike a new note in colour portraits, and will recommend themselves both to photographers and their customers by the very great technical perfection and their altogether distinctive character. They have been compared with the effect which one sees when looking at oneself in a mirror; and the comparison is an apt one in giving an idea of their realistic quality. We learn that Mr. Handel-Lucas is busily engaged in fulfilling commissions, which have resulted from a comparatively limited announcement of his work, and that further particnlars of the process may be obtained by application to him by letter at 169, Gleneagle Road, Streatham, London, S.W.

FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Clnb. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Malt East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Particulars from the Secretary, Royal Photographic Society, 35, Russell Square, London, W.C.I.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

MADAME YEVONDE'S LECTURE.

To the Editors.

Gentlemen,—I had not the pleasure of listening to Madame Yevonde's lecture, so am free from the hypnotism of the lady's wit, or is it "tact," so often alluded to.

Anyway, the whole tenor is very misleading and unfair to all, although I fancy her own sex will be most misled, as the lady so strongly maintains photography is essentially a woman's business, and so fits the feminine qualities of "tact," etc. This kind of talk is but too likely to create a crowd of deluded people, seeking an easy living by their tactful acquiescence and flattering smiles to the new baby, the girl with her latest blouse, and the bride-groom; but do not these form but a very small part of a photographer's work? How does Madame Yevonde suppose her tactful ideas are to work with sitters who have stronger characters, when it is a case of coming up to the sitter's level, not down. How is it to be used in photographing machinery, architecture, furniture, jewellery, etc., or from a lofty building's scaffolding, or a ship's crankshaft, or 3,000 ft. up in an aeroplane? These and more intricate, technical and difficult work I have been called upon to do; all photographers are at times. Photography as a living requires long and arduous application early and late of technical expertness, as in the old wet-plate days, with real art discrimination, quick judgment, ready adaptability, and sound business acumen, and then you are getting somewhere near it. A camera, a packet of plates (with instruction by post), some blue and pink bows in the window, and tact, spell dismal failure. Again, how is it that women are so disliked as employers? I have yet to find the employee who prefers a woman to a man. Why doesn't the "tact" work with the servants at home?

As for the man who left the work to his girl assistants, well is that a criterion of their ability or his mental inferiority? And as for the dear, old gentleman of 35 years' experience, who advertised "perfect" pictures, I am afraid we are now suffering from the imperfect advertising; it won't work now—the public knows.

In 1914 I left for the war, returning in 1919, I applied for a manager's job, the two girl managers leaving to open a place of their own. "Don't take this place; come with us as assistant," they said, but neither knew anything but plate and paper makers' instructions, and had picked that up whilst I was away on Service. I believe they ran for twelve months, like many another war-time product, and, finally, lost all. To any deluded by Madame Yevonde's "tact" to start in photography, I copy "Punch" and say "don't."—Yours faithfully,

1914

THE STUDIO WORKER AND THE SHOPS ACT.

To the Editors.

Gentlemen,—The official view recently quoted ("B.J." May 13, p. 273), that "the actual taking of a photograph is a part of the *process of manufacture*" (the italics are mine) sounds suspiciously like the Factory Act, and if any question of applying the Factory Act to studios arises both employers and employees will be affected in many cases.

Now it is only just and reasonable that a photographer should be free to make appointments without being shackled by the apron strings of bureaucracy, but if assistants are employed for appointments out of regular business hours, and "process of manufacture" is pleaded against the Shops Act, we ought to be prepared to observe the laws regulating processes of manufacture.

At least six of the clauses of the Factory Act would have significance for studios were the Act to apply. Under these clauses it would become compulsory to provide adequate ventilation, heating arrangements, and sanitary accommodation for all employed. Provision would also have to be made for escape in the event of fire. The maximum hours of employment would have to be definitely fixed for the first five days and for Saturdays, and no woman could be employed on Sundays, Christmas, Good Friday, and the four Bank Holidays would be compulsory holidays for all employees in England and Wales, and other days in Scotland and Ireland.

Admittedly many of the studios which make a specialty of sittings by appointment are already well within the above provisions, and the Act could be applied to them without their knowing it or being inconvenienced in the least, but there are others which are not up the Factory Act standard and yet might wish to enjoy freedom from the Shops Act. This is the crux for employees. Before the Shops Act was law, studios were open all hours on all days, and there were no rules or regulations governing working hours. This Act gave a certain half holiday to many who had not had it before, and also shortened their daily hours, but if it is no longer of any significance to those employed in the studio and presumably in other work-rooms, they must either come under the Factory Act or drift back to pre-war conditions. There is, however, no reason at all why the interests of both employers and employees should not be safeguarded. Appointments could be freed from red tape without assistants being rendered liable for it. Under the Factory Act it should be possible to arrange for work out of usual business hours on an overtime basis subject to mutual agreement. This would mean that special appointments at which the services of paid employees were required would benefit not only the customer or the customer and the owner, but the employees as well. As things are at the moment the latter seem to be rather out of the running as regards the case in point.

THERMIT

PICTURE WIRE.

To the Editors.

Gentlemen,—Perhaps a few remarks apropos this subject, and in reply to Mr. R. B. Marston's complaint, may find an odd corner in your valuable space.

In choosing a wire there are three main points to consider, viz., strength, appearance, and durability. The saying, "Unity is strength," is exemplified in this article when new. I say advisedly "when new," as deterioration sets in when exposed to dampness and the various chemical actions in the air, the fineness of the strands, of course, laying themselves more open to attack.

True, there have been some brands placed on the market, such as autobronze and gilt copper, that have answered all requirements admirably, but the price precludes them from general use. When hanging pictures, I always advise customers to hold an annual inspection.

To sum up, for general purposes, such as for studio curtains, workroom fittings, etc., where appearance is *not* of primary importance, the single strand copper wire is preferable on all counts including economy.

FRAMER.

THE WOMAN IN PHOTOGRAPHY.

To the Editors.

Gentlemen,—It is very interesting to know that "Onlooker" regards the lady photographer as a passing fad. Lady photographers have just as good a reason for taking up the work as men, to help earn the daily bread. Before I had a business of my own I started in a country place against tremendous odds. I was a lady assistant to three men, who never gave me a chance to do anything but just the work I was paid for, though I was eager to learn.

Women are good at details; that is why they do well in photography when they have the chance. Besides doing business, I have a large house to look after, with the help of one little maid, and my husband says I am a good cook. I expect "Onlooker" does not know much about women. He will be an onlooker at a football match on a Saturday afternoon.

I cannot write more. I am off to take a group of footballers with a cup they have won from a good many teams.

THE WOMAN IN PHOTOGRAPHY.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

B. H.—D.50 is made and sold by the Cooper Research Laboratory, Watford, Herts.

G. E. A.—For particulars of the Carbro process apply to the Autotype Co., 74, New Oxford Street, London, W.C.1.

C. T.—Possibly the brush is out of order, but fine grain can only be obtained by high air pressure. Don't have paint too thick. Pumice on print will have no effect. We don't think it is the fault of the colour as we have often used the same.

A. N.—As regards glazing in quantity, perhaps we should refer you to an article by Mr. Brangwin Barnes, in our issue of April 1, 1921, page 185, which gives very full details of glazing by means of ox-gall., which is the process very largely used.

W. P.—For machinery for coating with the ferro-prussiate or ferrogallic sensitisers the two best firms are Messrs. R. W. Munro, Ltd., 103-149, Cornwall Road, South Tottenham, London, N.15, and Messrs. N. L. Scott and Co., Ltd., 3, Pancras Lane, Cheapside, London, E.C.4.

E. G.—Messrs. Billcliff, Richmond Street, Boundary Lane, Manchester; the Magna Co., 2, Eastborough, Scarborough; the Quta Co., 252-254, Haydon's Road, Wimbledon, London, S.W.19; and the Victoria Frame Co., 103, Anglesey Street, Lozells, Birmingham, are the firms supplying ferrotype and similar cameras.

S. D.—Certainly you can have a $3\frac{1}{2} \times 2\frac{1}{2}$ inch adapter, and the only difference will be that a narrower angle of picture will be taken, that is to say, from a given standpoint you will get exactly the same picture as on a quarter-plate except that a margin of $\frac{3}{8}$ inch width will be missing. The camera will not need to be re-scaled.

M. H.—It is very difficult to get a background black enough to show up a dark figure effectively. In the present case the negative is rather under-exposed. If, as we suppose, the coat is red, a panchromatic plate and a fairly deep filter, say, K.3 or Ilford Gamma, should have been used. Italian cloth has too much gloss to give a good black. Serge or velvet is better, and these should be kept well back in the shadow. We should not call the print inartistic though, as you realise, it is rather "spotty."

W. J. B.—(1) Assuming that the ammonia is of the full strength of .880 or .885—much that is sold is not of this full strength—the specific gravity for half-strength is about .938. We are afraid we cannot tell you what the corresponding graduation should be on the 0-40 scale to which you refer. (2) The M.Q. formula is certainly rather weak for ordinary work. The same chemicals dissolved in 40 ozs. of water would be somewhere about normal, but, on the other hand, the formula was recommended for process plates, which readily give density.

H. J.—A trough made of a bent piece of tin is a very suitable holder for the flash powder. The latter is very conveniently fired by putting a small piece of gun-cotton (from the druggist's) at about the middle of the train of powder and lighting this by means of a match on a rod. With an $8\frac{1}{2}$-inch lens on a whole-plate you would probably require to use stop from $f/16$ to $f/22$, and depending on the colour of the walls of the room from, say, $\frac{1}{4}$ to $\frac{1}{2}$ oz. of powder. A lens of this focus on a whole-plate is a comparatively narrow angle for an interior subject of moderate size. If you are required to get in as much of the room as possible you will probably find it necessary to use a lens of not more than 6 inches focal length.

H. S.—We think the best means for avoiding the deep tone of the elder boy's face would be to make a P.O.P. print from the negative in well diffused light with an opaque paper patch on the part to be treated. Then, when the main part of the subject has been printed to sufficient depth this patch should be removed and replaced by a mask covering all of the negative except the part which was previously covered. You could now print the elder boy's face to the required depth and make a copy negative from the toned and finished P.O.P. In carrying out this process it will be necessary to bind up the negative with two or three sheets of glass of the same size, so as to provide some distance, from $\frac{1}{4}$ to $\frac{1}{2}$ inch, between the negative film and the masks.

Dr. J. M. D.—The only formula we know for a persulphate solution of reasonable keeping properties is that of Mr. H. W. Bennett, as follows:—

Ammonium persulphate	480 grs
Sodium sulphite	96 ,,
Sulphuric acid	48 minims.
Water	10 ozs.

Subsequently Mr. Bennett advised 85 minims of sulphuric acid in preference to the quantity given in the formula. For use, 1 part of solution is mixed with 9 parts of water, forming a 1 per cent. solution of persulphate. We have not had any experience of this formula ourselves, but Mr. Bennett is a very reliable technical worker, and we have no doubt the formula does what he claims for it, although we are bound to think that the sulphite is immediately oxidised by the persulphate.

W. A.—(1) The usual pigment for holding back parts of the negative by applying the pigment to the glass side, is carmine, the ordinary tube water-colour. You require to mix it with a little gum solution in order to make it adhere to the negative. (2) Methylated spirit will not do any harm to plates during the short time they are exposed to its vapours whilst backing is drying. (3) It requires a good deal of practice to turn out a number of gold-toned P.O.P. prints of identical tone, particularly if you use separate toning and fixing baths. Perhaps you would succeed best by toning prints as far as they will go in a batch of toning bath measured out for a given number of prints. The instructions for Solio P.O.P. (Kodak) give the necessary directions; or you could use the combined toning and fixing bath, which does not yield so easily the very finest results in P.O.P., but in the hands of a beginner gives a much better average of results, especially as regards uniformity, than the separate toning method. (4) Double toning in P.O.P. means a bluish tone in the high-lights or light parts of the prints, whilst the shadows are still not completely toned, and, therefore, have a warmish colour.

THE BRITISH

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Contents.

SUMMARY

In the present issue we begin the publication of a series of chapters written for the purpose of presenting the elements of the scientific principles concerned in the making of negatives and, in a measure, prints, which are correct reproductions of the original subject. These chapters are, in fact an exposition of the work of Horter and Driffield, and endeavour to set forth their doctrine in the simplest possible way. The first chapter deals chiefly with the terms "density" and "opacity" and the description of a theoretically perfect negative in terms of the former. (P. 335.)

The several working formulæ reducer, stain remover, sepia bleach, re-bleacher, re-developer and hypo-eliminator—which may be compounded with permanganate as their staple constituent, are the subject of an article by Mr H C Inskeep. (P. 339)

There is a systematic way of securing the greatest degree of depth when using a large-aperture lens. A note on this item of practice will be found on page 333

The method to be adopted in providing view negatives with neatly lettered titles, either in black on the white margin of the view or in white in one corner of the foreground of the subject, is described in an article on page 334, containing the necessary working directions.

Now that the slower development papers of long range of gradation are so much more widely used, a useful purpose is served in emphasising their distinctive qualities in comparison with gaslight papers, and particularly as regards the type of negative most suitable for them. (P. 334)

Mr. Marcus Adams, lecturing on "The Eyes in Portraiture" before the Pictorial Group of the Royal Photographic Society said that the photographer excelled the painter in the delineation of the eyes, and that the creases around the eyes were of immense value in portraiture (P. 345)

Since the eye cannot appreciate even great differences in the strength of illumination, a common error in the use of artificial light in the studio is failure to make allowance for the lesser strength of lighting caused by greater distance of the source of light. (P. 334.)

Details of construction of a lens for which special qualities of "plasticity" are claimed will be found in a recent patent specification. (P. 344.)

The care which requires to be given to the use of the very convenient single metal plate-holders is probably the sole cause of dissatisfaction with these accessories in the hands of the less experienced. (P. 334)

A very interesting collection of X-ray pictures is now on view at the Royal Photographic Society. Among the most interesting of the exhibits is a series of radiographs of the hands of some famous people. (P. 342.)

EX CATHEDRA.

Focussing with large Apertures.

Purchasers of very rapid lenses with apertures of *f* 3 or *f* 3.5 and of considerable focal length, say 12 inches or over, are often disappointed with the depth of focus in the resulting pictures. Such lenses are, of course, mainly used for portrait work, and although their covering power is much greater than the old portrait lens of similar aperture they do not possess any more depth. To make the best use of them, focussing must be done very carefully and the focus "divided," so as to distribute the definition as far as possible. If a large head is to be taken, the eye should first be got as sharp as possible. Then, keeping a focussing magnifier upon it, the camera back should be racked in until it is only as sharp as is necessary to give good definition upon the paper to be used for printing, many of the surfaces now in use being incapable of rendering critical definition. Most of the modern rapid lenses are fitted with a diffusing adjustment, and if this be set for a very slight softening, not enough for a "soft focus" effect, it will apparently increase the depth of focus (or field), this being due to the fact that there is no critically sharp point in the portrait to start from. For children's portraits with such lenses it is advisable to keep the image as small as possible, even if it is necessary to enlarge subsequently, when large heads are required.

* * *

Organised Photographers

During the present month one of the foremost professional photographers in America, Mr Pirie Macdonald, of New York, hopes to pay a short visit to this country, and will, it is hoped, have the opportunity of conferring with his professional brethren. Should he come to London, the Professional Photographers' Association will not let slip the opportunity of hearing the views of one who has been fighting the battles of photographers as a body in the United States for many years past. Mr. Pirie Macdonald represents in his own person a great deal more than a skilful and very successful "photographer of men." Ever since he arrived at success in New York he has thrown in his lot with the various movements for the organisation of photographers as a whole, and has done yeoman service, particularly in connection with copyright legislation in America. Mr. Macdonald, as we had occasion to say some weeks ago when reprinting a speech of his, is a combination of idealist and shrewd business man, and has a way with him which evokes enthusiasm, even from those reluctant to admit the effectiveness or necessity of corporate action among men engaged in the same business. But he has preached full representation of that business as an essential to the vitality of an organised body. To quote a dictum of his:—"A postmaster-general will listen to a society of a thousand

members, but a society of ten thousand members is able to induce him to listen to reason." Latterly, Mr. Macdonald has devoted himself to promulgating the value of a code of ethics to which professional photographers might well pledge themselves; and if he is heard in London it is very likely that he will give his audience the opportunity of a fruitful discussion around that theme.

* * *

Slower Papers. A great improvement in the quality of photographic printing is likely to result from the growing use of slower printing papers. Most of our leading manufacturers are now offering papers which require many times the exposure which is necessary for the bromide emulsions which have so long held the field, and it will be found upon trial that a much longer scale of tones can be obtained upon the new papers than was possible with the old ones. These papers must not be confused with what have been known as "gaslight" grades, for while the latter were almost invariably suited for thin or flat negatives, the newer papers give the best results with such negatives as would give a good print on P.O.P. or carbon. It is, of course, possible to obtain fairly good results from such negatives upon ordinary bromide paper, but as a rule the prints are lacking in quality and of poor colour, this being due to the fact that a full exposure and short development have had to be adopted in order to avoid vigour. With the new papers it is necessary to use a rather intense light, mercury-vapour or half-watt lamps being the most convenient. As the latter can now be obtained in small sizes and with the ordinary fitting, it is easy to substitute them for the ordinary lamps in any printing box.

* * *

Light-Distance and Exposure. A point which is commonly overlooked in taking portraits by artificial light is the effect upon the time of exposure of altering the distance between the light and the sitter. The photographer who has only been accustomed to daylight work does not realise that by moving the sitter three or four feet to secure a certain effect of light he may be doubling or halving his working light. The ordinary rule that the intensity of light is in inverse ratio to the square of the distance between the source of light and the object it falls upon is strictly correct only in the case of an illuminant of very small area, but it will not be far wrong if applied to ordinary portrait work. To give a simple example, we will suppose that at a distance of six feet from the light an exposure of two seconds is sufficient; at eight feet six inches four seconds will be necessary to give an equally exposed negative. This principle has also an important bearing upon the exposure of full-length figures, in which the difference of distance from the light between the head and the feet may be four or five feet in such a case. The head at four feet from the light will receive four times as much light as the boots which are, say, eight feet away.

* * *

Single Metal Slides. The single metal slide has become increasingly popular of late years among hand-camera users, and in some respects it has advantages to offer over more elaborate patterns, as regards the cost, weight, and freedom from the tendency to warp from damp. One point, however, is essential in its use if fogged plates are to be avoided; the re-insertion of the shutter into the slide, after the plate has been exposed, should always be done quite squarely, and not from one corner, as this tends to depress the light-trap, allowing the admission of stray light. The other day we were asked to help in diagnosing the cause of some plates which were very badly fogged along one edge; the trouble was eventually traced to this careless insertion of the shutter. Care should also be taken to see that the draw-out shutter slides straight into its groove in the slide. We have seen photographers who insert the shutter with a wobbling back and forward motion that tends to allow the admission of light. Lastly, the worker should take care that the shutter is inserted in its groove, and not between the slide and the camera back. Some of the apparatus upon the market that is not too well made allows plenty of room for a wrong insertion of the slide in this way. In fact, we know of a really careful worker who made this mistake, and only discovered the error when upon the withdrawal of the dark slide the shutter fell to the ground, leaving the plate uncovered.

TITLES IN VIEW NEGATIVES.

WHILE it is often said, with much truth in most cases, that the photographer in a given place is best qualified to produce the series of view postcards of the locality, that statement must, we think, be qualified as referring to the selection of the views and their production purely from the photographic standpoint. When it comes to the minor details of neatly incorporating titles or other lettering with the postcard views, the local photographer in our experience is almost always woefully neglectful of what should be done, and is done, by the large producers of postcards. We have often been astonished at the untidy lettering of postcard views, on many of which the title and the photographer's name are an unsightly disfigurement of really good photography. This deficiency must surely be recognised by the producers of such cards; its existence is presumably due to ignorance of the methods by which titles can be very neatly added to the postcards by photographic means. A few notes on a subject which is often the subject of inquiry from correspondents may therefore be of service to others.

For economy in this operation it is as well to make a whole series of titles at one time. The neatest lettering is undoubtedly obtained by getting the titles set up in a fairly bold, but not "condensed," type, by a printer, but if this cannot be done it is within the capacity of most studios to draw the titles by hand, using as a model either a given fount of type or one or other of the styles of script lettering, such as can be found in the educational copy books of Vere Foster. If this is done the lettering should be made on a very much larger scale (say five or six times) than is required in the negatives. Any irregularities in the drawing will almost disappear in the reduced version. In copying from large type, such as that available in the specimens of a type-founder's catalogue, individual letters may be traced in pencil on engineer's tracing cloth, and the outlines thus obtained filled in with Indian ink by means of a fine sable pencil.

A sufficient number of titles having been obtained, they are arranged together on an easel so that in the copy negative, now to be made, a space of at least a quarter of an inch is left between each. The negative is best made on a "process" or photo-mechanical plate on which ample density of the ground can be obtained with practically glass-clear outlines of the letters. Although "process" plates are slow, their latitude in exposure is small, and the best results are obtained only by hitting just the right exposure. With pyro-soda or hydroquinone developer, preferably made up according to the formula recommended for the "process" plate, there is, however, no difficulty in getting an excellent black-and-white negative. After development, fixing,

washing and drying, the film is cut through to the glass, using a steel straight-edge and a sharp pen-knife. The titles are thus cut into separate sections of the emulsion film. Each separate piece has now to be transferred to its respective negative. This is done by soaking the negative in a hydrofluoric acid stripping mixture, such as that recommended in the formula in the "Almanac" (page 449 of the current issue), and consisting of 25 ozs. methylated spirit, 1 oz. water, 1 oz. glycerine, to each ounce of which mixture from 10 to 20 drops of commercial hydrofluoric acid are added to form the stripping mixture. It is hardly necessary to say that care should be taken in handling, or rather refraining from handling, the hydrofluoric acid. The latter should be purchased in a gutta-percha bottle, the stripping mixture made in a vulcanite dish, and a plate lifter used in handling the negative, so that the fingers require to touch only the edges. After treatment in the mixture, each narrow band containing one title can be readily raised, detached and transfered to the view negative. Before applying the title strip to the latter it is usual to cut out a strip of the emulsion film with a sharp pen-knife, so as to provide a clear space for the reception of the strip bearing the title. By providing a little adhesive in the shape of weak gum solution applied to this bared strip and allowed to dry, the band of film will readily adhere when the negative is dry.

As a rule, and for the best effect in the printed postcard, this title is put on the negative, where it will print close to the bottom edge of the postcard, and the subject of the latter is then masked so as to give a narrow white margin all round the view on the printed card. This masking is very readily done by first drawing lines in Indian ink with a drawing pen, T-square and set square. The further blocking out, on the outside of the rectangle made with the drawing pen, can then be speedily done with a good blocking-out mixture, such as Vanguard "Photopake." In using this on the marginal part of the negative containing the transferred title, the fine brush is taken up as close as convenient to the letters; ample density of the title negative is, of course, necessary to prevent any tint showing around the letters in contrast with the white of other parts of the margins which have been fully blocked-out.

Some postcard makers, on the other hand, prefer to make a feature of cards in which the view extends right to the edges of the postcard. In this case the title has to be put on to some part of the foreground of the subject where it will show up on the print. For this purpose a positive of the lettering, that is to say, in black on a transparent ground, is usually better than the negative, since the white letters which are thus impressed on the postcard will show distinctly on any subject, whereas black letters are liable to be inconspicuous if the subject happens to have a particularly dark foreground. In this case it is a simple matter to print a positive by contact on to a second "process" plate, and to cut up and strip the titles as already described for a negative direct.

THE H. AND D. DOCTRINE.

In the series of chapters, the first of which appears below, an endeavour is made to present the elements of the scientific principles which are concerned in the processes of making photographic negatives and prints. The discovery of these principles was chiefly due to Hurter and Driffield. While researches on somewhat similar lines were made by previous investigators, the methods and conceptions originated by Hurter and Driffield have proved so fruitful that the title adopted above for this very elementary introduction to what is now the science of sensitometry is fairly justifiable. That science has been enlarged in many directions during the last twenty years, and now represents a considerable volume of literature, chiefly scattered in periodical publications, but accessible through the bibliography appended to the collected researches of Hurter and Driffield in the memorial volume published under the editorship of Mr. W. B. Ferguson, K.C., by the Royal Photographic Society at the price of twenty-five shillings.

Since the output of original papers written in the language originated by Hurter and Driffield and by later experimenters is growing year by year, it seems desirable to put the fundamentals of sensitometry in a form in which they can be understood by the non-mathematical reader. The following chapters are a first step in that direction. Although they do not take the student very far, they will, it is hoped, enable him to become familiar with the methods and terms which are the basis of a great deal of present-day research in photography. They should do much towards enabling him to extract the meaning from papers which he may regard as incomprehensible.

The first chapter deals with the optical conditions which a negative fulfils if it is a theoretically perfect record (in negative form) of any subject. It also explains the meanings attached in sensitometry to the terms exposure, opacity, and density, and will it is hoped, make plain the difference between the two latter.

I.—THE THEORETICALLY PERFECT NEGATIVE.

In making a negative the obvious aim is to record correctly the relative brightnesses of the parts of the subject—that is to say, the amounts of light which they reflect; in other words, to reproduce in inverse light and shade the tone-values in the subject, or, what amounts to practically the same thing, the tone-values in the lens-image of the subject. In a photographic negative this inverse rendering consists of deposits of granular silver formed in the gelatine by the developer, and it is self-evident that a negative is theoretically perfect when the light-intensities transmitted through these various deposits are respectively in inverse proportion to those emitted by the corresponding parts of the original subject. Thus the negative of, say, a drawing (Fig. 1) consisting of five tones of respective brightnesses expressed numerically as 20, 12, 8, 4 and 1, would consist of five silver deposits transmitting respectively

1 20th, 1 12th, 1 8th, 1 4th and 1 1 (the whole).....(A)

of the light falling on it, as shown in Fig. 2; or

1 10th, 1 21th, 1 16th, 1 8th and 1 2 .....(B)

or any other series of deposits exhibiting this proportionality of transmission of light by the respective parts. (Fig. 2.) Obviously only a negative answering to this description is a theoretically perfect substitute, in "negative" or inverse form, for the lens-image of the original subject, for the purpose, for example, of preparing a true positive version of the original by printing on to a light-sensitive paper, also theoretically perfect. It is also clear that negative A is better than negative B in one respect—owing to the larger proportions of light which it transmits it prints more quickly than any other.

The truth of the above definition had been admitted by students of the photographic process long before Hurter and Driffield formally expressed it in the above terms, but it was

not until Hurter and Driffield published their "Photo-chemical investigations" in 1890 that the conditions under which such a theoretically perfect negative is produced were defined and the laws established expressing the relation of light-intensities transmitted by the silver deposits in a perfect negative to

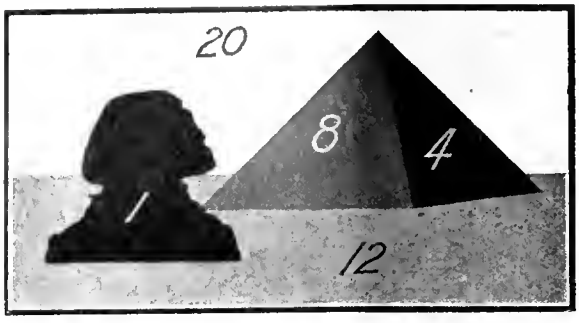

FIG. 1.—A LANDSCAPE OF ABRUPT BRIGHTNESSES.
In five tones, emitting light-intensities in the proportion of 20 : 12 : 8 : 4 : 1.

the exposures (amounts of light) which produce them and the process of development. It will be seen that exposure and development take each an essential but different share in producing the theoretically perfect negative as defined above.

Sensitometry and its Language.

These laws were worked out mathematically by Hurter, and the practical conditions in which they apply and the effects of departure from those conditions were ascertained by the experiments made by him and Driffield. While the two investigators began their work for the purpose of finding a scientific measure of the sensitiveness or speed of plates, their researches had a much wider result, and established a system of expressing the qualities of plates and negatives in definite figures or curves, and of providing a numerical or graphic language for the exact description of both the action of light on plates and the action of developers. In other words, they were, in fact, the creators of what we now call "sensitometry" (the science of measuring the properties and behaviour of light-sensitive substances), and though other sensitometric systems have been devised, theirs still remains the most useful.

The language which Hurter and Driffield introduced is now in every-day use by experimenters in sensitometry, yet is still Greek to large numbers of photographers, who are thereby denied the opportunity of studying a large and important mass of literature and of carrying out and describing any experiments they may make in the most definite way. This does not arise from the fact that Hurter and Driffield employed mathematical methods much beyond the powers of most people.

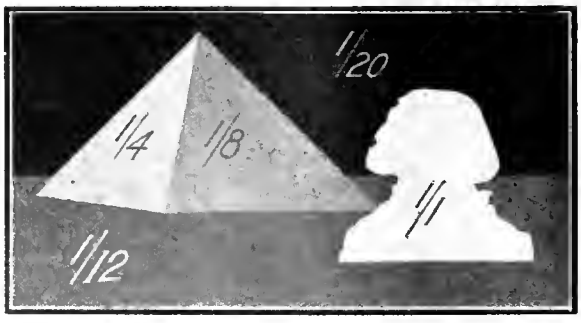

FIG. 2.—THEORETICALLY PERFECT NEGATIVE OF FIG. 1.
The numbers represent the relative light-intensities transmitted by the various parts.

These methods are used by them chiefly in arriving at simple formulæ. The obstacles in the way of assimilating their work from their own writings or those of others are of a much less serious kind. They are, in the first place, the understanding and use of logarithms, which anyone can master for this purpose in an hour or two. Secondly, the use of the word "density" in an altogether special sense, different from photographers' use of it; and, thirdly, that Hurter and Driffield never directly measured densities (in their sense of the word), although they and many other later authorities on sensitometry constantly write as if they do. They measure opacities, or, rather, transmissions, and express them as densities. The confusion introduced in these two latter ways into the study of sensitometry by laymen is perhaps more largely responsible than anything else for the difficulties which are experienced. Particular attention is therefore invited to them in what follows.

Fundamental Values.

It is the basis of sensitometry that we shall express the factors concerned in the making of negatives by numbers (values), not simply describe them by terms, such as large or small, high or low. Some of these numbers are ratios (proportions); others are definite quantities. We must therefore consider these fundamental factors and the manner of expressing them by numbers.

The amount of light which acts upon a plate—that is, the exposure which the plate receives—is measured by the intensity of the light, usually denoted by I, multiplied by the time, t, during which it acts. The intensity is conveniently measured in terms of the light of a standard candle at the distance of 1 metre; the time is measured in seconds. Thus an exposure (I t) of 40 seconds to the light of a standard candle at 1 metre distance is 40 candle-metre-seconds. Other (stronger) sources of light are often used, and are usually rated in terms of the standard candle.

Under certain conditions of experiment exposures represented by identical products of I and t produce equal results, however I and t may vary. This is the so-called Bunsen-Roscoe or "reciprocity" law, but it does not hold good in all cases.

Transparency and Opacity.

The proportion of light transmitted by a patch of silver deposit in a negative, *i.e.*, the *transparency* of that deposit, is expressed as the fractional part of the unit light falling on the other side. Thus, if 1/10th of the light is transmitted we call the transparency 1/10.

But instead of speaking of a substance as having such-and-such transparency, we can speak of it as having such-and-such opacity, transparency and opacity being inverse terms for the same property according as one considers the fraction of unit light-intensity which is transmitted or the multiple of unit light-intensity required for a transparency of 1. The two terms are names for the same thing expressed in different ways. Thus opacity is expressed as the inverse or reciprocal of the fraction denoting transparency, *e.g.*, a transparency of ½ is an opacity of 2. Beginners in the study of sensitometry appear to find a difficulty in becoming familiar with this relation of opacity to transparency. A common pitfall is to think that a completely transparent substance (transparency therefore = 1) should have opacity = 0 instead of = 1. This misconception perhaps arises from the wrong idea that a substance subtracts from the light-intensity which falls on it. It is overlooked that the numbers representing transparency and opacity are ratios. Transparency is the ratio,

$$\frac{\text{light-intensity transmitted}}{\text{original light-intensity}},$$

in which the transmitted light-intensity is taken as 1. Opacity is the ratio,

$$\frac{\text{original light-intensity}}{\text{light-intensity transmitted}},$$

in which again the transmitted light-intensity is taken as 1. Plainly then in the case of the transparency (=1) of a completely transparent substance the opacity also = 1. The number representing opacity is the number of units of light that must fall on the medium in order that one unit of light may be transmitted.

The terms transparency and opacity are perhaps unfortunate in their implication of completeness, or, at any rate, high degree of the denoted quality. But as used in sensitometry they have not this emphasis, and Mr. Renwick has suggested replacing them by the respective terms, *transmittance* and *obstructrance*. The student, however, should now appreciate their mutual relation.

Opacities of a Negative.

It will have been clear from the above that the opacities of the series of deposits which form a negative are the values of chief concern in the use of the negative, since they represent the light-stopping powers. They represent what are popularly called the "densities" of the negative, and in a theoretically perfect negative are directly proportional to the light-intensities which produced them, since the time factor (the *t* of *i t*) is common to all these latter in the case of a plate uniformly exposed in the camera.

The Meaning of Density.

But the term density has a particular significance in sensitometry, following its first use in this sense by Hurter and Driffield. Density is a measure of the quantity of silver or other light-stopping material per unit area of a negative. It is a quantity, not a ratio as transparency or opacity is. It has a particular relation to these latter which perhaps can be best shown by a simple example.

Imagine a negative made by laying on a sheet of glass strips of developed film having a transparency of 1/3, *i.e.*, transmitting one-third of the light-intensity falling on it. Let the glass be uncovered on the left, then one thickness of film attached, then two thicknesses, then three thicknesses, the arrangement being as shown in fig. 3. Let us see what will be

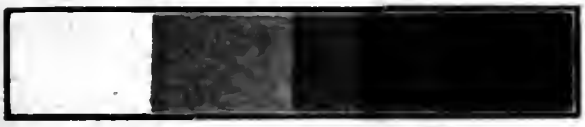

FIG. 3.—THE BASIS OF DENSITY.

The four deposits of the negative consist respectively of 0, 1, 2 and 3 thicknesses of film of a certain density.

the transparencies of these four patches. No. 1, being quite transparent, has a transparency of 1. No. 2 (one film) has a transparency of 1/3. What happens in the case of the two films? The first transmits one-third of the incident light and the second a third of this third, that is $1/3 \times 1/3 = 1/9$.

Index and Logarithm.

A little explanation must be put in here for the non-mathematical reader. It is one of the simplest mathematical forms to represent a value multiplied by itself any number of times by means of what is called an "index" (plural, indices) or "power." The index is written as a small figure placed slightly above, *e.g.*, 10×10 is written 10^2, and $10 \times 10 \times 10$ as 10^3, 2 and 3 being the respective indices. The value, in our example, is said to be raised to the power of 2, 3, or whatever the index is. Perhaps the best way of realising the nature of an index of any quantity is to think of it as the number of times that 1 is multiplied by that quantity. Thus:—

$3^3 = 1 \times 3 \times 3$. (Index is 2.)
$3^1 = 1 \times 3$. (Index is 1.)
$3^0 = 1 \times$ (no times 3) $= 1$. (Index is 0.)

Arithmetically an index must be a whole—you can't multiply a number by itself 2½ times by ordinary arithmetic—but mathematically an index is not limited in this way. It may be a fraction. A logarithm, which we shall need to employ directly, is simply an index or power. Hence its nature will be understood from what has just been said. Our $1/3 \times 1/3$, from which this digression started, is, of course, $(1/3)^2$. As we shall see directly, 2 is the logarithm of 1/9 to the base 1/3.

Relation of Density to Opacity.

To proceed now to the strip consisting of three thicknesses of silver deposit. Similarly it will transmit a third of a ninth, or $1/3 \times 1/3 \times 1/3 = (1/3)^3 = 1/27$. So we can write down the series of transparencies and the corresponding opacities as follows:—

No. of films	0	1	2	3
Transparency	1	1/3	1/9	1/27
Opacity	1	3	9	27
or	1 ($=3^0$)	$(3)^1$	$(3)^2$	$(3)^3$

Consider the third and fourth lines of this table. Neglecting the first column (those with some algebra will recognise that the 1 in line 4 may be written as 3^0), it is seen that we can express the opacities in a form in which a common number, 3, is successively raised to a power corresponding with the proportionate quantity of light-stopping material, *i.e.*, the silver deposit of the films. The silver (line 1) is in the proportion 1 : 2 : 3. The indices (line 4) are also 1, 2, 3. They simply indicate the number of 3's multiplied together, 1 (one 3) in col. 2; 2, (3×3) in col. 3; and 3, $(3 \times 3 \times 3)$ in col. 4.

But if the silver deposit in the two films be put all in one film, the transmitting effect will be the same; also the transmitting effect of three films will be the same if treble the quantity in a single film be contained in one film. Thus the indices 1, 2, 3 (line 4) are measures of the quantities of silver, *i.e.*, densities.

By comparing lines 3 and 4, we shall see the relation of density to opacity. It is that density is the logarithm of opacity. As mentioned in a preceding paragraph, a logarithm is an index or power. In $3^2 = 9$, 2 is the logarithm of 9 to the base 3 (written log$_3$ 9), that is the number of 3's which must be multiplied together to make 9. Similarly 1 and 3 are the logarithms of 3 and 27 respectively, in each case to the base 3. Any number, however, may be chosen for the base of a system of logarithms, and 10 is commonly selected in tables of logarithms which are published, *e.g.*, "Chamber's Mathematical Tables." Converted into logarithms to base 10, line 4 of our table will read:—

10^0 $10^{.477}$ $10^{.954}$ $10^{1.43}$ *

and the densities corresponding with the opacities in line 3 will be:—

Density	0	.477	.954	1.43

The density values employed in sensitometry are invariably computed on the above basis, that is, are logarithms of opacities to base 10. A density of 1 thus corresponds to an opacity of 10 or a transparency of 1/10. The density corresponding with any opacity is found by looking up the logarithm of the latter in a table of logarithms, but in measuring instruments, which invariably measure the proportion of light transmitted, and therefore measure its inverse or opacity, it is customary to graduate the scale in densities. This is done by marking on the scale the values of logarithms of the opacities instead of the opacity values.

Weight of Silver and Density.

There is not a simple method of measuring densities directly. Hurter and Driffield measured by chemical analysis the weight of silver (produced by development) per 100 sq. cm., which is required to give a density of 1 (opacity of 10), and found it to be .0121 gm. Subsequent measurements by Eder and by Mees of this *photometric constant*, as it is called, gave the values .0103 and .01035. Thus by use of this constant or multiplier, densities computed from optical measurements are expressed in terms of silver, *e.g.*, density of 1.2 = 1.2 × .0103 gm. silver per 100 sq. cms. = .0124. But we shall not have occasion to deal with densities expressed in this form, which is mentioned here only to show that the optically derived value (log opacity) is really a measure of density of silver deposit, just as the number of people per sq. mile is a measure of density of population.

Illustrations of Density.

Before leaving the definition of this all important property of density, perhaps an example may be given to show its logarithmic relation to opacity. Suppose a country to be so densely covered with pampas grass that an explorer by pushing through a region of it is exhausted to the degree that he can travel at only 1/10th of his previous rate. Suppose now that after regaining his full strength he comes into a region of equal extent, but having two grasses growing on an area where one grew in the first, and that his struggles to push through this denser region reduce his strength of progression to 1/100th. If we call the density of the first region 1 and of the second 2, we have a good illustration of density (as defined by Hurter and Driffield) and its relation to transparency.* Its relation to opacity is displayed by regarding the explorer as having a strength of 10 when entering the first region and of 100 when entering the second. These strengths being each brought to 1 by travelling through the respective regions, the numbers 10 and 100 are analogous to opacities. And if we multiply the densities each by the same suitable number (analogous to the photometric constant), we can express the densities of the regions in terms of the weight of the grasses on a given area.

A less fantastic illustration of density and opacity is provided by the simple optical device of a wedge of uniform substance, such as grey glass, or gelatine in which a fine pigment is evenly distributed. The density of such a wedge (Fig. 4) at any point is, therefore, measured by its thickness at that point, since the material is uniform. The densities

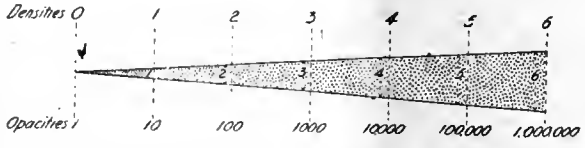

FIG. 4.—AN ILLUSTRATION OF DENSITY AND OPACITY.

The upper row of numbers represents the relative thickness of the light-obstructing medium. The lower row represents the corresponding opacities.

may, therefore, be represented by thickness numbers, which, in the wedge of fig. 4, run from 0 to 6. But if you hold such a wedge up to the light you see that towards its thicker end it becomes very opaque (" dense," as we commonly call it) indeed. That is what is denoted by opacity, and, as shown in the lower line of the figure, it increases by mathematical leaps and bounds as density proceeds sedately from its 0 to 6.

In short, and to clear the ground thoroughly for what follows, opacity is the degree to which a deposit of anything obstructs light, density is the quantity of the physical stuff—silver, pigment or anything else—of which that deposit is made. When you hold up a negative to the light, you judge its opacities; you can't judge its densities.

The Relation of Densities to the Tones in the Subject.

It will now be seen, from a comparison of the definition of a theoretically perfect negative (in the opening paragraphs of this chapter) with the relation of density to opacity to which we have now come, that we can set down the relation which the densities must bear to the light-intensities emitted by the subject in order that the negative may be theoretically perfect.

The opacities, as we have seen, require to be proportional to the light-intensities.

In the making of a negative in a camera the exposures (light-intensities × time, *i.e.*, $I\ t$) which the various parts of the plate receive are proportional to the light intensities, since all these latter act for the same time t. Therefore the opacities of the negative require to be proportional to these exposures.

But as the densities are the logarithms of the opacities, it follows that the relation between the densities requires to be the same as the relation between the logarithms of the exposures. This relation is that the difference between any two densities shall be equal to the difference between the two corresponding log exposures. I may illustrate this relation by reference to the Egyptian landscape (Fig. 1). The assumed light-intensities are:—

Light-intensities	20	12	8	4	1

which are proportional to the exposures of the parts of the plate representing sky, foreground, pyramid and sphinx. So we can write:—

Exposures	20	12	8	4	1

In a theoretically perfect negative the opacities will be, say:—

Opacities	40	24	16	8	2

representing densities (log opacities) of:—

Densities	1.602	1.380	1.204	.903	.301
	.222	.176	.301	.602	

The figure in the smaller type between each density and the next is the difference between the two. It will be seen that these are the same as those between the logs of the corresponding exposures, viz.:—

Log exposures ...	1.301	1.079	.903	.602	0
	.222	.176	.301	.602	

It is this equality of difference between logs of corresponding quantities which Hurter and Driffield, in common with mathematicians, speak of as proportionality. They mean this relation when they define the theoretically perfect negative as one in which the densities " are proportional to the logarithms of the intensities of light proceeding from different parts of the subject." (H and D. Memorial Volume, p. 78.) " Proportional " is used by the mathematicians as a contraction for the difference-relation when speaking of logarithms; but, in default of apprehension of this extra-ordinary meaning of the word, the custom, which is generally followed by writers on sensitometry, must be very confusing to the beginner who is trying to master the fundamentals of the H. and D. doctrine.

It should, however, be clear from the above what is the theoretical basis of a correct negative—that is to say, for any difference between the *logarithms* of the two numbers representing the different exposures on different parts of a plate, there shall be an equal difference between the *densities* produced by those exposures.

But can this condition be fulfilled in the making of negatives on dry plates? For the answer we must now proceed to consider the laws which by experiment have been found to govern the action of exposure and development and see within what limits the above condition of correct reproduction can be realised.

In proceeding to this part of the subject it should be pointed out that in sensitometric tests it is customary to increase exposures in multiple (2 as a rule), so that the difference between successive log exposures is the same. Thus:—

Exposures	1	2	4	8	16
Log exposures ..	0	.301	.602	.903	1.204

The common difference is .301, and in the theoretically perfect negative the densities produced by the above exposures would likewise differ by .301.

G. E. B.

(To be continued.)

* It may be rightly objected that two numbers do not serve to distiagnish, in this analogy, between a difference and a ratio. Will the reader, therefore, please assume a third region, of 3 grasses per unit-area, in passing through which my intrepid traveller's full vigour is reduced to 1-1000th.

PERMANGANATE FORMULÆ.

The majority of photographers do not realise how adaptable permanganate of potash is to the needs of the general worker.

This salt of potassium may be used for a variety of purposes, and it will be found that baths compounded with permanganate will compare favourably with other formulæ used for a like purpose, and in some cases excel them.

The object of this article is to collate the formulæ for various baths, of which permanganate is the principal agent, and also the processes for which the salt may be used.

Negative Reducer.

As a reducer for negatives this salt has proved valuable. Negatives that have been inadvertently allowed to develop a little too much may be as easily reduced to the required density as the excessively over-developed ones. A strong solution for rapidly reducing the most dense negative is

Potassium permanganate (5% sol.)	...	2 drs.
Sulphuric acid (10% sol.)	...	5 drs.
Water	...	10 ozs.

Apply this solution to a dry negative, wash immediately and dry. Again repeat this procedure, and a considerable softening of contrasts is obtained.

On the other hand, fairly even reduction may be obtained by diluting the above reducer to 60 ozs. and applying to a wet negative.

The strong reducer should not be used to reduce a negative with strong high-lights and shadow detail in clear gelatine, as the little deposit in the shadows will be removed, as they would be with any single solution reducer when considerable reduction is desired in the high-lights.

Stain Remover.

No matter how careful one may be, occasionally stains make their appearance on our negatives, but with the aid of an acid permanganate solution the fault may be rectified with ease.

Two methods may be adopted, one of which will permit the negative to be intensified during the process of removing the stain. Bleach the negative in either A, B, or C, solution of the late Welborne Piper's chromium intensifier according to the degree of intensification required. Wash, away from strong light, until the bichromate stain is removed, place the negative in

Potassium permanganate (5% sol.)	...	2 drs
Sulphuric acid (10% sol.)	...	5 drs
Water	...	5 ozs

from 2 to 10 minutes until the stain is removed. The negative will have taken on a characteristic brown stain which can be easily removed with a 1 in 10 bisulphite lye or a 2 per cent. potassium metabisulphite solution.

Pour either of these solutions on and off the negative until the stain is removed, but discard the clearing bath when any discolouration is visible, and use fresh solution. Wash the plate for a few minutes and develop with a normal amidol developer to complete the process.

The second method and the more direct for removing pyro stains is the formula published by Ilford, Ltd., in the "B J.," May 5, 1916, providing no intensification of the negative is required.

Soak the negative for 10 minutes with constant rocking of the dish in

Potassium permanganate	...	50 grs
Common salt	...	½ oz.
Acetic acid (glacial)	...	1 oz.
Water	...	20 ozs

wash briefly and transfer to

Potassium metabisulphite	...	1 oz.
Water	...	20 ozs.

until the bleached image is quite white everywhere to the back of the film.

Re-develop the image in any non-staining developer such as amidol, when a good neutral black deposit with clean shadows is produced.

If the negative has not been dried before the treatment is applied, harden the negative in a solution of

Chrome alum	...	10 grs.
Water	...	10 ozs.

as the film is liable to become a little more tender in the process.

Bleacher for Sulphide Toning.

Probably the best known formula containing potassium permanganate is the one popularised by Mr. T. H. Greenall for bleaching prints previous to toning by a solution of sodium sulphide. Many words have been written eulogising this bleacher, and with justice. It has the power of clearing up the high-lights and tones a correctly developed print to a pleasing cool brown colour quite free from any trace of yellow. The writer prefers the acid bleacher, as it is less trouble to compound than the formula containing sodium chloride, and the remarks in the previous paragraph apply to that formula.

Two stock solutions are required :—

A. Hydrochloric acid	... 10%.
B Potassium permanganate	... 5%.

For use, take A 1 oz. and B 30 mins.

This formula is considerably stronger than the one suggested by Mr Greenall, but it has been found necessary, to complete the bleaching within a reasonable time

Both stock solutions keep indefinitely in stoppered bottles, but the working mixture must be made up at the time of using and discarded when it shows any sign of discolouration or turbidity, as trouble may be experienced where the sediment which is formed touches the print.

The prints are transferred direct to the sulphide bath, which should not be stronger than 2 grs. to the ounce, where any brown stain due to the bleaching bath will generally disappear. Should the sulphide bath fail to remove the permanganate stain, a quite effective clearing bath is 1 per cent. solution of potassium metabisulphite.

Re-bleaching Sulphide Toned Prints.

It sometimes happens that a sulphide toned print is not quite the colour desired, particularly so when the exposure of the print, for the reason of excessive contrasts in the negative, has had to be increased and development not carried out to the limit. When it is deemed desirable to improve the colour of any sulphide toned print resort may be made to the bleaching bath already given, and it will be found to bleach out nearly as rapidly as a normal print. Apply a weak solution of sulphide (about 1 gr. to 1 oz. water) to the print, and a darker and much improved colour will be the result.

Should, however, it be desired to reconvert a sulphide toned print to a black tone, use the same bleacher and re-develop the print in the following acid amidol developer. —

Sodium sulphite	...	½ oz
Potassium metabisulphite	...	80 grs.
Amidol	...	30 grs.
Water	...	20 ozs.

pass through the hypo bath, then wash and dry.

Re-development for Improving Prints.

This useful salt may be also used for bleaching a bromide or gaslight print to improve the colour and contrast

It not infrequently happens that an enlargement has to be made from a negative with excessive gradations, and resort is made to abnormal exposure and development. The bad colour of the print show the method of its production.

Prints of this type can be readily improved and a warm

black tone obtained on most bromide papers by the following method:—

Bleach the print in	
Potassium permanganate, 5%	120 mins.
Sulphuric acid, 10	40 mins.
Sodium chloride	30 grs.
Water	10 ozs.

Wash the print for 10 minutes and re-develop in strong daylight with a normal amidol developer without any addition of bromide. Wash the print again for a short period, and the process is complete.

Slight intensification is obtained by this method, but should this increase in strength be deemed insufficient greater intensification can be obtained by first sulphide-toning the print, washing, re-bleaching and re-developing in the formulæ already given in an earlier portion of this article.

Hypo Elimination.

The rapid elimination of hypo is occasionally necessary, and no better chemical can be used than permanganate of potash. Rinse the negative for a short time in running water, and meanwhile make up a solution of permanganate of potash of a pink colour. Lay the negative in a dish and pour on a small quantity of the above solution, which must be removed so soon as the pink colour is altered. Repeat this procedure with fresh solution until the colour of the permanganate solution is not discharged.

Pyro Stained Fingers.

Immerse fingers in Ilford bleacher, already mentioned, for a short period of time, and remove permanganate stain with the metabisulphite solution.

Hypo Test.

Permanganate may be also used to test the presence of hypo in negatives or prints. For this delicate test make up a solution of potassium permanganate of a light rose colour and place a small quantity in two test tubes, or other glass vessels. In one tube allow the drippings from the negative or print to be tested to fall into the solution; if no change of colour is apparent when compared with the untouched solution you may be assured that the negative is free from hypo.

The dilute solution for this test should be used soon after mixing owing to the water causing the solution to lose colour.

HORACE C. INSKEEP.

FRAMING THE PICTURE.

[In spite of the great popularity of the *passe-partout* method of finishing photographs and other pictures, the older plan of framing in mouldings still holds its own, particularly among professional workers. The following hints, which we take from our contemporary, "American Photography," will no doubt be read with interest, they being given by a worker who has studied the subject of mounting and framing very closely, and whose examples of work are very well known in artistic circles.—EDS. "B.J."]

MUCH has been said about making enlargements from really good negatives, but unless some of these enlargements are framed and hung on walls much pleasure is lost. If the prints are taken to the local framing shop the maker should know whether or not his picture needs a mount; if so, how wide and what colour; also something about the width of the frame and what colour it should be. This knowledge is more useful if one attempts to make the frame, whether he makes the moulding or buys it and simply cuts it to correct lengths.

To frame a picture that is not beautiful is to honour what should be ignored. Much has been written about composition, so let us make use of whatever knowledge we may have on the subject, in selecting the portion of our negative to enlarge. Study a contact print, go over it with a pair of L-shaped cards, and select the composition, enlarge the corresponding portion of your negative, and then the following hints may be of value in framing it.

The functions of the mount are to increase the size of the picture space upon the wall, and to isolate it from the surrounding background. A picture with a great deal of action requires a mount, as the frame alone is not enough to bind the picture together and separate it from the background. Prints tinted with water-colours, and prints resembling Japanese prints in composition, need something more than the frame between them and the wall. In some pictures the figure comes close to the top, and seems crushed or at least crowded without a mount. Again, the figure may be cut on the sides, and a mount is needed. When a picture is filled with large objects and is to be viewed at a distance, a mount is generally required to isolate it. If the picture is filled with detail, and to be viewed at close range, no mount is required.

The shape of the picture determines the shape of the mount. A horizontal picture should be framed on a horizontal mount; a vertical one upon a vertical mount; and a square one upon a mount made slightly oblong by making the square below the picture wider than that above. Avoid squareness in either picture or mount; an oblong is much less monotonous, and therefore much more pleasing. Simple multiples in the dimensions of the oblong are to be avoided; that is, the ratio of the sides should not be 1 to 2, 2 to 3, or any similar even ratio, but should have a more subtle relation.

The picture should neither be crowded nor lost in space. There should always be a wider margin below than above giving a feeling of rest. The side margins should be equal, and can be the same as the top, or a little more or less, governed by the action in the picture. Much horizontal action requires more space at the sides than at the top, but the general rule is that the widest space should be at the bottom, next at the top, and narrowest at the sides. Much action in the picture calls for a larger mount, and a quiet one calls for a smaller mount. A number of large objects in a picture makes a larger mount necessary. The mount should give the appearance of rest to the picture. Avoid oval, diamond-shaped, or any odd-shaped mounts.

Sometimes a second mount, forming a narrow band $\frac{1}{8}$ in. to $\frac{1}{4}$ in. wide around the picture, and of a colour to harmonise with the dominating note in the picture, heightens the effect, and gives sparkle and beauty. Do not allow a strip of pure white to enclose the picture. Sometimes a single line of the value of the darks in the picture, drawn upon the mount about $\frac{1}{4}$ in. from the picture, softens the contrast between the two. An opening may be cut in the mount, the size of the picture, giving a soft-border line formed by the shadow of the mount.

Any picture in brown tones should have a mount of the same tonal quality as the picture; that is, neither warmer nor colder, and in value slightly above the middle value of the picture and one tone lighter than the frame. Gray pictures should have grey mounts, above the middle greys of the picture and of the same quality. Pictures tinted with water-colours require a cream or dull gold mount.

The frame may be considered as a part of the decorative scheme which the picture will make when hung, or a strong enclosing form which will separate the picture from the objects around it. The frame is only a continuation of the mount,

if one has been used, and should be unobtrusive. Any frame that detracts from the picture is wrong. For this reason mouldings should not be used in which the grain is too coarse or prominent. As a rule, the colour of the frame is the same as the mount, or the predominating colour of the picture, but lighter than the darkest parts and darker than the lightest parts. In some respects the frame is to the picture what dress is to people. The frame should modestly enhance the beauty of the picture, and be subordinate to it. One of the primary purposes of the frame is to protect the picture, hence a durable wood should be used, rather than a plaster combination. Ornately carved and glittering mouldings are harmful to the tone relations of the picture, and violate the principles of subordination. Whenever possible, there should be harmony, symbolic or otherwise, between picture and frame. When the frame is sufficient to isolate the picture, no mount should be used.

A consistently pleasing relation must exist between the width of the mount and that of the frame. The moulding is usually narrower than the mount, never the same width. The width is governed by three things: the amount of action in the picture, the number and size of the objects in it, and the brilliancy of the colouring. The stronger the action, the stronger the frame. Large objects in the picture require a wider frame than several small objects would. Single heads in repose need a wider frame than two or three small figures. In case of a tinted photograph, great contrast in hue or intensity requires a wider moulding than quiet contrasts.

In mouldings wood appears stronger the more it is cut up. A flat moulding is suitable for a picture flat in colour or strong in feeling. A moulding with depth is appropriate for a landscape showing perspective. The curve and the depth of the wood accentuate the impression of distance. Where there is much action or great strength shown, a more complicated moulding, made of two or more bands, may be used.

For the majority of pictures in brown use flat mouldings, or those with slight curves, finished to show the grain of the wood but slightly. The frame should be toned to the right hue and value to harmonise with the picture—lighter than the darkest parts and darker than the lightest parts—with perhaps a delicate beading for accent. The beading, if used, may be a dull gold, but never a bright, shiny gold. A small photograph in sepia looks well in a narrow gilt frame toned toward sepia. For photographs tinted in colours use a dull gilt moulding, usually narrow. Or, what is better, tone the gilt to sepia, or green, or grey, depending upon the predominating colour in the tinted picture. Green or grey-toned frames can be used with pictures cold in colouring, and sepia-toned gilt frames with warm-toned pictures. For pictures in black and white, or half tones of grey, grey moulding should be used, governed by the same considerations as brown mouldings for sepia prints.

A fine-grained wood is best for frames—white pine, poplar, cherry, well-seasoned red gum, walnut, mahogany, maple, fine-grained oak. Maple is good for grey effects. Mahogany is good where it can be stained brown to harmonise properly. Gum and walnut may be left natural or stained to a darker brown. The cheaper woods can be enamelled the proper shade.

In case one is attempting to refinish a moulding to more closely harmonise with the picture, use artists' oil colours, of a proper shade or mixture to tone the original colour to the proper shade. Thin the colour slightly and rub on the wood with a soft cloth until the desired shade is obtained. If the moulding has never been finished, the artists' colours may be mixed to the proper colour, and thinned with turpentine and used for the entire stain, or some prepared oil stain may be used, if the proper colour can be found. For tinted photographs the ordinary gold bronze may be used alone, or toned to harmonise with the predominating colour, as mentioned above. This is done by first staining the wood with the oil colours, and then, when nearly dry, rubbing the dry gold bronze into the colour, letting just a trace of the colour show through. Aluminium bronze may be used in this way for cool, grey effects. On some pictures a frame made of open-grained wood may be used, stained to the proper colour and then neutralised by rubbing a white filler into the open grain. The final finish on any frame should be flat or rubbed dull, never glossy. Wax is an appropriate finish.

When the frame is finished, the next thing is to put in the picture. Cut the glass and backing to fit the frame accurately, and then make sure the glass is clean. Use glass that is clear in colour and free from air bubbles or noticeable waves. Place the glass, picture and backing in the frame and fasten in securely with brads, laying them flat on the backing to start them. Then make the frame dust-proof by covering the back with a heavy piece of wrapping paper. Dampen one side of the paper with a moist cloth, and spread a thin layer of glue over the back of the moulding. Lay the paper on the moulding wet side up, press firmly to the moulding and stretch toward the outside of the frame until the wrinkles are practically gone and the paper seems quite taut. Let it dry and trim the edges of the paper that project over the edge of the frame.

Place screw-eyes not more than 2 in. from the top of the frame, as the picture should hang as flat as possible. If the picture is at all large, two wires should be used, each running vertically from the frame to the picture moulding of the room. The triangular space made by a single wire running to the ceiling and down to the other side of the frame is not in keeping with the vertical lines of the room. The wall on which the picture is to be hung should be considered as a complete composition, and the picture so hung that the space is well balanced.

GILMAN LANE.

HALF WATT LAMPS IN FILM STUDIO LIGHTING.

(A communication from the General Electric Co.)

THE gas filled metallic filament lamp is rapidly growing in favour as an illuminant for portrait studio lighting, but its use in the production of cinematograph films has not been developed to the extent which it deserves. An account of some experiments in

Fig. 1.

this direction recently made with Osram gas filled lamps in the studios of Messrs. Holams, Ltd., may be of interest.

The orthochromatism of modern films, by which colours are given their true relative tone values when exposed in daylight, is of little advantage when the exposure is made under arc lamps owing to the predominance of blue and blue violet rays in these lamps. In the gas filled lamp, however, the photographer has a light source rich in red, orange, and yellow rays. The resultant light is therefore a much closer approximation to daylight, and the images on standard orthochromatic film are also more colour true.

In the tests mentioned above, a large number of models and colour schemes were photographed, and it was found that it was necessary for the artistes to use little or no make up other than that necessary for special character effects.

The illustrations reproduced herewith are sections of films of the same scene taken on the same day under exactly identical

conditions, the one under arc lamps and the other under the light from Osram gas-filled lamps. The colour scheme was purposely made as rich and comprehensive as possible so as to present a really difficult subject. The background consisted of three panels—in the centre, an Indian rug having a warm pattern of red, yellow, green and blue. The side panels were of rose red velvet and black and yellow striped silk respectively. The sitter was also a somewhat difficult subject, being fair with light brown hair and blue grey eyes. Her dress was of natural shantung with navy-blue collar and cuffs.

Fig. 1 was taken with 12 enclosed arc lamps taking 15 amperes each at 200 volts, a total of 36 kilowatts.

Fig. 2 was taken immediately afterward with 16 1,500-watt Osram gas filled lamps in G.E.C. studio reflectors, and consuming in all 24 kilowatts.

The improved colour rendering in fig. 2 is obvious.

The results of these experiments tend to show that the gas-filled lamp is worthy to play a much larger part in film production than hitherto from the point of view of film-quality alone. They have, however, many other inherent advantages.

They are very light and easily handled so that replacements can be made quickly. Moreover, the absence of complicated

Fig. 2.

mechanism makes for simplicity of operation and low cost of supervision and maintenance. A very small staff of electricians would be needed for the largest installation.

Gas-filled lamps are obtainable for all standard voltages, and are suitable for both alternating and direct-current circuits. No energy, therefore, is wasted in resistances and no expensive converters are necessary.

Other valuable features are that the quality of the light does not vary appreciably throughout the life of the lamp, reaches its full value immediately the lamp is switched on, and is perfectly steady.

Finally, the question may arise as to the dazzling effect of the intensely brilliant gas-filled lamps, but if these are installed with large white reflectors behind and suitable diffusers in front the glare is not any greater than that of the usual arrangement of arc lamps, and, moreover, it is probably more bearable on account of its steadiness.

TYPEWRITING FOR PHOTOGRAPHIC REPRODUCTION.—In making duplicate copies of manuscripts having inset illustrations, or in reproducing specifications, the blue-print process is often the most convenient. To letter a considerable quantity of text is tedious (says "Popular Mechanics"), and, if properly done on a typewriter, the result will be more satisfactory. Tracing cloth, or tracing paper, preferably of the unglazed onion-skin variety, may be used. In writing the text on the typewriter, reverse a piece of carbon paper under the tracing paper, so that the impression is made on both sides of the sheet. This will give density, and make the blue-prints sharp. If white grounds with dark lines are desired, a new sheet of carbon paper should be used, and this taken as the negative in making the prints. Bromide or gaslight paper may, of course, be used in place of the ferroprussiate paper.

Exhibitions.

X-RAY PHOTOGRAPHS AT THE ROYAL PHOTOGRAPHIC SOCIETY.

AN important exhibition of X-ray photographs has just been opened at the House of the Royal Photographic Society, 35, Russell Square, W.C., under the auspices of the Röntgen Society. Comprising upwards of 250 prints it includes a number of examples from French workers. The French prints arrived by special aeroplane from Paris only on the day prior to the opening of the exhibition, and for this reason it was not possible to include the details in the official catalogue, but where available short descriptive notes are attached to the prints. Of especial interest in this section is the work of the late Dr. C. Infroit, of the Hospice de la Salpêtrière, Paris. It will be remembered that this worker died recently, a martyr to science. Drs. Vignal, Haret and Contremontez have sent very striking examples of their radiographic work, and interesting examples of metal radiography have been contributed by the firm of Giaffe-Gallot and Pilon.

Among notable examples of work contributed by radiographers in our own country is a fine series of prints illustrating various abnormalities of the vermiform appendix, by Dr. C. Thurstan Holland, and the Cancer Hospital is represented by some good technical prints, noteworthy being a record of the progress of opaque meals.

The wide application of radiography is demonstrated by the prints of paintings shown by Dr. A. Chèron and the Sunic Research Laboratory; as is widely known nowadays, fraud is readily detected and curiosities brought to light by its use.

Undoubtedly of historic interest are the photographs of the hands of celebrities taken in the early days of X-ray photography (1896) by A. Campbell Swinton, Esq. The hands shown here are those of Lord Salisbury, Sir William Crookes, Lord Armstrong, Lord Kelvin and the Rt. Hon. A. J. Balfour, O.M.

Dr. Salmond, joint honorary secretary of the Röntgen Society, is represented by work of good technical quality, and radiographers will be particularly interested in the comparative results obtained with the new Impex plates and the ordinary X-ray plates by Dr. G. H. Rodman, the President of the Royal Photographic Society. The increased rapidity secured by the Impex plates is clearly indicated.

A series of plates taken under the difficulties of war and with a portable apparatus by Miss Phyllis Berry and Miss Collum, of the Scottish Women's Hospital, France, illustrates some of the war-time applications of the X-ray.

The exhibition generally is one of very considerable technical excellence, and a distinct advance over anything previously seen. The hanging of the work of radiographers in this country alongside that of workers in other countries demonstrates the advantage of different methods of procedure, and should serve to help technique in the future. Perhaps the best evidence of this is seen in a series of sets of four prints produced by lay workers employed either in the radiographic departments of hospitals or acting as assistants to qualified radiographers.

A competition for prizes offered by Dr. R. Knox, President of the Röntgen Society, has undoubtedly helped in popularising this exhibition, and generally the entries are of a high standard. The work of Mr. Suggars, of the London Hospital, was the best, in the opinion of the judge, and it was closely followed by that of Mr. A. O. Forder, of King's College Hospital.

The exhibition will remain open daily during the whole of June (Sundays excepted), from 11 a.m. to 5 p.m., admission free, and should certainly not be missed by anyone interested in radiography

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FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Particulars from the Secretary, Royal Photographic Society, 35, Russell Square, London, W.C.1.

Patent News.

Applications, May 23 to 28 :—

DAYLIGHT LOADING.—No. 14,596. Combined daylight-loading roll-film or plate-holder for photographic cameras. J. W. Willans.

COMBINATION PHOTOGRAPHS.—No. 14,572. Method of producing combination photographic pictures. W. H. Pearse.

CAMERAS.—No. 14,796. Photographic cameras. E. G. Hughes.

PAPERS.—No. 14,549. Means for manufacture of photographic papers. J. W. Davies.

FERROTYPE PLATES.—No. 14,823. Holding and lifting ferrotype photographic plates. G. P. Usher.

STEREOSCOPY.—No. 14,827. Method of producing increased speed and stereoscopic or relief effect in photographic plates or films. F. W. Daniels.

CINEMATOGRAPHY.—No. 14,477. Cinematograph films. W. Ayer.

CINEMATOGRAPHY.—No. 14,420. Cinematographic cameras. J. B. Barton and Sir O. Stoll.

CINEMATOGRAPHY.—No. 14,421. Cinematographic projectors. J. B. Barton and Sir O. Stoll.

CINEMATOGRAPHY.—No. 14,732. Means for taking, printing and projecting films. J. V. Davies.

CINEMATOGRAPHS.—No. 14,832. Cinematographs. Educational Film Co.

X-RAY APPARATUS.—No. 14,563. X ray apparatus. General Electric Co.

FRAMES.—No. 14,894.—Photograph frames. J. Glover.

CINEMATOGRAPHY.—No. 14,280. Cinematograph film feed and take-up sprockets. A. Kur.

REPRODUCTION METHOD.—No. 14,341. Photographic reproduction of pictures represented on curved surfaces. G. von Lücken.

PHOTOGRAPHIC RECORDS.—No. 14,631. Photo-recording tachymeters. F. Rived.

CINEMATOGRAPHY.—No. 14,533. Cinematograph machines for advertising. W. E. G. Smithers.

STEREOSCOPIC CINEMATOGRAPHY.—No. 14,293 (or 14,239). Stereoscopic shutter for cinematograph projector. H. P. Tucker and W. Waugh.

CINEMATOGRAPHY.—No. 14,463. Cinematography. C. H. Verity.

CINEMATOGRAPHS.—No. 14,832. Cinematographs. G. C. A. and M. J. G. da Vrière de Lodi.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

TRIPLET LENSES.—No. 161,091 (June 5, 1920). The invention relates to objectives primarily for use in photography, and has for its subject an objective by means of which a sharp image will be produced. The objective is composed of a small number of lenses and is designed to give a plastic image, focally correct. According to the invention the objective is composed of three separate lenses, which are separated one from another by air-gaps and arranged in the form of two lens systems. The concave surfaces of the lenses in contact with the air-gaps are directed towards the diaphragm, which is disposed between the two lens systems. One lens consists of a convex-concave dispersive lens and of a concavo-convex collecting lens separated one from another by an air gap and having their concave surfaces turned towards the diaphragm. The second lens system is composed of a biconcave lens and of a biconvex lens cemented together along a collecting surface.

In order to obtain a sharp image, a large picture-field with anastigmatic flattening of the field, efficient orthoscopy, reductions of the spherical and chromatic aberrations and consequently a focally correct plastic image, and in order to permit of the use of three different focal lengths in a single objective the convex-concave dispersive lens has a greater thickness at the centre than the biconcave lens, whilst each of the two systems, separated by the diaphragm, has a collecting effect. An objective of this very simple construction has, with the glass types at present obtainable, a small residuum error of chromatic magnification, which is, however, not disturbing if the objective is used for amateur purposes. If the objective is designed to be used for high-grade technical purposes the error is avoided by forming the convex-concave dispersive lens of a positive lens and of a negative lens cemented together. The types of glass used are chosen so that the positive lens possesses less dispersive power than the negative lens. The refractive indices may either be the same or different according to the purpose in view.

The construction of the objective thus constructed may be modified according to requirements and according to the purpose for which it is to be used. The type of glass, the radii and the thicknesses may be varied as required.

Three forms of construction are described by way of example in the accompanying drawings. Each form serves a different purpose.

Similar reference letters designate similar parts in all figures. The diaphragm is indicated by the line B—B. In Fig. 1, L_1 is

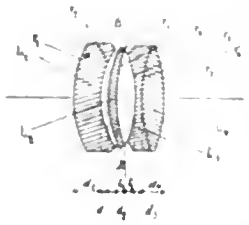


Fig. 1.

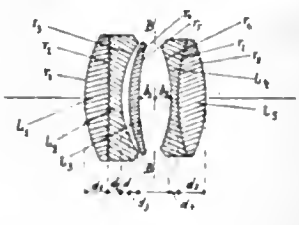


Fig. 2.

the convex-concave dispersive lens and L_2 the concavo-convex collecting lens. L_3 is the biconcave lens and L_4 the biconvex lens. The curved surfaces of the lenses are indicated by r_1, r_2 and so forth, whilst d_1, d_2 . . . . . are their thicknesses, and b_1, b_2 indicate the widths of the air gaps between the lenses. The types of glass of the various lenses are given by the refractive index n_D for the D line of Fraunhofer spectrum, n_G^1 being the refractive index for the G' line of the same spectrum.

In this form of construction the objective is designed for a focal length of 300 mm. The free aperture is 43 mm., the ratio of aperture to the focal length being consequently 1 : 7. The angle of view is greater than 90 deg. This is the simplest form of construction, as the objective is only composed of four single lens elements. The two lens systems of the objective, separated by the diaphragm, have a positive focal length, the front system having the longer focal length. The following particulars apply to an objective having a focal length of 100 mm. :—

Radii of curved surfaces.		Thicknesses and air-gaps.	
r_1	= 16.03 mm.	d_1	= 3.799 mm.
r_2	= 11.62 mm.	d	= 0.534 mm.
r_3	= 15.36 mm.	d_1	= 1.202 mm.
r_4	= 21.76 mm.	$b_1 = b_2$	= 1.336 mm.
r_5	= 17.36 mm.	d_3	= 0.801 mm.
r_6	= 20.03 mm.	d_4	= 2.871 mm.
r_7	= 18.03 mm.		

Glass types.

$L_1 = L_2$	n_D 1.53980	n_G^1	= 1.55159
$L_3 = L_4$	n_D 1.62070	n_G^1	= 1.63463

In Figs 2 and 3 the collecting lens of less dispersion than that shown in the foregoing example is indicated by L_1, L_2 being the dispersive lens of greater dispersion cemented to L_1. The concavo-convex collecting lens is indicated by L_3, L_4 being the biconcave dispersive lens and L_5 the biconvex collecting lens.

In Fig. 2 the objective is designed for a focal length of 300 mm. The free aperture is 50 mm., the ratio of aperture to focal length being consequently 1 : 6. The angle of view is 90 deg. The objective consists of five lens elements, the convex-concave dispersive lens being composed of the lens L_1 and of the lens L_2, which are connected together along a plane surface. The glass types for L_1 and for L_2 have for D approximately the same refractive index, but the dispersions are different. The front lens system of the objective possesses the larger focal length.

The following particulars apply to an objective having a focal length of 100 mm. :—

Radii of curved surfaces.	Thicknesses and air gaps.
$r_1 = +18.02$ mm.	$d_1 = 3.37$ mm.
$r_2 =$ plane	$d_2 = 1.42$ mm.
$r_3 = +12.91$ mm.	$d = 0.72$ mm.
$r_4 = +18.14$ mm.	$d_3 = 1.30$ mm.
$r_5 = -29.64$ mm.	$b_1 = b_2 = 2.02$ mm.
$r_6 = -17.25$ mm.	$d_4 = 0.94$ mm.
$r_7 = +25.61$ mm	$d_5 = 3.34$ mm.
$r_8 = -18.53$ mm.	

Glass types :

L_1 : $n_D = 1.57190$	$n_G{}^1$	$= 1.58460$
L_2 : $n_D = 1.57180$	$n_G{}^1$	$= 1.58643$
$L_3 = L_5$: $n_D = 1.61650$	$n_G{}^1$	$= 1.63113$
L_4 : $n_D = 1.54440$	$n_G{}^1$	$= 1.55971$

In Fig. 3 the objective has a focal length of 300 mm. The free aperture is 60 mm. The ratio of aperture to the focal length is therefore 1 : 5. The angle of view is 80 deg.. The convex-concave dispersive lens is composed of the lens L, and of the

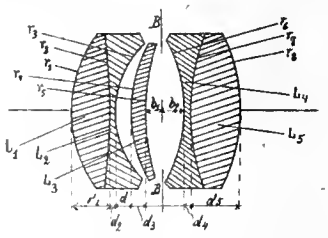


Fig. 3

lens L_2, which have different refractive indices as well as different dispersions. The front lens system has a smaller focal length than the rear lens system (L_4, L_5). An objective of a focal length of 100 mm. has the following dimensions :—

Radii of the curved surfaces.	Thicknesses and air-gaps.
$r_1 = +16.92$ mm.	$d_1 = 4.98$ mm.
$r_2 = -54.76$ mm.	$d_2 = 1.00$ mm.
$r_3 = +12.30$ mm.	$d = 1.80$ mm.
$r_4 = +18.92$ mm.	$d_3 = 1.98$ mm.
$r_5 = +29.87$ mm.	$b_1 = b_2 = 2.49$ mm.
$r_6 = -18.92$ mm.	$d_4 = 1.00$ mm.
$r_7 = +29.87$ mm.	$d_5 = 6.96$ mm.
$r_8 = -22.90$ mm.	

Glass types :

L_1 : $n_D = 1.61140$	$n_G{}^1$	$= 1.62503$
L_2 : $n_D = 1.55540$	$n_G{}^1$	$= 1.57036$
L_3 : $n_D = 1.53080$	$n_G{}^1$	$= 1.54244$
L_4 : $n_D = 1.53680$	$n_G{}^1$	$= 1.55503$
L_5 : $n_D = 1.61290$	$n_G{}^1$	$= 1.62678$

—Paul Rudolph, Grün, nr. Lengenfeld, Vogtland, Germany.

Background Stands.—No. 160,539 (December 20, 1919). Background apparatus for studio portraiture comprises several backgrounds carried by rollers a, Figs. 1 and 2, which are mounted

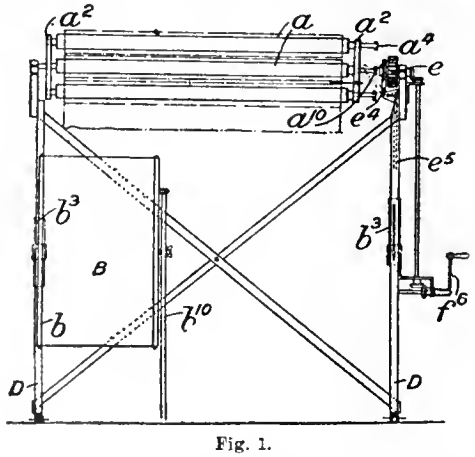


Fig. 1.

on a rotating holder a^2 and normally prevented from unrolling by springs a^5, Fig. 4. The holder a^2 is rotated by bevel-gearing from the handle f^6 through a gear-wheel a^{10} and pinion wheel e on a countershaft E. When the required background is brought into position in alignment with the countershaft E, the wheel e can be moved along the countershaft by a depending handle e^5 and crank-arm e^4, disengaged from the gear a^{10} and engaged with the projecting end a^4 of the selected roller, and the background unrolled from the same handle f^6. The ends of the rollers a may alternatively carry bevel gears, and a chain or pulley gearing

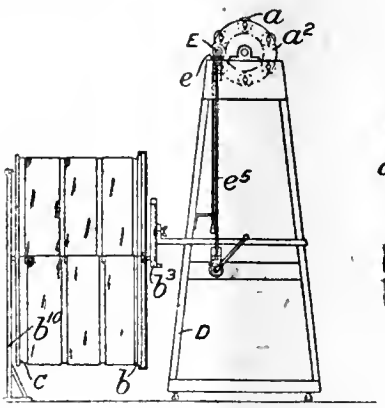


Fig. 2.

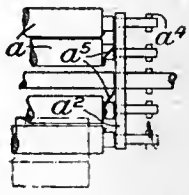


Fig. 4.

substituted for the bevel-gearing, provision being made for the countershaft E to engage recesses in the holder a^2. Reflecting or diffusing screens B, C on spring rollers b are mounted between a frame b^{10} and a bracket b^3, secured to the background frame D. Provision is made for a vertical and angular adjustment of the reflector or diffusing-screen.—J. H. Greenwood, 33, North Valley Road, Colne, Lancs.

The following complete specifications are open to public inspection before acceptance :—

Cinematography.—No. 163,676. Optical device for compensating the movement of the film in cinematograph apparatus. Petra Akt.-Ges. für Elektromechanik.

Cinematography.—No. 163,677. Film guiding for the optical compensation of the movement of the film in cinematographs. Petra Akt.-Ges. für Elektromechanik.

Cinematography.—No. 163,678. Optical compensation of the motion of the film in cinematographs. Petra Akt.-Ges. für Elektromechanik.

Projection Apparatus.—No. 163,687. Projection apparatus. L. Marzocchi.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Wellington (Child Design).—No. 412,402. Photographic plates, films and chemicals. Wellington and Ward, Shenley Road, Boreham Wood, Elstree, Hertfordshire, manufacturers. February 11, 1921.

Eclipse.—No. 413,813. Photographic plates and photographic films. The Imperial Dry Plate Co., Ltd., Ashford Road, Cricklewood, London, N.W.2, manufacturers of photographic materials.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register :—

Ufag.—No. 383,896. Sensitised films for photography. Universum-Film Aktiengesellschaft, Unter den Linden, 56, Berlin, Germany, manufacturers.

Mr. Pirie Macdonald, of New York, who was invited by the Edinburgh Society of Professional Photographers to a luncheon, has written to the President (Mr. E. D. Young) regretting his inability to accept the invitation, as his visit to Edinburgh has been cancelled.

New Books.

The Film Industry. By Davidson Boughey. London: Sir Isaac Pitman. 3s. net.

THERE is, no doubt, a large section of the public which is interested in being behind the scenes in the production of cinema films. Mr. Boughey has written a little book which gives a popular account of the industry from start to finish, and which makes clear, with the aid of a large number of illustrations, the many different types of appliance, from camera to projector, which are concerned in the exhibitions in the cinema theatres. He steers a reasonable midway course between too highly technical details and that kind of loose description which does not in fact convey anything to the reader. Statistics crop up constantly in his pages. It is a common trait of the cinematograph industry to measure success in thousands of feet or hundreds of thousands of dollars, and that is perhaps inevitable in an industry which has very quickly accumulated great wealth by marketing an output, much of which is of very mediocre quality. Nevertheless, it is interesting to note the estimate of the number of cinema theatres in the world, namely, about 87,000, requiring 1,500 million feet of film per week for performances. In the United Kingdom it is estimated that over 200,000 people are employed in the cinematograph industry, as compared with just over 1,000 in the period 1904-5. Probably few industries can exhibit such an extraordinarily rapid development. Mr. Boughey's eleven chapters provide a clear bird's-eye view of it as regards both the manufacturing and commercial sides.

Radiographic Technique. By T. Thorne Baker. London: Constable. 15s. net.

BETWEEN the doctors who know little about electricity and next to nothing about photography, and the electricians who talk none too intelligibly on electrical matters, the literature of X-ray work has fared rather badly from the standpoint of the growing number of people who wish to make themselves proficient in the technique of producing creditable X-ray photographs. During the last few years there have been some notably good additions to text books on radiography, but perhaps too comprehensive for the purposes of the radiographic operator. By confining his field within the scope of the facts which the user of an X-ray installation requires to know, Mr. Thorne Baker has consulted the needs of the practical radiographer. The first chapter of his volume brings within a small compass the description of the average X-ray outfit; the remaining part of the book is devoted to what may be termed X-ray technique, namely, the exposure and development of plates, the use of intensifier screens, visual examination with a screen and the photographic methods of developing and printing. Although these may seem superfluous to readers of the present notice, they are, in fact, of the greatest necessity to many operators in charge of X-ray installations, for the want of knowledge of photographic methods exhibited by many of these latter is a source of constant astonishment to those who would naturally assume a fairly close acquaintance with ordinary photographic practice. In later chapters Mr. Thorne Baker deals with commercial and industrial applications of X-rays, and his text book includes also working photographic formulæ and recommendations for protection of operators from the rays and from high-tension shock.

A Dictionary of Chemical Terms. By James F. Couch. New York: D. Van Nostrand Co. 2 dollars 50

MODERN chemical language has now such a specialised vocabulary of its own that the author of this compilation has performed a useful task in providing the means of quickly ascertaining the significance of the terms and contractions in current use by chemists. The volume is for the professional chemist or student, but a large proportion of the definitions which are included in it may be considered to be reasonably intelligible to those who are strangers among chemical literature and are trying to puzzle out the meaning of some chemical paper which is beyond their knowledge. Apparently Mr. Couch has deliberately restricted his field to pure chemistry; chemical technology or manufacture appears to be very slightly represented in it. And a fairly close inspection of his pages has disclosed to us only one photographic term, and that, one which we have never heard. On page 10 "Amasthenic" (= amacratic) is stated to be the name of a form of lens which focusses the actinic rays. If we may make any criticism of a work which we think has been most excellently conceived and carried out, it is that the terms of bio-chemistry get rather more than their due share in the dictionary. Perhaps that has resulted from an unconscious bias on the part of the author, who is chemist in the Bureau of Animal Industry of the United States Department of Agriculture. But we think the compilation would benefit by more ample consideration of, for example, the terms for physical phenomena and units with which chemists have to deal. The entry under "Density" might refer to the optical significance of this term, and in the paragraph on "Calorie," which evidently aims at being comprehensive, there might, with advantage, be a mention of the gross and net calorific values, according to inclusion or otherwise of the latent heat of steam, much used in the calorific measurements of fuels. However, when so much has been done with evident care and capacity, it is perhaps an injustice to the book to single out such instances as the above. We must express our opinion that the volume is one which every chemist and student of chemistry will constantly find of the utmost usefulness.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, JUNE 12.

South London Phot. Soc. Excursion to Dorking.
Hammersmith (Hampshire House) P.S. Outing to Windsor.

TUESDAY, JUNE 14.

Scottish C.W.S.C.C. (Glasgow). "Home Portraiture."
Hackney Phot. Soc. "Beginners' Difficulties."
Manchester Amateur Phot. Soc. "Methods of Producing Diffusion as Applied to Portraiture and Landscape." Francis Fielding.

THURSDAY, JUNE 16.

Glasgow and West of Scotland. Excursion to Cadder.

FRIDAY, JUNE 17.

R.P.S. Pictorial Group. "Foregrounds." J. C. Warburg.

SATURDAY, JUNE 18.

Scottish C.W.S.S. (Glasgow). Outing to Blanefield.
Bradford Phot. Soc. Excursion to York.
Manchester Amateur Phot. Soc. Ramble to Prestbury Village.

ROYAL PHOTOGRAPHIC SOCIETY.

At the meeting of the Pictorial Group of the Royal Photographic Society on Friday evening last, Mr. Marcus Adams opened a discussion on "The Eyes in Portraiture." The subject was found so exciting and varied that its further consideration was adjourned to a later date when it was understood such problems would be dealt with as the comparative value of the panchromatic plate in the rendering of the eyes.

Mr. Adams's remarks were mainly a criticism of painters, particularly the exhibitors at this year's Academy, who, he said, had lost, or had never possessed, the faculty of representing the soul in these features. In some of the portraits at present at Burlington House Mr. Adams thought that compasses must have been used to draw the face. As a result of a recent study of eyes, which had occasionally caused him some embarrassing moments, Mr. Adams brought forward certain dicta. Eyes were as various in shape and colour and expression as the flowers of the field. They betrayed character to an astonishing degree. Although silent, they had a good habit of telling the truth even when their owner attempted to lie. Intuitively through his eyes a person often sympathetically denoted his heart felt feelings when words were too harsh or crude for delicate emotion. Eyes, through the mind, had the power to hypnotise or capture another. Although actually the eyeball was always round, the setting of these orbs within it was very different, and it was the relative position of the pupil which gave expression. The size of the pupil was governed by the amount of light shining in, and the question for the portraitist was as to which size of pupil was most attractive.

Finally, the creases around the eyes were of immense value in portraiture, although often obliterated by an ignorant retoucher. The painter, said Mr. Adams, had everything in his favour, while the photographer was hampered by a crude mechanical process, which gave him only shape, tone values, and light and shade. Yet the photographer excelled the painter in the delineation of the eyes, and he believed that the sculptor, who had more difficulties than either, excelled both; he instanced particularly Rodin. One piece of sculpture in the Academy, the subject being the Prime Minister was specially worthy of study from this point of view.

Mr. C. P. Crowther, who was in the chair, said that it was his observation that the eye contracted very considerably under the illumination of the half-watt lamp of 3,000 c.p., and in order to avoid such excessive contraction he followed Mr. Luboshez's plan of asking sitters to look on the ground or to close the eyes for a little time before he exposed. He also mentioned that in Japan until recently it was the invariable custom to cut out the high-light in the eye. People could not tolerate an eye which had a little white speck in it, with the result that Japanese portraits were so commonly lifeless and glassy.

Mr. A. C. Banfield found it necessary in taking head and shoulders with certain portrait lenses to get at least eight feet away from the subject, in order to avoid actual squint. With regard to the most appropriate size of pupil, he was of opinion, to express it in terms of photographic optics, that if the full aperture were taken as *f*/4.5, the best effect was obtained by letting the pupil close down to the equivalent of about *f*/8. He agreed with the unpleasing effect of the pin-point pupil.

Mr. W. B. Ferguson had observed that the contraction of the pupil in the case of strong lights depended on the actual intensity of the light seen, and not on the total amount of the light. The pupil of the eye under diffused light was much larger than under concentrated light, although the total illumination in each case seemed about the same.

Among other speakers, Dr. G. H. Rodman thought that the practice of looking on the ground was really carried out by Mr. Luboshez, not with the object of securing a larger pupil, but to avoid the picture stare. Mr. T. H. B. Scott was eloquent as to the value of the delineation of the "countryside" all round the eyeball, and Mr. Bertram Cox thought that in addition to the contraction of the pupil a good deal depended on the contraction of the eyelids over the eyeball in getting the maximum of expression. Miss Olive Edis appeared as an advocate of daylight for effective rendering of the eyes. She did not believe that "old Sol" was beaten by an arc lamp. So far as the value of snapshot expressions went, she had got more natural expressions with long exposures—best of all when giving two or three minutes' exposure with the Autochrome plate. Other ladies who took part in the discussion deplored the common habit on the part of sitters to look up, which gave an exaggerated expression in a photograph, and also asked what should be done when the two eyes were looking in different directions.

Mr. Adams said that mothers often asked him to take children looking up, and though he did it, he knew it would be a failure. He was doubtful of Mr. Crowther's plan of looking down or closing the eyes just before exposure in order to prevent excessive contraction of the pupil, for the contraction was immediate, and would occur before exposure could be completed. Two eyes which looked in different directions were, especially in the case of children, difficult to deal with. The thing to do was first to get one eye fixed, and then gradually attract the other by means of something held in the hand until an approximately harmonious relation was secured; he added that a person who wore glasses should be portrayed as wearing them, because they were part of his personality. To return to the Academy—which was a sore point with Mr. Adams—he mentioned some of the pictures in which the delineation of the eyes was far from being successful—perhaps it would be cruel to name them in print—and added that he could not find a single example of the old triangular wedge of high-light in the eye; the shape of the high-light was either square or oblong or a band right across the pupil.

It was promised that when the discussion is resumed the case of the eye which follows the observer in every direction from which he may look at the picture will be explored to its sinister depths.

CROYDON CAMERA CLUB.

A print display last week concluded a highly successful session, the informal one, preferred by many, now beginning. The president, Mr. John Keane, and the honorary secretary, Mr. J. M. Sellors, despite sparo time being at a premium with both, still find time to run the club between them, and the trusty councillors, rarely called to conclave, bask in that sweet content which in these up-to-date times is ever derived from the knowledge of work escaped.

In order to persuade the new recruits to contribute, Mr. Sellors had laid stress on the fact that the print display was not intended to be an "exhibition." Paradoxically, the print display avoided making an exhibition of itself by forming a very excellent one, the best on the walls for years, a scientific section, due to Mr. Hibbert, adding materially to the interest.

In the absence of a detailed review it would be unjust to particularise, but an exception can be made in the case of Mr. Purkis, whose pictorial aspirations had hitherto been unsuspected. His one little "ewe-lamb" depicted a mendicant armed with a most horrible squint, surrounded by a countenance apparently ravaged by every known form of repulsive skin disease. Doubtless due to circumstances beyond control, something had played havoc with the photographic part of the picture, and undisguised and heavy handwork put a finishing touch to a thing the like of which has never been seen before, and it is hoped never will be seen again.

In honour of Derby Day a brass band stationed below played Old English airs in style, which if it had been a trifle nearer would have secured liquid refreshment from above. Criticism of the pictures, and many tributes to the secretary for the past fixture list terminated the proceedings.

Commercial & Legal Intelligence.

NEW COMPANIES.

F. Darton and Co., Ltd.—This private company was registered on May 27, with a capital of £1,000 in £1 shares. Objects: To take over the business of a manufacturing optician and scientific instrument maker carried on by F. A. Darton at 142, St. John Street, Clerkenwell, E.C., as "F. Darton and Co." The first directors are: F. A. Darton, Clare Lodge, Snakes Lane, Woodford; O. Darton, Ivyhurst, Reigate. Registered office: 142, St. John Street, Clerkenwell, E.C.1.

Stanley Pearce, Ltd.—This private company was registered on May 27, with a capital of £200 in £1 shares. Objects: To take over the business of manufacturing optician and scientific instrument maker carried on at 161, Wardour Street, Soho, W., as "Stanley Pearce." The subscribers (each with one share) are: S. Mitchell, 73, Burford Gardens, Palmer's Green, N.13, accountant; L. Bull, 38, Edith Road, West Kensington, W.14, accountant. The first directors are not named. Registered office: 161, Wardour Street, Soho, W.

Bedesco, Ltd.—This private company was registered on June 1 with a capital of £2,000 in £1 shares (500 pref.). Objects: To carry on the business of manufacturers of camera holders, stands and all kinds of photographic accessories, etc. The subscribers (each with one ordinary share) are: Brig.-Gen. H. B. Shackleton, C.B., C.M.G., 7, Park Place, St. James's, S.W.1; W. C. Devereux, 4, Oxford Street, W., engineer. The first directors are: Brig.-Gen. H. B. Shackleton, C.B., C.M.G., W. C. Devereux, and R. R. Bishop. Qualification: £50. Remuneration as fixed by the company. Secretary: W. C. Devereux. Registered office: 35, Bucklersbury, E.C.4.

Pearl Films, Ltd.—This private company was registered on June 2 with a capital of £1,000 in £1 shares. Objects: To carry on the business of agents for and dealers in films, photographic, negatives and positives, photo-plays, scenarios, photographic instruments, material and products, etc. The subscribers (each with one share) are:—E. G. Tindsell, 40, Datchet Road, Catford, S.E., clerk; S. E. Collings, 118b, Mallinson Road, S.W.11, clerk; Miss E. Josephs, 196, Willesden Lane, N.W.2; B. W. Gould, 18, Cicely

Road, Rye Lane, Peckham, S.E., clerk. The subscribers are to appoint the first directors. No qualification required. Remuneration as fixed by company. Secretary: H. A. Mabbott. Registered office: 86 and 88, Wardour Street, W.

News and Notes.

THE RAJAR COMPANY'S "Trade Notes" for June deal with a new concentrated one-solution developer the company have just introduced.

MR. F. A. SWAINE, of 146, New Bond Street, London, W.1, had the honour of photographing H.I.H. the Crown Prince of Japan at a private sitting at the Japanese Embassy on May 28.

BALKAN PHOTOGRAPHS.—The Balkan News Photo Service has been formed to supply foreign papers, magazines, etc., with photographs illustrating current events in the Balkans. The address of the Service is Sdraveta Str 30 Podouene, Sofia, Bulgaria, and correspondence may be in English.

GRIFFIN'S NEW LISTS.—Messrs. John J. Griffin and Sons, Ltd. Kingsway, W.C.2, have issued a new abridged list of thirty-two pages describing their cameras and photographic sundries also "Pointers for Professionals," an illustrated leaflet detailing studio furniture and other things of particular interest to professional workers.

THE MOUNT EVEREST EXPEDITION.—Our readers will be interested to learn that Messrs. J. H. Dallmeyer, Ltd., of Carlton House, Regent Street, Piccadilly Circus, S.W.1, were recently commissioned by the Royal Geographical Society to supply photographic apparatus for the Mount Everest Expedition, which is being undertaken by the Royal Geographical Society and the Alpine Club.

THE R.P.S. FELLOWSHIP.—We learn from the current issue of the Royal Photographic Society's "Journal" that there were twenty-two applications for the Fellowship before the last Council meeting and that only six were elected, namely: Arthur C. Banfield, Archer Clarke, Joseph Goodman, Geoffrey I. Higson, W. Harold House, and Herbert Lambert. Sixteen rejections must surely be a record.

AN INSIDE OUTING.—The members of the South Suburban Photographic Society have arranged an "outing" under the leadership of Mr. Percy B. Dannatt, A.R.I.B.A., to one of the old city churches, the whole afternoon to be devoted to interior work. We understand that the members are particularly interested in the problem of halation and development, and that efforts will be made to settle the question, the windows of the church selected being particularly bad ones to photograph.

CONTINENTAL PENCILS.—"Owing to the low exchange there has been such an extraordinary amount of foreign orders that 75 per cent. of the output went abroad." This significant sentence (writes a correspondent) is from the annual report of the Faber Pencil Company, who include retouching pencils among their manufactures. Last year the company made a gross profit of 4,300,000 marks, from which, after writing off over two millions taxation and for other purposes, a dividend of 5 per cent. was paid compared with 10 the previous year.

PLANS TO PROTECT X RAY WORKERS.—Active steps are being taken with a view of protecting X ray workers in their dangerous occupation. A committee was formed a few days ago as the result of a meeting at the Royal Society of Medicine, to take stock of the present position of the X ray worker, and consider means for his protection. Radiological societies and hospitals, and a number of the principal institutes in London sent representatives, and we understand that a committee of ten was formed, with one of the leading consulting physicists at its head. A small sub-committee was appointed to draw up a scheme for future investigation.

FERROTYPE MATERIALS.—The well-known firm of Jonathan Fallowfield, 146, Charing Cross Road, London, W.C.2, which have for many years made a specialty of ferrotype cameras and materials, send us particulars of many things required for this popular branch of photography. Chief among the cameras are the "Aptos" and the "Shell," the former taking 2½ in. × 1¾-in. plates, and the latter 1-in. circular "buttons"; there are also the "Mandel" cameras, for "while you wait" postcards and buttons. A good stock of plates and postcards, stickyback mounts, frames, etc., required for working this branch of photography, is held by the firm, and we understand that supplies, once rather scarce, are now very plentiful.

AUSTRALIAN WAR PHOTOGRAPHS.—It is stated in the "Australasian Photo-Review" that in her collection of official battle photographs, Australia possesses a pictorial record of the war which equals that acquired by any of the other nations who participated in the conflict. Some idea of the comprehensive nature of the collection will be gained when it is stated that the number of negatives held by the Australian War Museum totals 20,000, in which are represented battle scenes taken during the fighting in every campaign in which the A.I.F. participated, views of devastated towns and villages in France and Belgium, photographs of training camps in England and elsewhere, and posed group photographs of nearly every A.I.F. unit. These photographs were taken on behalf of the Commonwealth Government during the war by official photographers, who included such men as Captains G. H. Wilkins, Frank Hurley, and Lieut. G. H. Baldwin. The Australian War Museum Committee has now completed arrangements for their sale throughout Australia, and any profit resulting from the sale will be devoted to memorial funds. Whole-plate sepia-toned bromides and coloured enlargements are offered.

GETTING THE "ATMOSPHERE."—A writer in the "Daily Chronicle" has been describing the work done in a film-producing studio, and a part of his account is of particular interest as it gives the film producer's method of getting the right "atmosphere." A picture of an infirmary is being taken, but the "look" on the faces of the nurses and others does not please the producer. "He walks away" (says the writer), "thinking, to the end of the studio and back. Suddenly, he says, 'Disinfectant please. I want some disinfectant thrown down here.'" Presently there is the sharp acrid reek of disinfectant in the studio. 'Good,' he says. He calls out, the girl comes in at the door of the ward. 'Good.' "shoot" that,' says the producer to the man at the camera. And the effect of that small dash of disinfectant is amazing. The emotions one saw in the faces are real. One can see like a blow the reaction that the impact of that sharp pervasive smell has on the actors as they come into the 'ward.' That little touch of realism has keyed the whole business up into an astonishing naturalness. The producer tells you that if one is to recreate real life, one must reproduce the conditions of real life as exactly as possible."

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

WOMEN PHOTOGRAPHERS

To the Editors.

GENTLEMEN,—Had those of your correspondents who have thought fit to criticise woman's work in photography been good debaters they would not have shown any spleen even had they possessed it.

It is ridiculous for "Onlooker" to say that "woman photographers are merely a passing fad of a fickle populace," and he would have your readers believe that we women operators are a modern invention, if not a product of the war, which you know is wrong. There have been women photographers for generations, and I remember as a child—now, alas! thirty-five years ago, and I am not afraid to say it—being photographed by a Miss Pugh, the daughter of Mr. W. Pugh, one of the pioneers of photography in East Anglia. Miss Pugh assisted her aged father, and I thought it very curious being photographed by a lady, and I did not feel very comfortable about it until my parents told me that ladies were quite as good as men with the camera, which proved in my

particular case to be true, for I never had a better portrait of myself.

Some time afterwards my father started a studio, he having always been interested in photography, and one of his treasures was a printed card of "Mottoes for Photographers." These mottoes—there were seven of them—were put together by Mr. O. G. Rejlander, and I always had the idea, as my father had, too, that Rejlander had women photgraphers in mind when he coined the first motto, viz., To an operator: "She who hesitates is lost." Otherwise why "she"? I cannot now remember all the mottoes, but those I do remember are: To a Printer: "Make hay while the sun shines." To a Toner: "Let not thy left hand know what thy right hand is doing." To a Spotter: "Keep within bounds," and to a Mounter: "Act on the square."

If your captious correspondents knew anything of the history of photography they would be acquainted with the fact that lady photographers—both amateur and professional—existed long before the war, and one day I hope to compile a list of what lady workers have done, such workers as Mrs. Francis Clarke, who twenty years ago won many medals, Mrs. H. Snowden Ward, Mrs. Cameron, Mrs. Welford, Miss Tomlinson, and many dozens of later workers whose names are household words to-day. There are also many lady workers whose names are not known, and only last summer on the beach of Bournemouth I watched a rather elderly lady doing really good professional work, and she was "old established." too, a fact, "Onlooker" may be surprised to hear.

Thanks to developing tanks and other modern conveniences photography is not the messy job it was in my father's time, and its simplicity to-day is an inducement for any lady to take it up.—Yours faithfully, ANNA STIGMAT.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

L. W.—We made inquiries some time ago and learnt that there are no restrictions whatever as regards photography in either France or Belgium.

G. B. A.—It is too early to say whether D.50 is free from any action on the skin, but we have learnt from Mr. Gear, who has been using it for some months, that he has not found any action of this kind.

W. J.—The microphotographs are, we believe, made exclusively in France, and we do not think that the magnifying glasses can be obtained here. The miniature photographs are made by the wet collodion process, which you would first have to master.

E. D.—The lens appears to be an old half-plate Instantograph lens, and the number (1887) badly scratched upon it is, in all probability, the date, while the initials C.W., also scratched, may be those of a one-time owner of it. The F numbers of the five stops are 14, 19, 23, 32, and 50, the US numbers of which may be said to be 12, 22, 33, 64, and 156 respectively.

T. P. W.—The ellipsoid system is quite a good one so long as you have a nice thin negative, but as the light is not very powerful, and as also it is further reduced by reflection, exposures are apt to be unduly long if the negative is at all dense; and also it is not possible to use some of the slower development papers which yield the best results as enlargements.

H. E. C.—We are inclined to think that the failure to get the right kind of grain is more likely to be due to variations in the quality of the benzole. As regards this, we advise obtaining the purest benzene. The different quality of the deposit, apart from grain, is no doubt caused by variations in the quality of the gums, but that is a rather difficult matter to ascertain, because these gums are very complicated substances chemically.

F. L.—The Cellerier-Parkes colour process (introduced about 1886) was a modification of the crystoleum process. A carbon transparency was developed upon a waxed sheet of glass, and on a sheet of paper was made a coloured sketch of the subject. The two—carbon transparency and sketch—were united, and the sketch, with the adhering carbon image, when dry, stripped from the glass. The results were said to be pretty enough, but to lack brightness.

L. D. S.—We must say that we know nothing about the business of photography on board ship. Do you suggest that merchant vessels carry a photographer? No doubt the large liners may do so, although we have not heard that they do, but we feel sure that such is not the case in the case of smaller vessels. Of course, a great deal of photography is done "on their own" by men in the Navy, who use their leisure time and opportunities profitably in this way. We may be ignorant of the existence of this business, but our opinion is that there are no opportunities such as you suggest.

P. R. C.—(1) It is difficult to say from the particulars you give what is the cause of the markings on the film. It appears to arise from the wash water in some way. Possibly your wash water is hard (chalky), and that would tend to cause such markings, particularly if any of the films were treated in an alum bath, or an alum fixing bath. If you constantly get the defect, we should advise giving the films a soak in a few changes of citric-acid solution after they have had, say, 20 minutes' washing, and, finally, a rinse in distilled water. This, perhaps, would show what is the most likely cause. (2) Mr. Stine's book on the Aerograph is not on sale in this country, but is published in the United States by the Abel Publishing Co., Caxton Building, Cleveland, Ohio.

M. T. B.—We cannot say, but the following cements for porcelain and metals, given in a recent issue of the "Scientific American Monthly," may be of service to you:—The first is composed of ground fluor spar, finely-powdered glass, and sodium silicate, commonly called water glass. The old standby, litharge, made into a paste with glycerine, is the second on the list. Another suggestion is a thick glue mixed with one-half part of boiled linseed oil. Another is zinc oxide, calcined magnesia, and sodium silicate in equal parts. This mixture should be dried slowly. Chalk or percipitated calcium carbonate and powdered zinc mixed in equal parts with sodium silicate is another formula. The final is 20 parts plaster of Paris, 50 parts of fine ground flint, and 30 of zinc oxide. This mixture is made into a thick paste with sodium silicate.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3189. Vol. LXVIII. FRIDAY, JUNE 17, 1921. Price Fourpence.

Contents.

SUMMARY.

MM. Lumière and Seyewetz contribute an important article dealing with their investigations on the subject of desensitisers by dye stuffs. The matter is discussed from both the theoretical and practical standpoints, and the conclusion arrived at, that for all-round work the dye originally suggested by Dr. Luppo-Cramer (phenosafranine) is the most efficient. (P. 351.)

In the second chapter on the H and D. doctrine, the so-called Law of Constant Density Ratios is explained as a preliminary to the exposition of the part played by exposure in the making of a negative which is a correct, but inverse, reproduction of the subject. This involves the meaning of the characteristic curve of a plate, and leads to the definition of the latitude of a plate and of latitude in exposure. (P. 354.)

A new method of simultaneous developing and fixing; a collection of 1,800 Autochromes of all sizes, from 7 × 5 ins. to 16 × 7 ins., made for advertisement purposes; stereoscopic projection, and several other matters of interest, are dealt with by M. L. P. Clerc in his "Paris Notes." (P. 359.)

With the constantly greater use made of enlargements in comparison with contact prints, it seems inevitable that the condenser enlarging lantern should give place to an enlarging apparatus providing completely diffused or scattered illumination of the negative and, for the sake of greater convenience and expedition in use, built upon a vertical plan. (P. 350.)

Flatness of the image in tank developed negatives during the hot weather is often the result of using the developer too warm, and it is sometimes advisable to cool the solution. (P. 350.)

It was stated at the Croydon Camera Club that the too blue hue which the greens occasionally require when a Paget screen-plate is used may be corrected by dyeing the positive a pale yellow, while in the case of a too yellow slide, a blue dye may effect a cure. (P. 361.)

A prime condition of permanence in prints is their greatest possible freedom from moisture. From this standpoint the recommendation sometimes made to use a final glycerine bath, in order to prevent curling of double-weight papers, is open to serious objection. (P. 349.)

In a note on the unnatural cloud effects often printed into landscapes, it is pointed out that in many cases a sky of suitable tonal quality, though destitute of clouds, is more in accordance with truth to nature. (P. 350.)

A collection of the early photographic apparatus used by Fox Talbot with some of his experiments will be shown to members of the Photographic Convention when they visit Lacock Abbey on July 8 next. (P. 363.)

EX-CATHEDRA.

Glycerine and Fading. With the increasing use of double-weight bromide papers there has been a temptation to revive the practice of giving a weak glycerine bath to prevent curling. In these circumstances it may be useful to call attention to the danger of inducing fading in bromide prints by keeping them in a damp condition. Bromide prints in our possession made nearly forty years ago are now in quite good condition because they have been kept in a perfectly dry place, while others, made only two or three years and kept on the dark-room shelves, where the atmosphere is always damp, have faded to a sickly yellow. A large collection of unmounted, plate-marked prints which had been treated with glycerine to ensure flatness faded almost to invisibility in a few years. If a demonstration of the hygroscopic qualities of gelatine be needed, we have only to observe the surface of a tray of hectograph composition, which is composed of gelatine and glycerine which has been left uncovered for twenty-four hours in damp weather. The surface is found to be covered with globules of water absorbed from the atmosphere. In a lesser degree this is what happens to the glycerine print, the dampness of which facilitates the action of the sulphurous vapours found in the atmosphere of all cities.

* * *

Fine Art Essentials. That the work of the portrait photographer should be based at the very least on a lively appreciation of what is fine art, is a dictum which every studious professional portraitist at once admits, while in the same breath lamenting that art entered in very small measure into the training which he or she received. Unfortunately, the opportunities, such as they are, for students to acquire a living knowledge of art principles, present themselves only to those undertaking a systematic course of training in the technique of one or other of the manual graphic arts, such as painting and drawing; and even to them the good fortune does not invariably come of having a teacher able to lead them in the different, though cognate, paths of art and technique. Thus, in photography especially, it happens that training in art is often a work of self-education undertaken after a certain technical competency has been achieved. It is, therefore, in accordance with the realities of his situation that the ambitious portrait photographer should seek aid in his own artistic development wherever he can find it; and on that account we cannot sufficiently emphasise the value of the series of lessons on "The Appreciation of the Fine Arts," which is an outcome of the more general course on principles of æsthetics, devised and arranged by Mr. F. C. Tilney and directed by him from 28, John Street, Bedford Row, London, W.C.2. After having perused those lessons, as they are issued to participants in the course, we are bound to recommend them warmly to those wishing to see things through an artist's eyes. And

it is this gift of perception which more than any other is needed to redeem photographic portraiture from the lack of character with which so largely it may be fairly charged. It is obvious that in the absence of a correct or sharp recognition of what is good in art, there cannot be the progress in portraiture which, technically, is within the reach of photographers. This course of lessons deserves well of photographers as a whole for the means it provides for stimulating their thoughts and methods.

* * *

Under-Exposed Negatives. Although it is generally recommended to destroy apparently hopelessly under-exposed negatives, it is sometimes necessary to take any amount of trouble to obtain a passable result from such plates or films. A plan which has been worked with success is to treat the negative as an opaque and not a transparent object; that is to say, to back it with white paper in an ordinary printing frame and to copy it in the camera, using a contrasty bromide paper instead of a plate. A process plate may be used, if desired, and will, of course, give a positive transparency from which a negative may be made by contact. An alternative method is to bleach the negative with mercuric chloride, back it with black velvet, and proceed as for an ordinary glass positive. In either case the negative must have the shadows cleared with a suitable reducer or the result will be too flat. Still another method is to fix the negative in a frame or clip and place a dead black background at a considerable distance behind it, then to illuminate the film obliquely by *transmitted* light. This method sometimes gives remarkable results from negatives which are too thin and flat to be amenable to any other procedure.

* * *

Cooling the Tank. During very hot weather various troubles, such as flatness of the image, softening of the film and over-development are likely to arise if the temperature of the solution in the developing tank is allowed to rise much above 70 deg. Fahr. It is, however, quite easy to cool the solution without removing it from its receptacle by sinking in it a bottle filled with broken ice and water, and leaving it until the necessary reduction of temperature is made. Care must be taken to keep the solution stirred, either with a stick or with the bottle itself. so that the cooling is not localised, and a thermometer should, of course, always be used The colder mixture of ice and salt has been recommended, but if this be used it is necessary that none of the solution escapes into the tank. Conversely, the developer may be warmed in winter by using hot water in the bottle instead of cold, but in this case it is necessary to use well-tempered glass or, better, stoneware, a ginger beer bottle answering very well. Metal cans or bottles may be used, but are liable to contaminate the solution unless quite free from rust or corrosion.

* * *

Clouds as they are. Those who visit modern photographic exhibitions with a view to an intelligent study of the work on view cannot do so without being forcibly struck with a lack of observation of effects seen in Nature on the part of prominent photographers. In this connection we refer to the introduction of clouds into landscapes, which is one of the points at which many workers go wrong. When introducing clouds into a photograph it is not only important that the clouds should be in keeping with the landscape portion of the picture with regard to lighting, but the scale of the individual clouds should also be in harmony. In many pictorial photographs that we have seen in the past this point has been altogether neglected; in one instance a single large cumulus cloud occupied the whole sky portion of the picture, while the rest of the composition included a very large area of distant landscape. Such an effect in Nature would never have been seen, and whatever value the picture might have gained from the Art point of view is therefore discounted. A fact that does not seem to strike many workers is that a sky need not necessarily contain clouds. Not that the sky portion of a print should be an expanse of white paper, but a sky of luminous tonal quality is often far more expressive of truth than is the over-assertive sky often introduced by photographers. Observation of Nature will readily prove that clouds do not pile themselves up in overpowering masses over a sunny landscape.

THE PASSING OF THE ENLARGING LANTERN.

PERHAPS the piece of photographic apparatus which has remained longest without basic alteration within the memory of the younger generation of photographers is the condenser lantern sold for the making of enlargements. We are speaking now of the optical principle of the appliance, not of its mechanical details. As regards the latter, manufacturers have certainly been unremitting in introducing various movements and fitments which contribute to the more convenient and expeditious employment of the apparatus. We have had rack and pinion adjustments of the negative in its stage in all directions, masking devices and the incorporation with the negative carrier of a line transparency for facility of focussing, to mention only a few of the ingenious contributions by those responsible for the design of enlarging lanterns. Nevertheless, it may well be thought that there is the occasion for a radical reconstruction of the type itself; and we believe that there are already signs that the somewhat cumbrous condenser lantern has had its day. We think that manufacturers would not greatly regret its departure, for enlargers, of this type, as currently made, are heavy and bulky pieces of apparatus and, despite their undoubted merits for their work and the relatively low prices at which they are sold, are not the easiest things for which a large demand can be created. From the point of view of the user of them, who usually is an amateur worker, they suffer from the drawback of taking up a great deal of space when enlarging is being done and, further, require a degree of correct adjustment of the light which is more than can be expected of a large proportion of the pampered amateur workers of the present day.

Professionals, we believe, largely "rig up" their own enlarging apparatus, composing it from some old pattern of field camera, and often using daylight as the source of illumination. Inasmuch as most professional negatives carry a considerable amount of retouching, the condenser enlarger, by reason of its emphasis of retouching marks in the enlargement, is not the best for the purpose; and daylight, with its merit of excellent diffusion and despite its drawback of constantly varying strength, is found to be more suitable. At the present time we are witnessing the introduction of enlarging apparatus differing from the typical condenser enlarger in two respects: (1) the use of highly-diffused or scattered light from an artificial source, instead of light concentrated along an optical path by the condenser, and (2) a vertical instead of a horizontal type of construction. In both these respects the advantage to the user, whether amateur or professional, is manifest. The system of illuminating the negative by diffused light minimises the emphasis of retouching marks in the enlargement, and also cuts out

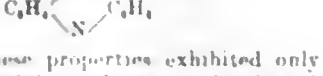
the necessity of making a suitable adjustment of the position of the light in correspondence with varying degree of enlargement. In this respect, therefore, the system serves, for different reasons, the needs of both amateur and professional. The diffusion of the artificial light, which can be gas or electric, may be done by reflection of the light from a matt white surface or by passage of the light through a scattering medium, such as opal; or, usually and most advantageously, by a combination of these two systems, the light or lights being contained in a box the inside of which is a matt white, whilst a screen of opal or ground glass is placed a short distance from the negative on the side towards the light. The diffusing screen thus receives the direct and reflected rays from the lamp, further diffusing or scattering the former in transmitting them to the negative.

As regards the build of the apparatus, again, both for amateur and professional purposes, the advantages of a vertical pattern are self-evident. The amateur must necessarily appreciate an enlarging apparatus which can stand ready for use and occupies very little floor space, whilst the professional has also occasion to value the more rapid operation of a vertical apparatus, which obviously could be made to produce enlargements almost as expeditiously as the present printing boxes produce prints. The name given to the vertical self-focussing enlarging apparatus by the Kodak Company, namely, "Projection Printer," does, in fact, foreshadow the possibilities—or we should say, practicabilities—of rendering enlarging as rapid a process as printing. We had some notes a few weeks ago on enlarging from this standpoint; and in returning to the topic, as we have done in the present article, we are seeking to show that the making of enlarging as universal a process as printing now is, depends upon a thorough revision of existing enlarging apparatus, and particularly the condenser enlarger. At present manufacturers have shown very little evidence in the shape of goods on the market of having taken this modern view of the enlarging process. There are plenty of opportunities for designers to show their ingenuity in designing new types of apparatus, which, we venture to think, will owe their success to their adoption of completely diffused artificial illumination and a vertical arrangement of their constituent parts.

EXPERIMENTS ON DESENSITISERS.

The discovery made by Luppo Cramer[1] of the remarkable desensitising action of the azo dye known as phenosafranine, and also of other dyes of the same class on ordinary and panchromatic plates, without affecting the latent image, has prompted us to study the possible relation between the desensitising property of the substance and its chemical constitution. The questions which we have endeavoured to answer are the following:—

(1) Are the properties of phenosafranine common to all the substances derived from the phenazine group,



of safranine, or are these properties exhibited only by substances which are derived from this group by the substitution of radicles analogous to those which give rise to phenosafranine?

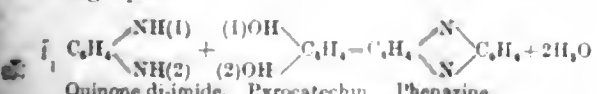
(2) Are the compounds containing the phenazine group the only organic substances having this desensitising property, or is the latter to be found among other coloured organic bodies or mineral compounds? Do desensitising substances act equally on ordinary and panchromatic plates?

(3) Is the desensitising quality a chemical, physical or physico-chemical one?

(4) Selection of desensitisers according to the purpose for which they are to be used.

Turning now to these four aspects of the subject, phenosafranine is a red dye belonging to the azo class, the phenazine group in which may be considered as derived from the substance, quinone di-imide,

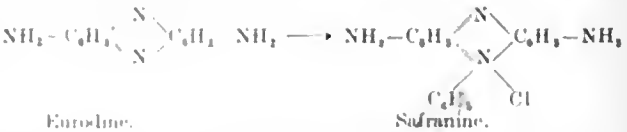
It may be assumed that phenazine is produced by the action of quinone di-imide on pyrocatechin according to the following equation:—



Quinone di-imide. Pyrocatechin. Phenazine.

(1) "Photographische Rundschau," 1921, p. 29.

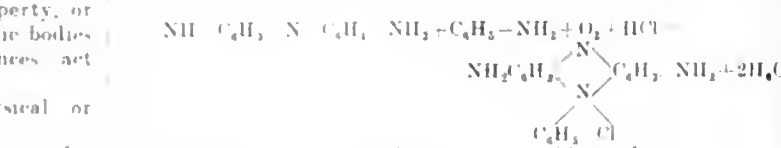
The introduction of two NH_2 groups yields a eurodine, and the further attachment of a phenyl group to the azo nitrogen of the eurodine gives rise to a safranine.



Eurodine. Safranine.

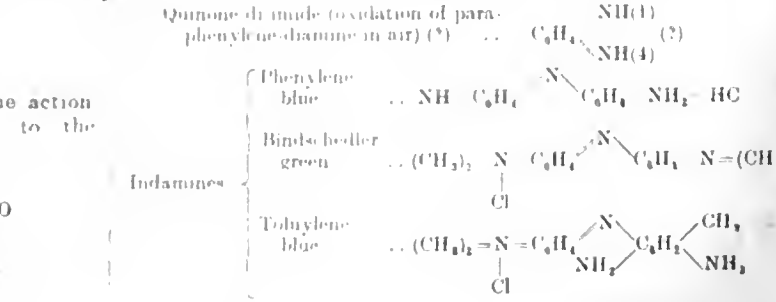
Phenosafranine is produced directly by oxidising a mixture of 1 molecule of para-phenylene-diamine and 2 molecules of aniline. This oxidation occurs in two stages, an indamine being first formed:—

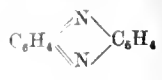
Para-phenylene-diamine. Aniline. Indamine (blue dye).

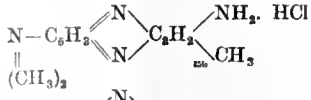


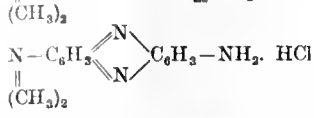
Indamine. Aniline. Phenosafranine.

There is therefore an interest in studying the desensitising properties of the various intermediate compounds which precede the formation of phenosafranine. These are:—



Phenazine .. .. .. 

Eurodines { Toluylene red .. 

Neutral violet .. 

Desensitising Ordinary Plates.

The following method was used in studying the desensitising of ordinary plates:—

Plates of ultra speed (Lumière Violet Label) were placed, in the dark, for 2 minutes in a solution of the dye, ranging, according to the particular substances, from 1: 100 to 1: 2,000. Successive tests were made in order to find the minimum strength of dye solution which could be used for the production of the maximum desensitising effect.

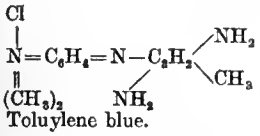
The plates were all exposed under identical conditions in the Chapman-Jones plate-tester, and, on removal from the desensitising solution, were developed at a distance of 1.5 metres from a candle, the light of which was reflected vertically on to the developing dish so as to illuminate the plate uniformly from above.

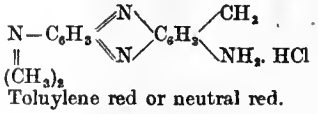
A normal diamidophenol developer was used for 4 minutes at a temperature from 60 to 64 deg. F., the plate being examined twice by transmitted light, first after 2 minutes and then after 3½ minutes.

When the images thus developed showed only a slight fog, spectroscopic tests on panchromatic plates, developing in a bright yellow light, were made as described in a later portion of the present paper.

Among the substances already mentioned, aqueous solution of paraphenylene-diamine exerts a very slight desensitising action; the other substances, with the exception of toluylene red, are without action. Toluylene red (neutral red) gives results closely comparable with those of phenosafranine.

This dye is made by boiling in contact with the air the unstable indamine dye, toluylene blue, which results from the action of di-methyl-para-phenylene-diamine on meta-toluylene-diamine.


Toluylene blue.


Toluylene red or neutral red.

It thus appears necessary that the following two conditions should be fulfilled:—

(1) Presence of the phenazine group.

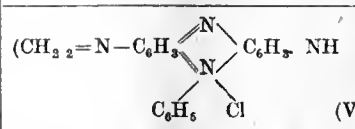
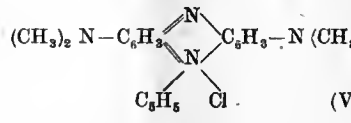
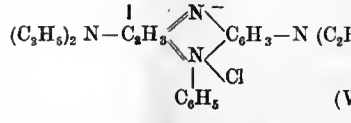
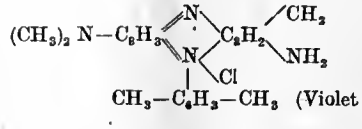
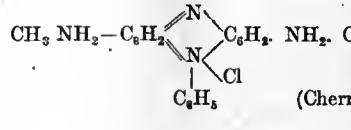
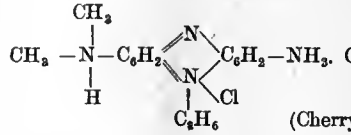
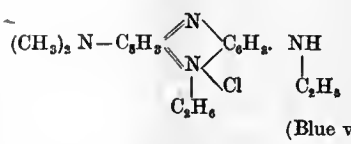
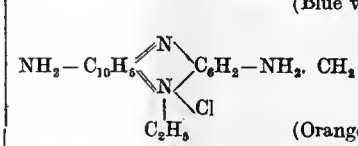
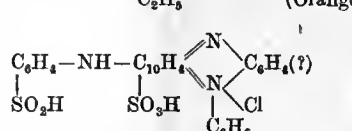
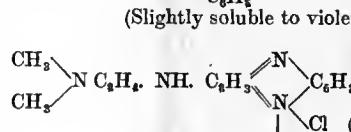
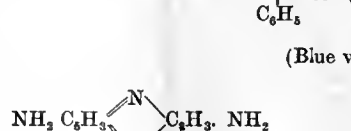
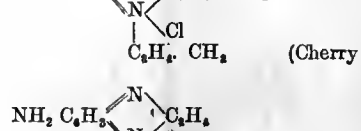
(2) Substitution of amido groups in the benzene nucleus.

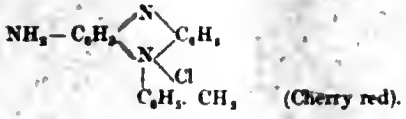
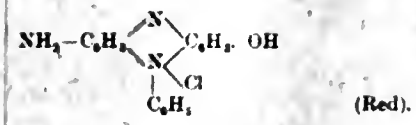
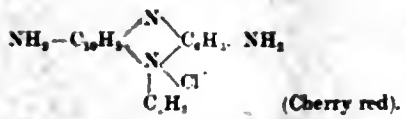
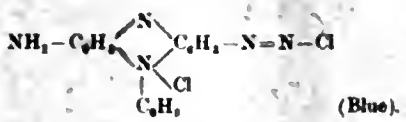
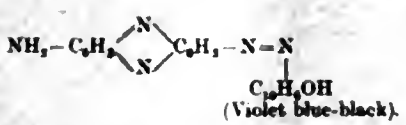
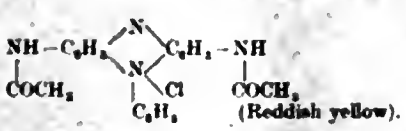
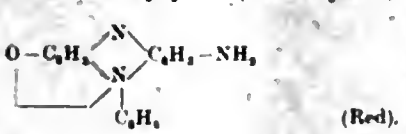
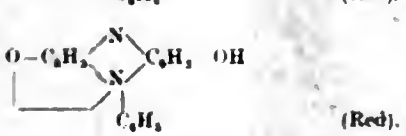
Nevertheless, although these two conditions appear to be fulfilled in the case of neutral violet (which contains a CH_3 group less than neutral red), this dye does not possess the properties of neutral red. Possibly it has not the constitution which is commonly attributed to it.

Neutral red is a brownish-red dye of low brilliancy which has a feeble staining action on gelatine and washes out more easily than safranine. At the same time it enters into the gelatine film more slowly, so that it is necessary to bathe the plate for about 4 minutes in a 1 per thousand solution in order to impregnate the film with the solution.

Action of Different Safranines.

We have compared the desensitising properties of a considerable number of safranine dyes with those of phenosafranine. Some of the dyes which we have used are commercially obtainable; others have been prepared. The following are the colouring matters which have been examined.

Commercial Name. Scientific Name.	Formula (and Colour of Solution in Water).	Desensitising action compared with phenosafranine.
Dimethyl-phenosafranine.	 (Violet).	Slightly inferior
Tetra-methyl-phenosafranine.	 (Violet).	Slightly inferior.
Amethyst violet. Tetrethyl-phenosafranine.	 (Violet).	Similar.
Giroflé. Dimethyl-benzoxylyl-safranine.	 (Violet red).	Similar.
Ordinary safranine. Tolusafranine.	 (Cherry red).	Similar.
Safranine MN. Methyl-tolu-safranine.	 (Cherry red).	Similar.
Fast neutral violet D. Ethyl-dimethyl-etho-safranine.	 (Blue violet).	Slightly inferior.
Induline scarlet. Tolu-naphtho-etho-safranine.	 (Orange red).	Slightly inferior; discharge of colour difficult
Azocarmine X. Disulpho-phenyl-naphtho-benzo-safranine.	 (Slightly soluble to violet red).	Much inferior.
Indazine M. Dimethyl-amido-phenyl-dimethyl-benzo-safranine.	 (Blue violet).	Much inferior; attacks latent image.
Creso-safranine.	 (Cherry red).	Similar.
Apo-safranine. (hydro-chloride).	 (Violet red).	Much inferior.

Commercial Name. Scientific Name.	Formula (and Colour of Solution in Water).	Desensitising action compared with phenosafranine.
Homo-aposafranine.	 (Cherry red).	Much inferior.
Amidosafranone.	 (Red).	Much inferior.
Phenonaphthosafranine	 (Cherry red).	As phenosafranine.
Diazo derivative of phenosafranine.	 (Blue).	No action.
Indoine blue R. Diazo derivative of phenosafranine and β naphthol.	 (Violet blue-black).	No action.
Acetylphenosafranine.	 (Reddish yellow).	No action.
Safranone.	 (Red).	Much inferior.
Safranol.	 (Red).	No action.

The results obtained with dimethyl, tetramethyl and tetraethyl phenosafranine and with safranone and safranol have already been pointed out by Lüppo-Cramer and König ("Photographische Rundschau," 1921, p. 37).

In the foregoing table it is seen that the dyes of the safranine class which possess desensitising properties comparable with those of phenosafranine are:—

Dimethyl-phenosafranine.
Tetra-methyl-safranine.
Tolusafranine (ordinary safranine).
Methyl-tolu-safranine (Safranine MN).
Dimethyl-benzoxylyl-safranine (Giroflé).
Tetra-ethyl-phenosafranine (Amethyst violet).
Cresosafranine.
Naphthophenosafranine.
Ethyl-dimethyl-etho-safranine (Fast neutral violet D).

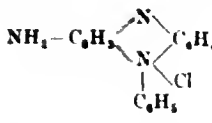
None of the above possesses any appreciable advantage in practical use over phenosafranine, with the exception of cresosafranine, which is distinctly more easy to wash out of the gelatine film than phenosafranine.

It will be noticed that safranines which have lost anamino group, *e.g.*, the aposafranines, and those, *e.g.*, safranones, in which this group is replaced by oxygen, have the desensitising property much less marked. If the two amino groups are replaced by O and OH, as in safranol, the property is altogether destroyed.

Replacement of this NH_2 group by acetyl, its conversion into the diazo group or the formation of a diazo compound with a phenol, as in indoine blue R, destroys the desensitising property of the original phenosafranine. On the other hand, the substitution of a C_6H_5 group (attached to the azo nitrogen) by C_2H_5, as in fast neutral violet D, has no effect on this property.

Desensitising Action of Indulines.

The indulines are dyes closely analogous to the safranines. They may be regarded as aposafranine

 (phenosafranine from which an NH_2 group has been eliminated).

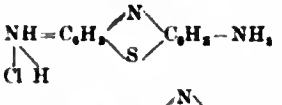
in which one or more hydrogen atoms of the benzene ring are replaced by the aniline residue, NHC_6H_5.

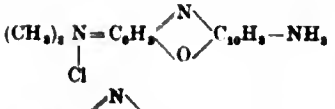
The desensitising action was tested of the following indulines, chosen among those which include 1, 2, or 3 aniline residues substituted in the benzene rings and having methyl or ethyl groups in the amido groups:—Fast blue 3R, soluble induline B, paraphenylene blue R, metaphenylene blue 2B, azine green, azine green S, Bale blue R, Milling blue, and Coupler blue.

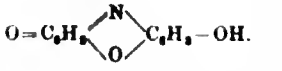
The colour of the solutions ranged from violet blue to greenish blue, but none of these dyes showed any desensitising action.

Thiazines, Thiazones, Oxazines and Oxazones.

The thiazines and thiazones, as also the oxazines and oxazones, are regarded as derivatives of quinone imide. These dyes have a constitution approximating to that of the safranines, or rather the eurodines, one of the phenazine nitrogens being replaced—by sulphur in the thiazines and thiazones, and by oxygen in the oxazines and oxazones.

Thiazine.
Lauth violet .. 

Oxazine.
Nile blue 2B .. 

Oxazone.
Resorufine .. 

We have examined the action of the following dyes exhibiting substitution of various kinds and of colour ranging between blue and violet:—

Thiazines.—Gentian violet; methylene blue; thiocarmine R; toluidine blue.

Oxazines and Oxazones.—Capri blue; gallocyanine; Prune O; Meldola blue; Nile blue 2B; fluorescent blue.

None of these substances showed desensitising properties approaching those of phenosafranine.

These different classes of dye, although derived, as is phenosafranine, from quinone imide, thus appear to be destitute of useful desensitising action.

Desensitisers from Other Classes of Dyes.

We have investigated the action of a large number of dyes belonging to other classes than those derived from quinone imide. The only ones which showed any notable action are those included in the table on p. 354.

Names.	Formula (and Colour of Solution).	Desensitising action compared with phenosafranine.
Nitro compounds : Picric acid (tri-nitrophenol).	$C_6H_2(OH)(1)(NO_2)(2)(NO_2)(4)(NO_2)(6)$ (Yellow).	Strong action ; image not fogged.
Aurantia (ammonia salt of hexa-nitrodiphenylamine).	$(NO_2)_3-C_6H_2-N(NH_4)-C_6H_2(NO_2)_3$ (Reddish yellow).	Very strong action ; image not fogged.
Indian yellow (nitro derivative of orange IV.).	$SO_3H-C_6H_4-N=N-C_6H_4-NH-C_6H_4NO_2$ (Orange yellow).	Considerable action ; image slightly fogged.
Azo compounds: Chrysoidine (Diamidoazo-benzene hydrochloride).	$C_6H_5-N=N-C_6H_3(NH_2(1))(NH_2(3))\cdot HCl$ (Brownish yellow).	Strong action ; image not fogged.

The desensitising action of crysoidine has been pointed out by König and Lüppo-Cramer,[2] who, however, have not stated if this dye produces chromatic desensitising comparable to that of safranine.

In short, there appears to be no well defined relation between the constitution of the dyes and their desensitising properties, since, among the derivatives of quinone imide, only the safranines and one eurodine possess this property, whilst among very different dyes there are found isolated desensitisers, such as aurantia in the nitro derivatives, and chrysoidine among the azo dyes, the constitution of which is not closely related to that of the safranines. In the case of chrysoidine, if there are two NH_2 groups, these latter are in the meta position relatively to each other, and are not susceptible of yielding by oxidation in the air a quinone imide as they would if in the para or ortho position.

It is of interest to compare these results with those obtained in respect to colour sensitisers. As is well known, there are two classes of dyes, the cyanines and the phthaleins, most of the members of which are colour sensitisers, whilst, on the other hand, there are isolated examples of other classes of dyes, *e.g.*, rosaniline and azo dyes, which possess this property

A. and L. Lumière.
A. Seyewetz.

(To be concluded.)

(2) " Photographische Rundschau," 1921, p. 37.

THE H. AND D. DOCTRINE.

In the previous chapter we considered the condition which a negative requires to fulfil in order that it may be a theoretically perfect reproduction, but in inverse or negative light and shade, of a scene or object.

We saw that the condition is that the light-intensities *transmitted* by the various parts of the negative shall be inversely proportion to the light-intensities *reflected from* the corresponding parts of the subject.

We became familiar with the conception of opacity as an alternative form of describing transparency, opacity being simply the inverse or reciprocal of transparency.

Whence, in the theoretically perfect negative, the opacities of the various deposits are directly proportional to the light-intensities from the corresponding parts of the subject.

We then saw the relation of the relative quantities of actual stuff (density) forming the deposits to the opacities of the latter and found that this relation is that of an index or logarithm. The density is the logarithm of the opacity.

Thus it became evident that in a theoretically perfect negative the difference between two densities is equal to the difference between the logarithms of the exposures which produced them. The opacities are then proportional to the corresponding light-intensities from the subject.

We have now to see how this condition depends, in the first place, on the time during which the plate is exposed to the action of light. In doing that we shall become familiar with the method originated by Hurter and Driffield, namely of representing the effect of exposure of a plate by means of a so-called " characteristic curve."

II.—THE LAW AND LIMITS OF CORRECT EXPOSURE.

Exposure, Development and Density.

If a plate receives the same exposure over all its surface, *e.g.*, by exposing it to the light of a candle at a considerable distance, a uniform density is obtained on development. As every photographer knows, within certain limits, the density depends partly on the exposure, partly on the time of development, and partly on the plate. All these factors come into play in the making of a negative, and Hurter and Driffield at the outset of their investigations set themselves to discover the separate influences of exposure and development on the production of a negative true to the original. They did not succeed in this until they studied, not a single density produced by a single exposure, but a series of densities produced by a series of exposures; in other words, when they studied the ratios of densities to each other. The rule or law connecting a single exposure with a single density is a very complicated one and involves development, but, as Hurter and Driffield were the first to show, the rule connecting a series of exposures with a series of densities can be expressed in a very simple way, involving exposure only.

In studying this first step in the making of a negative, we are following the lines of photographic practice. Except as regards speed of printing, the absolute values of the opacities of a negative are immaterial; it is their relative values which determine the correctness of a negative. As every photographer knows, a negative which is of considerable opacity throughout its various gradations may give as good, *i.e.*, as true, a print as one which is thin. It will take longer to print; a practical drawback certainly, but not one which is opposed to correct reproduction.

Development and Density Ratios.

Before considering the relation of successive exposures to densities we must examine a property of development. If the same series of any exposures be given to several plates and the plates be developed for different times, it is found that though the actual densities are different in each plate, they

preserve the same ratio to one another as development proceeds. An example from Hurter and Driffield's paper of 1890 (Experiment 13) will make this clear.

Exposures	1	2	4	8
Densities D_1 (4 mins. development)	0.775	1.000	1.180	1.250
Ratio of Densities D_1	1.0	1.29	1.52	1.61
Densities D_2 (12 mins. development)	1.260	1.660	1.96	2.08
Ratio of Densities D_2	1.0	1.31	1.55	1.65
Ratio of $D_1 : D_2$	1.63	1.66	1.66	1.60

It will be seen that within the limits of experimental error of measurement, the densities by 4 minutes' development have the same relation to each other as those by 12 minutes' development, or, what is the same thing, each density by short development stands in the same proportion to the corresponding density obtained by longer development, as shown in the last line. This preservation of proportion is what Hurter and Driffield called the law of constant density-ratios. They maintained that it held good in the use of different developers, and even when bromide is added to the developer, and therefore they declared that the ratio of densities is unalterable by modifications of the developer or development.

It was this statement that aroused so much controversy when it was first made. This arose from various causes, which it may be well to recall, although the battle of the density-ratios is almost forgotten. In the first place photographers thought density-ratios meant opacity-ratios, which, as we shall see later on, are a measure of contrast and *are* altered by development. In the second place, Hurter and Driffield omitted to qualify their statement (that density-ratios once formed on exposure cannot be altered in development) by indicating that they meant:—Cannot be altered in a definite or controllable way, or so as to rectify the error caused by incorrect exposure. They admitted this omission in their paper of 1898 on "The Latent Image and its Development." In the meantime reams of print were filled in showing that under certain conditions and chiefly by means of modifications in the pyro-ammonia developer an improved result could be got from an under- or over-exposed negative, though not with any degree of certainty, not in a precalculable manner, and not to a degree which remedied errors of exposure so far as correct reproduction of the tones of a subject is concerned. Other reams were filled in proving that longer development increased the amounts of the differences between the densities, and thus the contrast, which of course was never denied, but on the contrary specifically shown, by Hurter and Driffield.

The Exposure-Density Relation.

So we are clear in understanding the law of constant density-ratios to mean that whatever densities are produced in a plate, first latent and then visibly by the developer, they remain *relatively* the same during a normal period of development. The individual densities are increased as development proceeds, but their ratio to each other is not altered. If the ratio is wrong at the start, it may be altered, but is not corrected, by "tinkering with the developer."

The question is: Under what conditions is it obtained right at the start? By correct exposure. Yes, but what is correct exposure in definite terms? For this we must retrace our steps and examine the experimental manner in which the relation of exposures to densities was investigated.

Densities and Increasing Exposures.

By giving a series of exposures (each the same multiple, say double, of the preceding) to different parts of the plate, and developing for any convenient time (length immaterial), Hurter and Driffield found that the lowest densities, produced by the smallest exposures, differed from each other by relatively small but gradually increasing amounts, and that at a certain point in the series of successively doubled exposures, this difference between each density and the preceding one reached a maximum and continued approximately at that maximum until a second turning point was reached at which the increase of density at each doubled exposure begins to fall off; and, finally, further doubled exposures produce actually less and less densit

These four phases in the growth of density, which follow eacl other as exposure is increased, can be recorded in various ways. We can set down in adjoining columns (1) the exposure, (2) the density, and (3) the addition to the density. Such a table shows the general nature of the progression of density, but not in a very striking way.

Plotting Density Against Exposure.

Another way is to represent the course of the growth of density by a line. We draw two lines at right-angles, meeting at a point, as shown in Fig. 5. On the horizontal line we can mark off from O distances proportional to the exposures, and on the vertical line distances proportional to the corresponding densities. On then drawing vertical lines through the points on the horizontal scale and horizontal lines through those on the vertical scale we get a series of intersections; and on joining these together by short, straight lines we get a line (which in some parts may be straight and in others curved) the shape of which indicates the rate at which density increases with exposure. This line rises very steeply at first, then less steeply, and becomes much flatter in the phase corresponding with the longer exposures. It may even slope downwards if the chart be made large enough to include the phase (reversal) during which density becomes less in actual amount with each successive doubling of exposure.

There are, however, two objections to plotting density against exposure in this way. One is that the range of the two values is very different. The densities which are measurable in a negative run from about .1 to 3.5, *i.e.*, a range of 1 to 35. But exposures required to produce such a range of densities may vary from 1 to about 8,000. Therefore, the exposure scale has to be enormously big in order to show slight differences of density. This objection may be overcome, though at great inconvenience.

The second objection cannot be overcome. It is that the portion of the line representing the second phase (of equal *addition* of density for each *multiple* of exposure) will always be curved. This arises from the fact that there is not a simple relation between the densities and the exposures which produce them; density-values corresponding with exposure-values progress according to a different rule from that of the latter. But this part of the line, as we shall see directly, is the most important part. It is the part which largely measures the quality of the plate. You can't readily tell where such a curve comes to an end, or how long it is, and so cannot compare the curves for different plates. For this reason the plotting of exposures against densities gives little useful information.

Logarithms and Log Exposures

But the *logarithms* of exposures progress according to the same (additive) rule as do the densities corresponding with them. The two are like quantities in this respect.

That this is *so* will be clear if we recollect the nature of a logarithm as briefly indicated in Chapter I. of this series of articles. A logarithm is an index (or an exponent as the mathematicians prefer to call it). The logarithm of a number, e.g., of A, is the number of times a certain base number must be multiplied by itself in order to produce A. Any base number may be chosen, 10 being commonly adopted. Thus, since $10 \times 10 = 10^2 = 100$, the log of 100 to base 10 is 2. Similarly, $\log 1{,}000 = 3$. On this system the logarithms of numbers from 0 to 999999 and over have been worked out and arranged in tables. As $\log 1 = 0$, the logarithms of numbers (i.e., decimal fractions) between 1 and 0 are minus quantities.

By way of example of the respective progression of numbers and their logarithms we may compare:—

Number	10	100	1,000	10,000
Log	1	2	3	4

While the numbers progress by multiple (of 10), their logs progress by addition (of 1). That is a characteristic property of logarithms, and, as we shall now see, is one reason for choosing log exposures instead of the exposure values themselves for plotting against densities.

B

Plotting Densities Against Log Exposures.

If, then, we plot densities against *logarithms* of exposures, and it is found that any part of the "curve" is a straight line, it is made evident that as exposures are increased by some multiple—that is, as the log exposures increase by the same amount at each step—the densities likewise show an addition, which is the same at each step, although it may not be equal to that plotted on the log exposure scale. This is

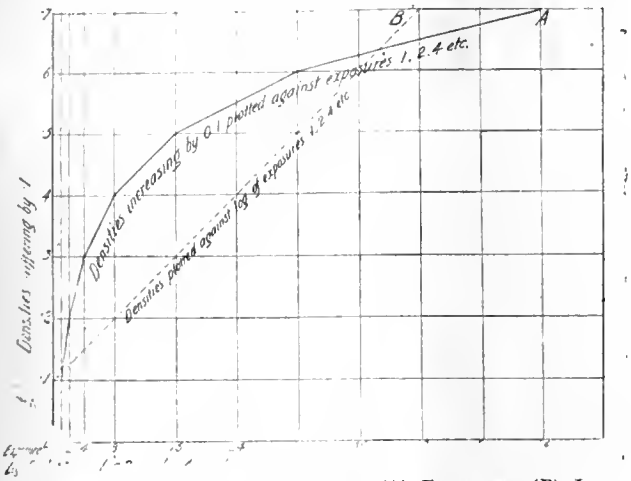


FIG. 5.—DENSITIES PLOTTED AGAINST: (A) EXPOSURES; (B) LOG EXPOSURES.

In the case of curve A, densities .1 to .7 are plotted against distances proportional to 1, 2, 4, 8, etc. In B, the same densities are plotted against distances proportional to the respective logs of 1, 2, 4, 8, etc.

shown in B, fig. 5, where the same density values are plotted against distances on the horizontal scale which are proportional to the logarithms of the exposures employed for curve A.

The scale of exposure logarithms (log exposures, as they are called) has another advantage. The difference between the logarithms is small compared with the difference between the numbers of which they are the logarithms. The logs of the numbers 1 to 8,000, representing a range of exposures which may be used in examining a plate, are respectively 0 and 3.9, so that by plotting log exposures instead of exposures the magnitude of the scale becomes of the same order of size as that of densities, and changes in the course of the curve are plainly evident within a small compass.

It may be asked—why not plot opacities against exposures, since these are like quantities, and, therefore, give a straight-line "curve" when plotted one against the other. But opacities vary in their ratio to one another with the progress of development, and therefore an opacity-exposure curve would vary at every stage of development. If we want to discover the limits within which a plate fulfils the conditions of correct reproduction as regards exposure and development separately, we must adopt a methed which first involves the first of these factors without the second. How that was done by Hurter and Driffield we can now see.

Charting the Growth of Density.

Hurter and Driffield were the first to perceive the usefulness of plotting the logarithms (or values proportional thereto) of exposures against the densities correspondingly produced by those exposures.

The density scale is conveniently one from 0 to about 2.5, since densities which are measurable with fair accuracy fall within these limits. It is divided into 10 divisions from 0.0 to 1.0, and so on, each representing a density of .1. Each of these divisions is sub-divided into fifths, so that densities can be plotted to an accuracy of one-fifth of .1 (=.02) throughout their scale.

The log exposure scale is not quite so simple. The numbers on the scale indicate candle-metre-seconds (C.M.S.) from .1 to 1,000, a range equivalent to 1 to 10,000, which is more than sufficient for exhibiting the properties of a plate which are of practical importance. But the *distances* laid off on the scale are made proportional to the logarithms of exposures (C.M.S.), that is to say, as each exposure is doubled an equal amount is added to the distance.

Since the exposures indicated on the scale become greater in increasing proportion along the length, the sub-divisions of the scale are made to indicate an increasing number of C.M.S. as one proceeds along the scale from the lower to the higher exposure values. In the form of chart originally devised by Hurter and Driffield the sub-division of the scale is as follows:—

Over portion of log exposure scale marked (exposures)—	each sub-division indicates.
.1 to .3	.01 C.M.S.
.3 to .7	.02 ,,
.7 to 1.0	.05 ,,
1.0 to 3.0	.1 ,,
3.0 to 7.0	.2 ,,
7.0 to 10.0	.5 ,,
10.0 to 30.0	1.0 ,,
30.0 to 70.0	2.0 ,,

and so on for the higher values. Apart from the necessity of marking the lower exposures (*i.e.*, their logs) with sufficient accuracy, it is of importance to be able to take an exact figure in this part of the scale, since, as we shall see in a later chapter, it is here that the *inertia*, by which the speed of the plate is rated, is measured.

A further little point concerning the log E scale may perhaps be usefully explained. As commonly plotted in sensitometric measurements the zero point, at the junction of the vertical and horizontal scale, the "origin" as it is called, represents .156 C.M.S. But as the distances on the scale correspond with the logs of these exposures, log 1 (= 0) represents a zero point and actually the distances representing logs of exposures from .99 to 0 are minus distances. However, this does not make any difference as regards charting the characteristic curve on a properly made scale since we are concerned simply with the values of the log E distanes. But in making this part of the scale oneself it is necessary to bear this point in mind and lay off the distances according to one or other of two plans, the basis of which is shown in the following table:—

E	log E (approx.)	
	a	*b*
.9	$\bar{1}.95$ =	− 0.05
.8	$\bar{1}.90$ =	− 0.10
.7	$\bar{1}.85$ =	− 0.15
.6	$\bar{1}.80$ =	− 0.20
.5	$\bar{1}.70$ =	− 0.30
.4	$\bar{1}.60$ =	− 0.40
.3	$\bar{1}.50$ =	− 0.50
.2	$\bar{1}.30$ =	− 0.70
.1	$\bar{1}.00$ =	− 1.00

NOTE.—In col. *a*, $\bar{1}$ represents − 1.00. The numbers in col. *b* are the differences (minus) between the respective positive decimal fractions and this − 1.0 *e.g.* − 1.0 + .95 = − 0.05.

In setting off the distances on the log E scale we can start from the extreme right (log .1 = $\bar{1}$.0) and successively measure off from left to right the distances .3, .5, etc., in col. *a* representing the positive (decimal) part of the logarithm; or we can start from the 1 (log 1 = 0) on the scale and successively set off distances representing .05, .15, etc., in col. *b* from right to left. The resulting scale will be the same in each case.

The two scales (density and log exposure) are also made equal, that is to say, the length between densities 1.0 and 2.0 is equal to that between a log of value 1.0 and a log of value 2.0, corresponding respectively with exposures 10 and 100, since log 10 = 1 and log 100 = 2. It will thus be seen that there is a strict proportionality between the two scales.

The Characteristic Curve.

If now the densities obtained by exposing a strip of plate to a series of increasing exposures be plotted on a chart devised as above and the points joined, the growth of density

is exhibited by a curve, which varies both in shape and in its position on the chart according to the particular quality of the plate, but almost invariably is of the *f* type shown in fig. 6. Hurter and Driffield called this the *characteristic curve* of the plate.

It is usual to make each exposure double the preceding one because that is found to provide a sufficient number

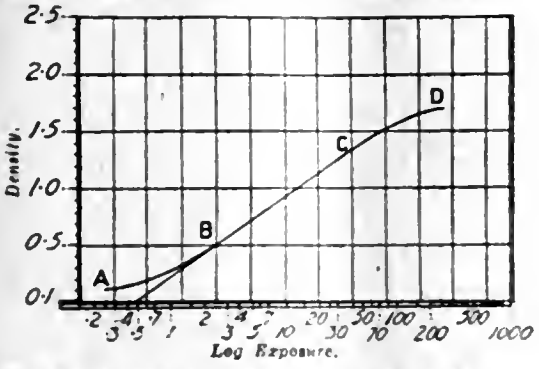


FIG. 6.—THE CHARACTERISTIC CURVE OF THE PLATE.

Densities are plotted against the logarithms of the exposures which respectively produce them. The upper ends of the lines representing density values, when joined together by an even curve, produce the characteristic curve of the plate.

NOTE.—The numbers are proportional to the exposures, but their distances from the zero point are proportional to the respective logarithms of the numbers.

of points from which to build up the curve, but there is no necessity that the exposure should be doubled each time. If exposures are successively increased by a larger multiple than 2 a sufficient number of them may not be obtained within the range necessary to produce the characteristic curve. On the other hand, if the exposures are increased by smaller steps, a needlessly greater number of them will be required. But apart from this it is immaterial what the exposures are so long as their logarithms are plotted on the scale against the density produced by each. It is, however, the regular practice to double each successive exposure. Exposing discs are made to do that, and the system has the advantage of giving a series of C.M.S. values which are quickly found on the log exposure scale.

Providing that a sufficient range of exposures be given, the characteristic curve of any plate exhibits (with variations) the three phases to which allusion has already been made. In the part A B corresponding with the least exposures it rises slowly. The addition to density at each successive increase in log of exposure is small, but increasing. This is the period of under-exposure, during which the growth of density is directly proportional to the exposure. Next the "curve" becomes (BC) practically a straight line; each successive density receives an addition proportional to the increase in the corresponding log exposure. This phase was named the *period of correct representation* by Hurter and Driffield and is now commonly spoken of as the *period of correct exposure*. The latter term is the better one, for the straight line does not signify correct representation, but a proportionality of density difference to log exposure difference which make correct representation possible by suitable development, and is a necessary preliminary to development to the *correct* degree. In other words, the difference between successive densities is (usually: short development) smaller than the difference between the logs of the producing exposures and in a constant proportion thereto.

The final phase of the curve is one of reduced slope, C D. The density ceases to obtain the same addition with each successive multiple of exposure, but a constantly smaller addition, which, if exposures are greatly continued, may even become a subtraction of density. Neglecting, however, this latter reversal phase, the upper less steep part of the curve in fig. 6 is the period of over-exposure, in which densities tend to show less and less increase for equal increases in the logs of exposures.

There is, of course, no sharp demarcation of these three phases: they merge imperceptibly into each other, but the correct exposure portion, in the case of almost every plate, is a straight line of such length that it can be used, as will shortly be shown, for measuring an important quality of the plate, viz., latitude, and, as we shall see later on, speed.

Translating the Imagery of the Characteristic Curve

Perhaps a difficulty felt by students of sensitometry is in becoming familiar with the form in which facts are described by the characteristic curve of the plate. It may, therefore, be desirable to say something which will help to show the meaning of the curve in relation to the conditions under which plates are exposed.

As we have seen, the curve is a picture of the varying rate at which increasing exposure produces increased density. The series of exposures *successively* given to different parts of the plate is an artificial and definitely repeatable substitute for the series of exposures *simultaneously* given to different parts of the plate in the camera. In fact, the artificial exposures need not be successive; they also can be given simultaneously by means of a screen, different parts of which transmit light in known relative intensities. The significance of the curve can perhaps be better displayed by representing it as a series of steps of a staircase (fig. 7), the height of each step representing the addition to the density produced by a doubled, trebled, or otherwise multiplied exposure, of the different parts of the plate. It is seen that the steps first become higher and higher, then remain at the same height, and then progressively become lower as we trace the effect of increasing exposure. If we imagine Nature to be a cubist artist in the design of her landscapes, we can conceive a scene different parts of which emit light-intensities in such sharp proportion as 1, 2, 4, 8, and so on. And as all would act on the plate in the camera for the same time, exposures would be in the same proportion, comparable with those from an artificial exposing screen.

This hideous cubist landscape being imagined, what is the meaning of the characteristic curve? It is that if the time element in the exposure is small, so that the plate is exposed not much more than is requisite to produce any

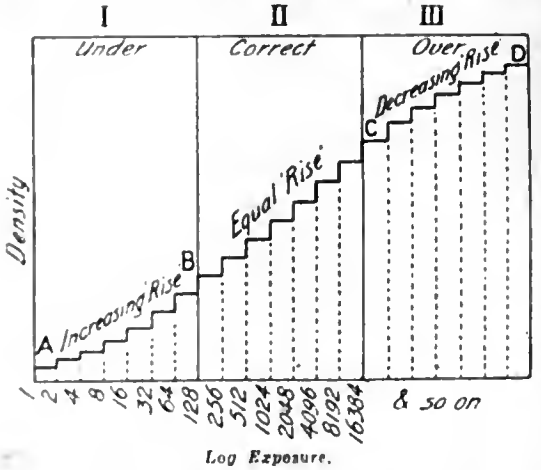


FIG. 7 HOW DENSITY IS ADDED AS EXPOSURE IS MULTIPLIED.

In II. (correct exposure and correct development), increase in density at each step is equal to the increase in log exposure. In I. (under-exposure), addition of density is *greater* at each *equal* increase in log exposure. In III. (over-exposure), addition of density is smaller at each equal increase of log exposure. (Hurter and Driffield.)

effect at all, the density differences increase more rapidly than they should for any development to give correct representation. Relatively there is too much density in the part of the negative representing the lightest part of the subject and not enough in the darkest part for a true relative representation. In photographic language, dense high-lights (of the subject) have too great a difference from the middle tones,

and bare shadows (again, of the subject) have insufficient differentiation of such tones; in other words, the well-known marks of under-exposure became evident on development.*

It is necessary to allow the light-intensities to act for a longer time in order that the plate receives such an exposure that increase of density is related to the exposures as shown in the middle part of fig. 7, that is an *equal* addition to each of the deposits representing light-intensities in the proportion of, say, 1, 2, 4, 8, etc., the resulting densities jumping from step to step by an amount which is constant and proportional to the increase in the corresponding log exposure.

And what happens if a still longer time is allowed for the light-intensities to act? It is depicted in the third part of fig. 7. A regularly falling increase of density marks the action of the light-intensities in proportion 1:2:4:8, etc. The step between each density is less than it should be for a correct relative representation of the light-intensities; in other words, the flat effect of over-exposure.

We have conceived a subject of abrupt tones in order to express sensitometric results in terms of camera exposures, but it is self-evident that what is true of such an arbitrarily imagined subject is true also of one consisting of a multitude of softly gradated tones. The emitted light-intensities, however little they differ from one another, require to act for more than the minimum time requisite to produce an under-exposed negative in order that their effects in relation to one another may fulfil the first condition of correct representation, viz., increase of density in proportion to increase in log exposure. But they must not act for so long that their effects cease to fulfil this condition and exhibit the results of over-exposure. Between these two times lies the period of correct exposure, which may be great or small according to the particular quality of the plate and the character of the subject. Here we approach the question of latitude, to which we must next turn in order to see that it can be expressed in a definite way.

Before we do that the diagram, fig. 7, requires a word or two of comment respecting one feature of it which may mislead the beginner. It may suggest that for the correct representation of a series of light-intensities of 1 to 128 shown under-exposed in part I. of the diagram exposure must be such that the *lowest* density must be at least a little greater than the *highest* density in a wholly under-exposed negative (I.). Every photographer knows such is not the case and therefore will be inclined to regard the diagram as a misstatement of fact in this respect. But the gradations you see in a negative are the opacities, not the densities which are plotted in fig. 7; and densities are small compared with the opacities they produce. It will be clear that you can have a series of low densities (related to another series as in fig. 7) which on development can give rise to a negative in the straight-line portion having a series of opacities, the lowest opacity in which need not be as great as the highest opacity of a negative in the under-exposure portion. Nevertheless, the diagram does indicate, though obscurely, that a negative which is correct in its gradations must have received a greater degree of exposure, must therefore have greater densities in its shadow tones, and therefore must have appreciable opacities in these tones. In other words, the negative corresponding with the straight-line (correct exposure) part of the curve has perceptibly different deposits (opacities) over its shadow tones. These need not be as great as the greatest in an under-exposure negative; that is a condition dependent on development.

* We are here leaving out of consideration for the moment the effect of development in bringing the ratio of densities into correct correspondence with the light-intensities as regards transmission of light. This has been touched upon in the earlier paragraph "Exposure, Development and Density," and we will return to further consideration of it directly.

Latitude.

The term latitude is employed in two distinct senses: (1) latitude of the plate—a property or quality of a plate—and (2) latitude in exposure—the relation of the degree of that quality to the range of light-intensities from the subject. Many photographers appear not to distinguish between these two conceptions of latitude, failing to recognise that latitude in exposure depends on the subject as well as on whatever merits the plate may possess in this respect.

As regards the latitude quality of a plate, it is customary to take approximately the straight part of the characteristic curve, or rather the range of exposures corresponding to this part of the curve, as a measure of it. In fig. 6, for example, the portion of the curve from about 1.5 to 80 may be considered straight. This is equivalent to a range of exposures of about 1:53. Hurter and Driffield were of opinion that for practical purposes a part of both the under-exposure and over-exposure sections of the curve might be included in the latitude without materially affecting the results, and on this basis, in the above example, would have considered the latitude as equal to about 1:148. Of late years, however, it has become customary to rate latitude more strictly, *i.e.*, to express it by the range of exposures corresponding with the actually straight part of the curve.

Latitude in exposure is obviously dependent on the magnitude of the range of light-intensities from the subject in comparison with the magnitude of the latitude of the plate. Hurter and Driffield, by actual measurements, satisfied themselves that the range of light-intensities from the different parts of a landscape was much smaller than had previously been supposed. They found, for example, that the sky of a brightly lighted landscape reflects light of only 30 times the intensity of that from a very dark object in the foreground; that is to say, the range is 1:30. The ratio of the range of exposures (corresponding with the straight part of the curve) to the range of light-intensities from the subject is therefore a measure of the latitude in exposure. If the exposure range is 1:60 and the subject range 1:30, the latitude is 2; which means that if an exposure of one second was sufficient for minimum correct exposure, 2 seconds would give an equally correct result, differing from the former only in the fact that the negative as a whole would be denser and therefore take longer to print.

It will thus be seen that with a plate of good latitude correct exposure, as Mr. Watkins has aptly written, "is an enclosure rather than a spot." So long as exposure falls within the correct exposure part of the curve, it is immaterial where, except as regards the printing speed of the negative. If the subject-range of light-intensities exceeds the latitude of the plate, *e.g.*, in interior subjects, including windows, something must be sacrificed at one or both ends of the scale by giving such an exposure that part of the subject range is recorded in the under-exposure or in the over-exposure part of the curve.

G. E. B.

(To be continued.)

New Spanish Customs Regulations.—By Royal Decree published on June 4 the Spanish Government has increased the co-efficients on importation duties on goods from countries with depreciated exchanges. The increase varies from 10 to 70 per cent. The system devised to apply this Decree is an ingenious one (says the "Times" Madrid correspondent), and ensures a measure of justice, the idea being to apply the greatest surcharge where the exchange suffers the greatest depreciation and where, for that reason, the greatest facility exists for dumping. The new Decree re-establishes many articles of British goods on a more equal footing for competition in the Spanish market by compensating for the hardships imposed by the duties under the recent provisional tariff in combination with the exchange barrier. It should, therefore, encourage British manufacturers to redouble their efforts in the Spanish market so as to profit by the changed outlook and the opportunities it affords.

PARIS NOTES.

Autochromes in Advertising.

A most interesting and deservedly successful new departure has recently been made in bringing many of the chief French luxury trades to the notice of the general public. This has been done by means of the Autochrome process, which, in serving the purposes of advertisement, has itself obtained considerable *réclame*. The "Salon of French Taste," which opened last month in the Palais de Glace, Champs Elysées, Paris, contains more than 1,800 Autochromes of all sizes, from 7 × 5 inches to 16 × 7 inches (the largest size made), representing jewellery, glass and pottery ware, enamels, bookbinding, tapestries, furniture, lighting accessories, and all articles of dress and toilet, and even carriage work. These Autochromes, in company with a number of coloured transparencies from 14 × 10 to 24 × 20 inches, are mounted in frames and are illuminated by concealed electric lamps. The colour reproductions of the goods of each of 250 exhibitors occupy a separate panel, and these panels are systematically arranged in twelve alcoves erected in the rotunda of the Palais de Glace. The conception and organisation of the whole exhibit have been perfectly carried out in all respects, and reflect the greatest credit upon its designer, M. Devries, and equally upon the makers of the Autochromes, MM. Desboutins and Ventujol. The exhibition has been a revelation of colour photography, and the Autochrome process to the public unfamiliar with photography; and the reviews in the newspapers have shown a widespread ignorance, on the part of the Press, of the existence of the Autochrome process. One daily journal refers to it as "having apparently been invented by someone named Lumière about the year 1907." The exhibition remains open until the end of September, and I can strongly recommend any of my readers who may be passing through Paris this summer to set aside an hour for a visit to it. After it has come to an end in Paris, the exhibition is to be transferred in turn to the capitals of several countries in which French luxury goods find their principal markets, and hence has been dubbed "an exhibition in a portmanteau."

The Paris Fair.

Although the Paris Fair is this year of much greater size than previously, the photographic industry obtains very small representation in it. The few exhibitors are grouped in the corner of the Esplanade des Invalides, which nominally had been assigned to photography. The chief exhibits are "As de Trèfle" plates and papers of MM. Grieshaber, lenses Berthiot and other optical instruments and hand-cameras of the Société d'Optique et de Mecanique de Precision, cameras and accessories of Demaria-Lapierre, cinematograph appliances by M. Mendel, photo-engraving by Dujardin, and other accessories, such as frames, albums, dry-mounting materials. In the mechanical and electrical sections are several models of photocopying (blue-print), and cinematograph printing machines. In these same sections, and forming part of the exhibit of the official Department of Scientific and Industrial Researches and Inventions, is shown an Autochrome photograph by Dr. A. Polack, an oculist of repute, but apparently a very indifferent photographer. This has been produced with an anachromatic lens, which is pompously described as a "hyperchromatic" objective, the French and German patents of which declare that "the uncorrected rays, diffusing into the image of the red, compensate for lack of red-sensitiveness in the plates employed." The result obtained, as was readily to be anticipated, is not at all promising.

Combined Development and Fixing.

A French chemist, M. L. J. Bunel, living in Italy, whose name is well known in connection with uranium toning, has recently worked out a formula for simultaneous development and fixing which, I think, is the first step towards a really satisfactory form of this process. It employs chemicals in common use, and is readily compounded. As with previous processes of this kind, it is necessary that the exposures should be ample, otherwise fixing is completed before development has proceeded far enough. The following developing solution is made up at the time of use:—

Soda sulphite, dry	30 gms.
Diamidophenol (hydrochloride)	5 gms.
Hypo	50 gms.
Acetone	80 ccs.
Water to make	1,000 ccs.

I have obtained some excellent vigorous and well graduated negatives with the above formula, which, moreover, works perfectly with plates or films desensitised with safranine.

Keeping Qualities of Developers.

Another French chemist, M. J. Desalme, who has previously made several contributions to the subject of developers and development, has published a process which he has had in use since 1912 for preventing the oxidation of the ordinary developers, which can be used until the accumulation of bromide in the course of development renders them too slow in action. M. Desalme, after a systematic study of many reducing substances able to regenerate the developer from its products of oxidation without acting either on the latent image or the unaffected silver bromide, and also capable of addition (without precipitation) to developers containing sulphite and alkaline carbonates, has made choice of a double soda-stannous tartrate, which he prepares as follows:—Dissolve 10 gms. crystallised stannous chloride and 15 gms. powdered tartaric acid in 50 to 80 c.c.s. of boiling water. After cooling to nearly the ordinary temperature, pour this solution slowly and with constant stirring into a cold solution of 25 gms. dry soda carbonate in 250 c.c.s. of water. Make up to 400 c.c.s., let stand for at least 12 hours and filter. This solution is used in conjunction with alkaline developers by adding about 40 c.c.s. to each 1,000 c.c.s. of the working developer. In using it with developers, such as diamidophenol, not suitable to the employment of a strongly alkaline salt, the stannous tartrate solution is first neutralised, or very slightly acidified by addition of sodium bisulphite up to a point at which the mixture, after thorough stirring, slightly renders red the blue litmus paper. I have been able to keep diamidophenol developer "preserved" in this manner in good condition for over a week in an open vessel, whilst similar but unpreserved developer was useless within less than an hour. Although the stannous tartrate compound decolourises many dyes, it has no action on safranine, and it does not interfere in any way with the desensitising powers of these dyes.

My experiments with alkaline developers, other than a special developer (quinol and paramidophenol) commended by Mr Desalme, have not had the same success.

Stereoscopic Projection.

A great deal of interest is now being taken in stereoscopic projection, and a meeting of the French Photographic Society has been held for showing anaglyphs made by M. L. Gimpel on Autochrome plates. Although this method of production is, as I think, neither the best nor the most economical, it must be admitted that the results shown were truly remarkable, and, when at the end of the exhibition, those who had taken part and had not seen the relief on the screen were asked to raise their hands, not a hand was put up. While it may be possible to make stereograms direct from nature in this way by two exposures in register (this obviously limits the scope to subjects without movement) it is better to produce the anaglyph by reproducing in two successive positions the two images of an ordinary stereoscopic transparency. If, in accordance with the usual custom, the eye-pieces used for the inspection of the images provide a green screen for the left

eye and a red screen for the right, the left-hand image of the pair is reproduced on the Autochrome plate through a deep red screen such as the Wratten F., thereby allowing light to act only through the red grains of the mosaic filter layer. The right-hand image is then printed either successively through green and blue screens such as the Wratten N. or L. or at one operation through a blue-red screen such as "Minus red 4," so as to act upon the emulsion through the green and blue grains of the mosaic filter, the two images being thus complementary to each other. In order to ensure suitable register of the two images, which register, as a rule, will be made on the foregrounds in order that the subject may appear as though viewed through a window formed in the plane of the projection screen, focussing is done with the ground glass reversed (that is to say, the normal position for correction of focus, the Autochrome plate being exposed through the glass), and on the ground glass are pencilled a few marks outlining the foregrounds. The first image having been printed, the negative holder is replaced for a moment by the ground glass and the position of the second image so adjusted that it coincides satisfactorily with those marks. It will be noticed that from the fact of the reversal of the two images, the colours of which are added to each other instead of subtracted from each other as in the case of the assemblage of pigment images, the image printed under the red screen will appear, after the usual reversal, as green on a white ground, whilst the image printed under the green screen will appear in red on a white ground. The inspection of the images themselves, or on the projection screen, is done by means of a card, with two holes in it, providing a red screen for the right eye and a green screen for the left eye and corresponding as closely as possible with the Wratten A. and "minus red 4" screens. These screens can be made by dyeing fixed and washed films. A mark is made on each card to show the side which should face the observer.

At the same time I cannot help thinking that it is simpler and more economical to make these anaglyphs by superimposing two actual positive transparencies prepared on film, *e.g.*, Process film. The transparencies are respectively toned to red and green by the mordant dye process of Ives described in the "B.J. Colour Supplement," Jan. 7, 1921, p. 3.

Cinematography for Amateurs.

There has just been placed on the market, under the name of "Sept," an ingenious camera for the taking of cinematograph pictures by amateurs, and serving also for making single different pictures and also for the printing and projection of the cinema films. The apparatus, which is made in accordance with the patents (1908) of J. B. Tartara, is entirely automatic, and under good conditions can be used in the hand. It uses standard cinematograph film of about 15 ft. length, the 250 pictures obtained occupying about 15 seconds for projection, which allows of showing many interesting scenes. The spools are loaded in full daylight by means of special boxes of very simple construction, which avoid all friction on the film, the aperture in the spool-box being opened, after the box has been loaded, by a device outside the camera. A large number of very satisfactory films obtained by different amateurs was shown at a recent meeting of the French Photographic Society on the occasion of the camera being described. The apparatus has a mechanism which essentially is a Maltese Cross, but exact register of the pictures is ensured by a pin, which is caused to enter the perforation of the film at each instant that the shutter is on the point of opening, and thus corrects any error of position. And it may be added that the apparatus is made by the firm of Debrie, universally known for the high standard of its apparatus and projectors for cinematography.

L. P. Clerc.

The Affiliation Outing.—The affiliation of Photographic Societies' annual outing will take place on June 25, the ground selected being the Dorking and Betchworth districts. A capital map and programme giving the most minute details has been issued.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications May 30 to June 4 :—

Roll Films.—No. 15,384. Support of photographic roll films. C. W. R. Campbell.

Development.—No. 15,385. Means for development of photographic negatives or positives on glass plates. C. W. R. Campbell.

Lens Mountings.—No. 14,956. Lens mountings. C. H. Clarke.

Glazing.—No. 15,184. Preparation for glazing photographs. J. V. Cook and Photographs (Birmingham), Ltd.

Cameras.—No. 15,257. Cameras and easels. E. A. Green.

Camera Device.—No. 15,059. Camera-holding device. G. V. Massey.

Sound Recording Apparatus.—No. 15,377. Photographic apparatus for recording sound. H. G. Matthews.

Sound Reproducing Apparatus.—No. 15,378. Photographic apparatus for reproducing sound. H. G. Matthews.

Cinematography.—No. 15,104. Cinematographic picture taking and projection apparatus. Cinemundi and E. C. R. Marks.

Cinematography.—No. 14,997. Manufacture or cinematograph films. A. C. Coppier.

Cinematography.—No. 15,403. Cinematograph apparatus. G. S. James.

Cinematography.—No. 15,356. Cinematograph projectors with automatic rewinders. J. B. A. E. Peranne.

Stereoscopic Cinematography.—No. 15,193. Stereoscopic or curved screens for cinemas, etc. D. B. Procter.

Stereoscopic Cinematography.—No. 15,445. Stereoscopic cinematography. E. H. Wright.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Changing-Boxes.—No. 144,605 (June 12, 1919). The invention relates to changing-boxes of the type in which films are drawn by means of tabs out of a compartment having an exposure aperture into a rear compartment in which they are retained, pending removal at a convenient time in a dark room.

The ends of the tabs, in changing-boxes of this type, project through an aperture of the rear compartment, and a usual method of making a light-tight joint at this aperture is to use a kind

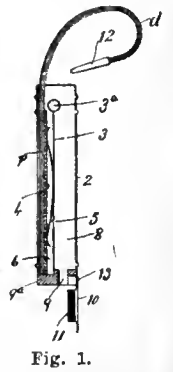


Fig. 1.

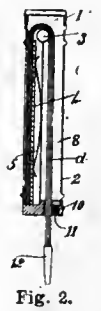


Fig. 2.

of valve comprising a strip of plush, which bears against the tabs.

According to the invention, the slot through which the tabs pass has a lateral enlargement, and the strip of plush is attached

to an arm pivoted to the box so that the strip can be rocked into, and out of, this enlargement.

In the drawings, the metal box 2 has a lid 1, fitting the top with friction and making a tight joint. This lid can be pulled off and replaced with a slight effort. The interior of the box is divided into two compartments by a wall 3 having a cylindrical guide bar 3a at the top, under the lid 1. In the front compartment 6 there is the usual packing plate 4, thrust by a spring 5 towards the front wall which has an exposing aperture 7. The floor 9a is provided in the rear compartment 8 with a slot 9, and is in part cut away at one side of the slot to form a gap or enlargement of the slot, as shown in figs. 1 and 3. A short metal arm 10 having a strip of plush 11 or the like attached to one side of it is pivoted at 13 to the back of the box, so that it can swing away from the floor, as shown in figs. 1 and 3, or lie parallel with the slot 9, as shown in figs. 2 and 4. In the latter position it is held by a catch, and the strip 11 lies in the enlargement of the slot.

The films *p* are attached in the usual manner to sheets of paper having long tabs *d*, which may be numbered. Twelve or any other convenient number of films are made into a pack, and the tapered ends of their tabs *d* are then enclosed in a metal sheath or clip 12. With the lid 1 of the box removed, as shown in fig. 4, the films are inserted into the front compartment 6, the packing plate 4 being pushed back for this purpose and then allowed to bear against the rear of the pack. The tabs, held together by the clip 12, are then passed over the guide

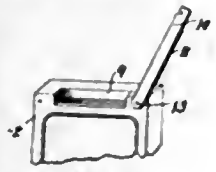


Fig. 3.

Fig. 4.

bar 3a through the compartment 8 and through the slot 9, the arm 10 being swung down for this purpose. Then the arm 10 is swung up, so that the strip 11 is pressed against the tabs and makes a light-tight joint, and the lid 1 is put on. The clip 12 can then be removed by a sharp pull. When an exposure has been made, the tab of the exposed film is pulled, so that the film is drawn over the bar 3a into the compartment 8, in which it is usually left till all the films have been exposed and collected in this compartment. Then the films are taken out, in a dark-room, in order to be developed, and the box can be filled again with another pack of films having a clip 12.—Société Anonyme des Celluloses Planchon, 237, Cours Gambetta, Lyons.

FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Particulars from the Secretary, Royal Photographic Society, 35, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, JUNE 20.

South London Phot. Soc. "Toning Bromide Prints." W. J. Shields.

TUESDAY, JUNE 21.

Hackney Phot. Soc. "Bromoil." J. W. O. King.
Manchester Amateur Phot. Soc. "One Man Show of Prints and Lantern Slides." J. D. Berwick.

THURSDAY, JUNE 23.

Kinning Park Co-op. Soc. Open Night.
Hammersmith Hampshire House P.S. "Mounting the Print." G. C. Weston.

SATURDAY, JUNE 25.

Kinning Park Co-op. Soc. Outing to Glasgow Harbour.
Hammersmith Hampshire House P.S. Affiliation Outing to Dorking.
Glasgow and West of Scot. Outing to Islands of Loch Lomond.
Manchester Amateur Phot. Society. Ramble to Warburton Church and Canal Side.

CROYDON CAMERA CLUB.

The informal session started last week with a capital lecture by Mr. S. W. Rose on "Paget Colour-Screen Plates." Many fine slides by the Paget Co. and the lecturer were shown, those of the latter, by general consensus of opinion, in most cases equalled, and in one case surpassed, any of the loan collection. Some interesting examples of the now defunct Thames plate (which may be said to have been the father of the Paget) were also passed through the lantern.

It is not necessary to follow Mr. Rose through his clear exposition of a well-known process, but some points arising may usefully be mentioned. Beginners, he said, should note that colour transparencies made for viewing by daylight are generally not the best for projection. For the latter, slides inclining to thinness and dullness of colour seem to show best on the screen. He had found that after correct registration is apparently obtained, a further minute refinement of adjustment, so to speak, will perceptibly change shades of colour. It also transpired, doubtless due to the difficulties experienced by all manufacturers in this "do, as you would never wish to be done by" country, that the Paget Co. are in arrears with colour plate orders, and speedy delivery cannot be guaranteed.

The reference to the too blue hue which the greens occasionally acquire, Mr. L. J. Hibbert pointed out that dyeing the positive a pale yellow often puts matters right. Naturally, one is not tied to this colour, for if, for instance, the prevailing tone of a slide happens to be too yellow a blue dye may effect a cure. The "Dolly" dyes, he said, are handy and supplied in various colours.

On the question of rapidity *versus* colour correction, it was pointed out by Mr. J. W. Purkis that comparatively heavy screen-plate colours are necessary for full correction, and, other things being equal, this condition slowed exposure. The Autochrome was an example of heavy colours. Mr. N. Moody stated he had tried "Desensitol" with the Paget plates, and successfully; the preliminary bath seemed to slow development somewhat. Mr. A. F. Wood was sadly distressed that no information was forthcoming about tank development, which cast the only shadow on the evening. Mr. H. P. C. Harpur thought that colour plates at present prices formed a gorgeous tonic for inducing care in exposure. Failing colour work, 15 × 12 dry-plates used in the field would be found equally effective.

It happened to be the birthday of the president, Mr. John Keane, who celebrated the occasion by directing that all obligations incurred in the purchase of bath buns, lemonade, and other commodities from the refreshment department should be met by his personal exchequer. Congratulations were the order of the day, Mr. G. H. Gardner, however, expressing sympathy that the birthday happened to drop expensively on a Wednesday. This led the tender-hearted "office boy" to inquire anxiously whether others were similarly afflicted. The evening terminated with a hearty vote of thanks to Mr. Rose.

News and Notes.

Masks and Photographs.—Do you know the latest photographic pose? asks the "Daily Mirror"; we are then told that "You face a wall and then look over your shoulder at the camera And on the wall must hang the oddest and most grotesque mask to be found. You shine by contrast, even if you are not very beautiful!"

The Scottish Photographic Circle.—An exhibition of pictorial photography will be held in the rooms of the South Glasgow Camera Club, 43, Bankhall Street, Govanhill, Glasgow, from December 3 till 17, 1921. Full particulars may be obtained from the Hon. Secretary, Mr. W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

Miss Olive Edis had the honour of giving a private view to H.R.H. the Prince of Wales, at York House, St. James' Palace, of some of the colour-photographs taken during her recent tour in Canada under the auspices of the Canadian Pacific Railway. H.R.H. expressed keen interest in the views, and the colourings of the lakes and the Rocky Mountains, and accepted some of his favourite views.

Marion's New Productions.—The current issue of Marion's "Professional News" describes a new portable electric light studio which can be packed in a case no larger than a golf bag, also a new "soft focus" single achromatic lens designed with all the features necessary for the production of soft effect portraits. The latest prices of chemicals are also given, and we notice many reductions. A copy of the list may be had on application to the firm, 3, Soho Square, London, W.1.

The "Kodak Trade Circular" (with supplement) for June deals in an interesting way with window displays; it states also that the manufacture of "Libra" bromide postcards, which had to be suspended owing to the difficulties of war-time, has now been resumed. "Libra" cards can be supplied in singles and strips, but, unless ordered otherwise, quantities of one thousand and upwards will always he sent in strips of 21½ ins.; the cards are not supplied in packets for retail sales.

Fireproofing Flashlight Smoke-Bags.—The following formula, according to "Camera Craft," is the one used for fireproofing flash-bags by one of San Francisco's commercial photographers, who highly recommends it:—Ammonium sulphate, 8 parts; pure ammonium carbonate, 2½ parts; boracic acid, 3 parts; gelatine, 2 parts; water, 100 parts. The fluid is heated to 85 deg. F., and the material (nainsook) immersed in it until thoroughly permeated It is then slightly wrung and dried sufficiently for ironing. The quantity of gelatine may be changed according as the material is to be more or less stiff.

A New "Criterion" Booklet.—A most artistic, and useful booklet comes to us from Criterion, Ltd., Stechford, Birmingham The publication bears the title, "A Treatise on the Art and Practice of Photography," and consists of forty-eight pages (8 x 6½ in.), bound in a three-colour pictorial cover. The author, Mr. William Bell, deals very cleverly, and in a chatty, free-and-easy manner with many branches of work, including bas-reliefs, retouching, bromoil, carbro and press photography. A copy of the book may be obtained by applying to the firm and enclosing two-pence for postage; early application is advisable, as there is sure to be a huge demand for it

Photographing Groundsel.—Writing in the "Yorkshire Post" on the art of photographing weeds, Mr. F. M. Sutcliffe says:—"In weed photography there will be difficulties to be overcome, as in other branches of the craft. There is the difficulty of the gardener, to whom weeds are nothing more. You pull hold of his shirt sleeve and bawl into his ear—it is odd how deaf all good gardeners are—'You see that bit of groundsel there. Just leave it alone, will you, for a day or two? I want to photograph it.' On the morrow you take out your camera, the wind having gone down, and find your ideal groundsel plant has disappeared. When you tackle the culprit, he only says: 'Yes, I heard what you was saying of, but I thought it was only your fun.' As if photography had anything funny about it." The concluding sentence of the article is but one of the many useful tips contained therein, namely, "An empty snail shell will look better to show the height of each specimen (of weed) than a foot-rule stuck in the ground."

A Playroom Studio.—The proprietors of a large store in Pennsylvania have added a photographic studio to their children's department. Instead of fixing up a photograph gallery, the firm installed a children's playroom. The youngsters who have been made ready for their pictures are taken into the playroom, where toys are scattered on all sides. They are encouraged to play with them and be natural. All the time the photographer is busy getting some exposures with a reflex camera, and, with few exceptions, they are pronounced the most life-like that the parents ever saw. The children do not know they have been snapped, and the feature is advertised as an aid to young mothers, and brings them as shoppers to the store.

Portraits by Telephone.—An Exchange wire from Paris published in last Sunday's papers, stated that all the chief officials of the Paris police attended at the "Matin" office a few days ago to witness experiments in the latest scientific methods to aid in the speedy arrest of criminals. Photographs of fingerprints were sent over the telephone wire from Lyons to Paris. Within ten minutes of the commencement of the experiment proofs were in the hands of experts, who pronounced them excellent. The second test was the sending of portraits by telephone. The transmission occupied barely eight minutes, and the pictures obtained were as clear as the original Prof. Balthazard, who witnessed the experiment, expressed his admiration to M. Belin, the inventor of the system, who stated that in the near future it would be an easy matter to send photographs of fingerprints and portraits across the Atlantic.

Economy of Water.—Partly in consequence of the coal strike, which has curtailed the pumping powers of the water companies, but principally through the lack of rain during the past few weeks, the reserves of water available for use in London have been seriously depleted. The Ministry of Health has, therefore, notified to the Metropolitan Borough Councils that it is necessary to conserve the water supplies to the utmost. Photographers can assist in this direction by keeping a careful eye upon their taps and taking care that no more water is used for print and plate washing than is absolutely necessary. In most establishments at least four times as much water as would do the work is habitually used, and owing to defective methods, even then the washing is not thorough We have repeatedly pointed out the efficacy of washing with changes of water, especially in the case of prints, as compared with the usual method of letting a tap run into the dish or tank without moving the contents. In case of a serious shortage we may remind our readers that the use of hypo. eliminators, such as Hypono or Milton, allows of perfect washing with the use of a very small quantity of water, and, moreover, with a great saving of time.

The P.P.A. and the New Postal Taxes.—Protests against the proposed new postal charges continue to be showered down upon the Postmaster-General from all parts of the United Kingdom. The letter sent from the Professional Photographers' Association read as follows:—"The Rt. Hon. F. G. Kellaway, M.P., Postmaster-General, House of Commons. Sir,—I am directed by the Council of the Professional Photographers' Association of Great Britain, which is the representative organisation of photographers in this country, to communicate with you upon the subject of the proposed increase in postal charges. The members of this Association view with consternation the proposed increase, as it will particularly injure the business of photographers and result not only in a loss to them, but in a considerable reduction in the revenue which the country derives from the use which photographers generally under existing circumstances make of the facilities afforded by the post office for the distribution of printed trade matter, and the transaction of business by means of postcards. I am instructed to point out that the proposed increase in the charges for postcards will very seriously affect the volume of trade in photographic postcards, which from the point of view of the public are a luxury, and as such can be dispensed with if their use is rendered expensive. I am to request that your serious consideration may be given to the before-mentioned aspects of the matter and to urge that postal charges should be reduced (to the advantage and profit of the country and its revenue) rather than

that they should be increased to the serious detriment of trade generally and the revenue derived from postal service.—I am, sir, your obedient servant, LANG SIMS, Secretary."

METRIC SYSTEM ADOPTED IN JAPAN.—The "Board of Trade Journal" states that the new Weight and Measure Law as passed by the Diet was formally promulgated recently by the Japanese Government, thus rendering Japan one of the metric countries. Simultaneously with the promulgation of the new Law, Director Kitsukawa, of the Weight and Measure Office, gave out a statement saying that even when the first weight and measure law was framed in 1893 Japan was desirous of adopting the metric system, but the nation was not ready to accept it, and the old systems were fully adopted. "Several times since, the wholesale reform of the weight and measure systems has been attempted," the official's statement continues, "but it was quite difficult before the war to break with the old systems and adopt the new one to which the nation was hot little accustomed. When the world war started, however, the necessity of adopting the metric system was keenly felt and the Government Bill was readily accepted by the Diet." According to the Yokohama Chamber of Commerce "Journal," within the five years beginning with the date from which the Law takes effect all public works, Government offices, schools and large factories will be made to adopt the new system, while the general public will be given 20 years' grace.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.—A preliminary programme of this year's meeting of the Photographic Convention to be held at Bristol, from July 4 to 9, under the presidency of Mr. C. H. Bothamley, has been issued. The arrangements, subject to additions and alterations, are as follow:—Monday, July 4: Members attend headquarters at the Merchant Venturers' College, Unity Street, to sign the visitors' book and obtain tickets for excursions and the annual dinner, etc., and members of the Bristol and West of England Amateur Photographic Association and of the Bristol Photographic Club will conduct parties to places of interest in the city. At 3 o'clock, in the Merchant Venturers' College, the Lord Mayor will welcome the members of the P.C.U.K. to Bristol; installation of the president, who will deliver his inaugural address; election of new council. Reception at the Bristol Art Gallery in the evening at 7.30. Tuesday, July 5: Excursion to Gloucester, where permission to photograph in the Cathedral has been kindly granted by the Dean; lecture in the evening, by Mr. C. F. W. Dening, on "The Old Houses of Bristol," with lantern illustrations. Wednesday, July 6: Bristol Cathedral, in which permission to photograph has been kindly granted by the Dean; St. Mary, Redcliffe, where permission to photograph has been kindly granted by the Revd. J. N. Bateman Champain. In the afternoon visits will be paid to the tobacco factories of Messrs. W. D. & H. O. Wills, and to the chocolate factories of Messrs. J. S. Fry & Sons, Ltd. Arrangements are being made for an afternoon gathering at which the official group will be taken, and in the evening at 7.30, the annual dinner and smoking concert will be held at the Royal Hotel. Thursday, July 7: Long day excursion to Chepstow and Tintern, with lunch at Chepstow and tea at Tintern. As the hour of return from this excursion may be late, there will be no evening lecture, but an informal meeting may be arranged. Friday, July 8: Motor excursion to Bath and Lacock Abbey. At Bath the old Roman baths and the abbey may be photographed. After lunch, Lacock Abbey will be visited via Bradford-on-Avon; Lacock Abbey was the home of Fox Talbot, the contemporary of Daguerre and the pioneer of photography in this country; a collection of his early apparatus, experiments and work will be displayed at the Abbey for the visit of the Convention. In the evening there will be an illustrated lecture by Mr. C. P. Crowther. Saturday, July 9: The Bristol docks and shipping, and the Zoological Gardens, in addition to many other points of interest in the city, will provide a day's work with the camera. During the week an exhibition of pictorial photography will be held at the headquarters, the Merchant Venturers' College, and arrangements are also being made for a trade show and demonstrations. The programme, which is obtainable from the hon. sec., Mr. F. J. Mortimer, 56, Leigham Court Road, Streatham, S.W.16, also contains a comprehensive list of hotels and boarding houses, with tariffs.

Correspondence.

**** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

**** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE PERSULPHATE REDUCER.

To the Editors.

Gentlemen,—In "Answers to Correspondents" in your issue of June 3, page 332, I notice that you recommend a formula for a persulphate reducer, with alleged keeping properties, containing sodium sulphite and sulphuric acid, at the same time expressing the opinion that the sulphite would be oxidised by the persulphate. Since this oxidation of course takes place, it follows that solutions of this and similar composition should be *less* permanent than a plain solution, and this was confirmed experimentally by Namias and Baschieri, "B.J." 1907, page 940, who showed that they possessed no advantages over the simple solution.—Yours faithfully,

G. I. HIGSON

British Photographic Research Association.

MICROPHOTOGRAPHY.

To the Editors.

Gentlemen,—In your "Answers to Correspondents" I notice a brief reference to microphotography—not photomicrography, be it noted—an almost forgotten branch of photography to which some further attention might be given.

Microphotography, however, was never very popular in this country, we always getting, years ago, a plentiful supply of specimens from the French, who were looked upon as being—as they undoubtedly were—past-masters of the art of microphotographic work. Indeed, I know of only one English worker who followed up the subject very closely and produced the most perfect results, this was the late Mr. J. I. Pigg, who just before his death was engaged upon a task of simplifying the now rather difficult process. One of Mr. Pigg's interesting examples was a page of the "British Journal" reduced down to one thirty-second of an inch, and every letter in this miniature reproduction of one of your pages could be read distinctly under the microscope; the examples he produced were in the form of microscopic slides, he being unable to obtain the small magnifying lenses used by the French manufacturers of penholders, etc., in which the miniature pictures were once commonly used. Perhaps one of your Parisian readers can tell us who makes or supplies the small "pin's-head" lenses, as all my efforts, both here and in France, to trace the manufacturer, have been in vain. It is just possible that the industry has disappeared.

As you say in your reply, a knowledge of the wet-plate process is necessary, but having this knowledge the actual making of the pictures is, I think, easier than many people imagine. Working instructions are extremely rare in photographic literature, and a few brief details of Mr. Pigg's method of working may be of interest, if not of service.

The most suitable objective is one of about 1 in. focus, and a camera is not required for the making of the very small picture, the prepared plate being fixed in the microscope stage and exposed in that position, the operation being carried out at night or in the darkroom.

A good negative—preferably a half-plate—of the original subject is first required, and this, of course, is taken in the usual way, and it is from this negative that the miniature positive is printed by reduction. The microscope, with the eyepiece removed and the objective in its place, is arranged in a horizontal position, and the negative placed about 24 in. from the lens, the open end of the microscopic tube facing the negative, the latter being arranged with ground glass so that the light comes through it as when enlarging, or reducing. The reduced image of the negative given by the objective is roughly focussed on a piece of white paper placed on the stage of the microscope, a strip of glass is then coated with collodion and sensitised, and then placed in the stage, the final and finest focussing being done with the help of a magnifier on the collodion, which, of course, will be fogged during the focussing. When the

correct focus has been found, the light is shut off, another portion of the sensitised slip—or a fresh piece—placed to receive the image and the exposure made. As it is so easy when all is arranged, it is advisable to make several exposures on the one strip.

As an exceptionally fine grain is necessary, pyro and acetic acid should be used as the developer, this developer giving a finer grain than the usual iron developer.

Such is the process in brief, the details, however, are quite sufficient for those who understand the microscope and wet-plate photography.—Yours faithfully. W. T. L.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

H. P.—There is no danger in using sea water for washing negatives and bromide prints provided you give a good rinse in fresh water afterwards.

P. E.—Many local newspapers do not pay more than has been sent you, and we daresay your people could show such are customary rates. Still, it might be worth while returning the remittance and submitting an invoice of 10s. 6d. for each print.

M. C.—We can hardly give you any useful information as to wages, as there are so many branches of work and in each varying degrees of efficiency. We do not think any decent firm would offer less than £3 weekly for a competent general assistant (male).

B. A. G —Stippling with zinc white is apt to slow the light, as the oil used soon turns yellow. A better plan is to use ordinary starch made as for mounting, mixed with a little whiting. This will not discolour, and you can easily wash it off for the winter. The Anschutz type of camera would be more convenient for your work. For a 5 × 4 about 5 or 6½ inches would be the best focal length. It is advisable to buy the camera ready fitted with the lens, as the camera has a fixed extension, and the focussing has to be effected by a screw movement. Even if you had a suitable lens and could buy a camera without a lens (which is not likely) it would cost a good deal to adapt it properly. You can do nothing to stop the Press from using your grouping; perhaps some day you will be glad to have a chance of doing the same.

M. E. J.—Under the Copyright Act you can demand delivery of all the copies of the book or other publication containing the photographs of yours, the copyright in which has been infringed. You are also entitled to damages, in which case, as no doubt your solicitor advises you, it is necessary to show the amount of the damage which you have sustained. Usually in such cases, where photographs have been produced without deliberate intention to infringe, photographers are ready to allow the sale of the publications to proceed providing a reproduction fee is paid in respect of each of, say, double the customary amount. As the minimum now for many reproductions is about 15s., we should think the people who have infringed your work would be very glad to settle the matter at 30s. apiece.

O. G.—(1) We certainly think you could make up with half the quantity of water and develop in about 10 minutes. (2) Bromide slows the developer considerably, best not to use more than is necessary to keep the negatives free from fog. An acid amidol developer needs very much less bromide for this purpose than other developing formulæ. (3) If the backing consists of an opaque pigment we think you may take it that it is inert in the developer, but if it is a dye, which usually means a transparent backing, the dye may have an effect on the developer, as has been recently discovered in connection with desensitising. But the effect is probably to make the developer slower or more rapid in action. (4) Cut films are liable to float about in an ordinary developing dish. One way of keeping them under the solution is to arrange a few dabs of plasticine at the bottom of the dish and gently press each film by means of a clean glass plate (not the fingers on to a little disc of the plasticine before flowing on the developer. (5) 10 ozs. of developer ought to be ample for treatment of six 3½ × 2½ films.

S. C.—The following method of waterproofing prints is said to be very good, but we have never tried it. After hardening, the prints should be dried, and then well sized, or floated upon a 25 per cent. solution of warm gelatine, and again dried. They are then varnished with the following mixture:—

Mastic	1½ oz.
Oil of lavender	¼ oz.
Alcohol	5 ozs.
Benzine	4 ozs.

This should be allowed to stand eight days, then decanted and used. This is a suitable finish for photographs to be framed up without a covering glass. You do not say what kind of prints are to be treated, or for what purpose they are required. Probably the following more simple print varnish would serve the purpose:—

Borax	150 grs.
Pale yellow shellac	300 grs.
Soda carbonate	50 grs.
Glycerine	150 minims.
Water	5 ozs.

Boil, cool, and add 5 ozs. of alcohol. Add pumice powder or whiting to throw down the lac wax, shake up, allow to stand a few days, and filter.

J. E. D.—(1) It is very difficult to give any idea of prices without knowing the class of trade you do; that is to say, what your customers can afford to pay On the basis you give we think that you should charge at least £2 2s. per dozen for the groups. It is to be remembered that out of this sum you have to pay rent, rates and taxes, wear and tear of apparatus, and your own living expenses. One shilling per hour is far too little to charge for your time; besides you spent more than half an hour on this job if you take into consideration developing, fixing and washing the negatives, packing and posting them to the trade house, and again delivering to the customer. (2) We believe that you can get an account book which might answer your purpose from Messrs. Marion and Co., 3, Soho Square, London, W.1, and we think that Messrs. Kodak, Kingsway, London, W.C.2, can supply you with a card system, which is what most photographers use. (3) As you do not appear to have any idea of book-keeping in general it would be a good plan for you to get (through your bookseller) "Munro's Elementary Book-keeping," published by Effingham Wilson, London; the pre-war price was one shilling. This will give you a clear idea as to starting a set of books.

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THE BRITISH

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Contents.

SUMMARY

Mr. E. J. Bedford describes the results of carefully conducted experiments made with the object of determining the best lens separation in the stereoscopic photography of small objects on a large scale in respect to the preservation of natural perspective when viewed in the stereoscope. (P. 367.)

In the third chapter on the H. and D. doctrine the effect of development on a plate having (through correct exposure) the density ratios in the correct relation is considered. It is shown that at one given point in development the contrast is equal to that of the subject and is expressed numerically by the value known as gamma. (P. 372.)

The second and concluding part of MM. Lumière and Seyewetz's contribution dealing with desensitisers is given this week (P. 370), also some editorial comments on the investigations. (P. 366.)

In much of the enterprise which is being shown as regards lighting and finishing of portrait photographs there is the tendency to neglect the most important quality, namely, likeness. (P. 366.)

Even in the case of the small cameras, now so popular, there is a limit to the depth of field, neglect of which is responsible for out-of-focus results, as is also accidental shifting of the focussing scale as a whole. (P. 365.)

An amended list of judges who are to act at the Royal Photographic Society's forthcoming exhibition, along with a rule concerning the sizes of mounts, will be found on page 378.

Formulæ and apparatus for the correction of aerial photographs which have been made with the lens axis in a non-vertical position are contained in a recent patent specification. (P. 375.)

A correspondent draws attention to a circular sent out by the Central Districts Branch of the London Master Printers' Association explaining the several varieties of picture and other postcards. (P. 379.)

Actual stereoscopic photographs were used by Professor C. Piazzi Smyth to illustrate his work, "Teneriffe, an Astronomer's Experiment," published in 1858. Some particulars of this unique publication will be found on page 365.

A method of eliminating troubles met with when using the developing tank in hot weather is described in our correspondence columns. (P. 379.)

Qualified medical practitioners who undertake X-ray work are now known as Radiologists, and qualified non-medical workers as Radiographers. (P. 380.)

EX CATHEDRA.

Focussing Small Cameras by Scale. Many users of small cameras fitted with large-aperture anastigmats can give abundant instances of unsharp negatives through error in estimating the distance between the camera and the subject. We are often too much in the habit of associating short-focus lenses such as are used upon these cameras with immense depth of field, and it should be pointed out that there is a limit to depth when very near objects are being photographed. Within ten or twelve feet the distance to a foot should be very carefully measured either by pacing the distance out, or by the help of a distance gauge, an necessory by the way. That used to be far more in evidence than now. Another cause of unsharp negatives with small cameras is that the focussing scale does not exactly fit the lens when distances beyond the infinity point are required. Focussing scales for many cameras are all marked the same, and though they may give quite a sharp image at infinity with all lenses, when nearer objects are being focussed the lens and the scale may no longer be in exact unison. On one camera that we recently examined the lens gave perfect definition at infinity, while an object carefully measured eight feet away was decidedly unsharp when the scale was set at that distance. Users of small cameras frequently make the mistake of misjudging the infinity distance and setting the scale for a slightly nearer point than is actually required. In practice it is surprising what a number of pictures may be taken with the lens at infinity, even with large-aperture anastigmats.

* * *

Stereoscopic Publishing in 1858. By the kindness of our old friend, Mr. Thomas Bolas, there has recently come into our possession a copy of the rare work which we happened to mention some weeks ago in writing of the early literature of photography which is to be found described and priced in the "Bibliotheca Chemico Mathematica" issued by Messrs. Sotheran. This is the volume "Teneriffe, an Astronomer's Experiment," by C. Piazzi Smyth, published by Lovell Reeve, Henrietta Street, Covent Garden, in 1858. It is a work describing the mission undertaken in 1856 by Piazzi Smyth for the Admiralty for the purpose of ascertaining to what extent astronomical observations could be improved by mounting the telescope at a great height. Mr. Smyth, therefore, proceeded to the Canary Islands, where observations at over 10,000 feet above the sea level were carried out. The volume, however, is not altogether a technical account of this scientific work, but a story of personal experiences in the mountains of the Canaries; and its chief interest from the historical photographic standpoint is its inclusion of a number of actual stereoscopic photographs representing scenes in Teneriffe. We think that there is no doubt that these photographs represent the first known use of stereoscopic photography in

the illustration of books. Under each print it is pointed out that they were made by A. J. Melhuish, under the superintendence of James Glaisher, F.R.S. The prints are, of course, by the early albumen process, and it speaks well for the permanence of the sometimes despised silver processes that, although there is some marked yellowing of the high-lights, there is very little evidence of actual fading of the image. In fact, many of the prints, we should say, are practically as vigorous as when they were made.

* * *

Likeness First. The young photographer who is possessed of a certain amount of artistic training and instinct is apt in his strivings after effects of lighting and composition to overlook that aspect of portraiture which is foremost in the minds of his customers, the likeness to the original. A couple of generations ago a photographic or even a painted portrait was commonly called a likeness, and it is a likeness that nearly all sitters, except society beauties, hope to get when they visit a studio. To this end the photographer should be chary in the use of unusual lightings or poses and avoid excessive retouching. In the finishing of enlargements there is great danger of losing the likeness by attempting to idealise the sitter, some very clever workers making this error. At the same time it is desirable to make the best of our subject, but not to bore him. Some of the best portraits have been secured when the sitter has relaxed after an exposure and has been caught with a natural expression which was previously absent. There has lately been a fashion of talking to the sitter while the exposure is made, but it must be sensible talk and not obvious cackle, such as we have sometimes heard.

NEW WORK ON DESENSITISERS.

The communication on desensitisers by MM. Lumière and Seyewetz, the concluding portion of which appears in our present issue, is one which will enable a clearer perspective of the subject to be obtained than has been possible hitherto. It places before those whose knowledge of languages does not extend beyond the "King's English" the first lucid account of qualitative and quantitative experiments with various substances, more or less well known to photographers, which appeared, from theoretical considerations, to be likely to act as desensitisers. It is quite appropriate that these workers should have taken up the investigation of this matter, for, as we have pointed out before, it was whilst probing results which they had obtained many years ago, that Lüppo-Cramer came across the germ idea which eventually led him to phenosafranine. With characteristic alacrity and thoroughness MM. Lumière and Seyewetz have returned to the subject, and have continued the research for the mutual benefit of the theorist and the practical worker.

The theorist might perhaps be disposed, on the first reading of the communication, to criticise the methods which were used in the testing of the ordinary, as distinct from the panchromatic, plates; it cannot be denied, however, that the tests applied, duplicated as nearly as possible, the actual conditions under which the practical worker would use desensitisers. Further, it is evident that these rapid practical tests expedited the progress of the research. Surveying the dyes which were already known to act as desensitisers, a programme was mapped out which had for its main object, we imagine, the elucidation of the theory of desensitisation. The photographer who is acquainted with the chemistry of dyes will appreciate the difficulties which had to be surmounted in the preparation, in pure form, of those likely dyes and intermediates which, as the authors say, are not obtainable commercially, and will congratulate our contributors on their achievements in preparing these bodies. Having, in one way or another, procured their products, they proceeded to separate them roughly into two well-defined classes. The majority of the substances proved to be useless as desensitisers in spite of the fact that they were constitutionally related to those which, by reason of their positive action, were considered worthy of further investigation. Quite early in the work, therefore, and employing only comparatively rough tests, they were able to conclude that desensitisation power was not concomitant with a certain arrangement of the various groups of atoms in the compounds which they were using. By comparing the constitutional formulæ of neutral violet and neutral red, for example, this conclusion will be at once justified. As stated in the text, the accepted formula for neutral violet may not be the correct one, but it is interesting to note in this connection that the introduction of a methyl group (CH_3) imparts an activity suggestive of, but much more pronounced than, that which results from the introduction of the same group into the well-known developer para-amidophenol, giving monomet.

Having narrowed down the selection of dyes, etc., the next part of the research—and, in our opinion, the most important part—was undertaken. It constituted an attempt, on somewhat different lines from those which have been used by Lüppo-Cramer to give a numerical value to the desensitising effect to any treatment. In order to make the matter clearer to the general reader we might perhaps indicate in non-technical language an equivalent of their procedure. It will simplify things if we assume that a strip colour chart of the spectrum of daylight is the test object, and that it is placed in the ordinary way on an easel in front of the copying camera. If in copying this spectrum chart, average daylight being the illuminant, a "pan" plate be used in the camera, and if the plate is equally sensitive to all colours, it is easy to see that the negative obtained will be a perfectly uniform grey strip. If the plate is less sensitive to some colours than to others, the particular portions of the negative representing the colours to which the plate is relatively less sensitive will be thinner or less opaque than the rest of the strip. By measuring just how much thinner the image is in these areas some idea of the relative sensitiveness of the plate to the particular colour can be obtained. A very simple addition to the outfit, however, will enable us to get a negative of the strip which shows automatically the relative sensitiveness of the plate for any part of the colour chart. All that is necessary is the placing in front of the plate in the dark slide of a device (wedge) which cuts off no light along one edge of the image and has a gradually increasing light-stopping power across its width. Assuming that the light-arresting material in the wedge stops all colours with equal facility, *i.e.*, exhibits no selective absorption, it is clear that any negative of the spectrum chart taken behind such wedge will show a deposit of silver at a greater distance from the edge of the image which received the maximum exposure, the more sensitive to that particular colour is the particular plate in use. The heights of the image from the most exposed edge thereof are thus a measure of the sensitiveness of the plate. Although the photographic investigator does not employ such "studio" methods, he works on exactly the same principle, and by tracing a line along the extinction boundary of the negative he gets such a curve as that given for example on page 370 this week. Again, by ascertaining the relative exposures which have to be given to two plates in order that the heights of the negative

image representing say, the red portion of the spectrum chart, shall be equal, the relative red sensitiveness of the two plates can be obtained and expressed numerically. A combination of both these methods has been successfully used by the authors of the communication enabling them to give exact information of first-rate importance. It would be well if all future work on desensitisation were thus quantitatively carried out—giving the specialist in each branch of photography just the information he desires, whether it be in reference to the illumination of his dark room or to the selective depression of colour sensitiveness of his sensitive materials before use. It is conceivable that selective desensitisation might obviate the necessity of a yellow screen in orthochromatic photography.

Turning now to the results and conclusions of MM. Lumière and Seyewetz, one is struck by the fact that the efficient desensitisers are mild "oxidising" compounds, a circumstance which lends support to the recently published assertion of Lüppo-Cramer that desensitisation is an oxidation phenomenon. One cannot interpret this expression in the usual chemical sense, for the restoration of sensitiveness consequent on washing out the desensitiser indicates that no permanent modification of the emulsion results from treatment with the desensitiser. To adopt similitude, one may regard desensitisation as the addition to the gelatine of a substance which just satisfies the appetite which the gelatine normally has for the "something" which is liberated by light action from the sensitive salt. Further, it might be suggested that this satisfying of the appetite does not result from a digestive process (which could be looked upon as the equivalent of a chemical reaction between desensitiser and gelatine), but rather from the mere "tasting" of the desensitiser, removal of which leaves an unimpaired appetite.

Several questions will no doubt suggest themselves to the interested reader, the correct answering of which would advance our knowledge of the whole subject of sensitisation. Such questions for example as:—Is the depression of sensitiveness induced by a given desensitiser applied in a definite way a constant factor of the initial sensitiveness, or is the residual sensitiveness remaining after treatment of the same order of magnitude no matter what was the initial sensitiveness of the emulsion? Does desensitisation reduce the sensitiveness to that of an unripened emulsion composed of the same materials, or to that of the same sensitive salt emulsified in a non-reducing carrier such as collodion? Is a given desensitiser active in the same regions of the spectrum for collodion colour-sensitised plates as for colour-sensitised gelatine plates?

These and similar questions can only be answered by the acquisition of information of a quantitative nature, and photographic science is indebted to MM. Lumière and Seyewetz for a description of their methods of working. The practical photographer is indebted to them for specific information on several points, amongst which must be mentioned that relating to the choice of desensitisers for bromide paper. On behalf of photographers in general, therefore, we express the hope that the authors will continue their work and give us the benefit of their further results, results which may materially enhance the value of our art in its application for the exact determination of the magnitude of phenomena with which the physicist, chemist, and scientist in general concern themselves.

STEREOSCOPIC LENS SEPARATION FOR NEAR OBJECTS.

The lack of practical information concerning the stereoscopic representation of near objects probably arises from the fact that until comparatively recent times no work, or, at least, very little, had been attempted in this direction.

During the past few years, however, many nature photographers have turned their attention to securing stereoscopic records of natural history subjects, accompanied, as they are, by faithful presentments of form, texture and even colour when required. The question arises, therefore, what are the best methods to employ in order to secure the most accurate results, and one point of considerable importance is, what is the best lens separation to use when taking near objects. This article is an endeavour to assist in the solution of the problem.

For the present purpose the term "near objects" may be taken to mean those photographed natural size, and may include also those represented on a scale of half full size, and small specimens enlarged to 12 diameters or more.

The writer recently carried out some experiments with the view of arriving at some practical data to work on, and the results of some of these experiments will follow. The point specially borne in mind was to determine, by practical methods, the best separation of the lens centres, in order to obtain *natural* as opposed to *exaggerated* relief. The point at issue does not seem to have been considered by the makers of stereo. apparatus, no commercial cameras on the market allowing for the small separation necessary for these near objects.

The pair of lenses are usually fitted to work at a fixed separation of 3¼ inches, and in the small number of cases where a variable separation is provided, it is arranged to work between the limits of 2¾ ins. and 3½ ins. or 3¾ ins. We have been told that this separation of 3¼ ins. is for the purpose of giving slightly exaggerated relief.

But why should we have this exaggerated relief when the whole process of stereo. photography is to present objects as seen in nature? The fact is, exaggeration has become so universal that when it is absent the representation is criticised as flat.

The average separation of the eyes being about 2½ ins. or slightly more it seems reasonable to argue that when photographing the average subject, the separation of the lenses should agree with the separation of the eyes. (We are not dealing now with exceptional cases either of very near objects or of very distant ones, e.g., the moon.) As a matter of fact, the more distant parts of an ordinary scene show very little relief to the eyes of an observer, and consequently should not be expected to do so in a stereograph.

The writer's experiments have been carried out with particular reference to the correct stereoscopic representations of comparatively small natural history specimens, such as entomological or botanical subjects photographed full size, where truth of effect is an important factor.

There are a good many naturalists engaged upon this class of work at the present day, hence the importance of a correct solution.

The "British Journal of Photography" for December 12, 1919, p. 725, contained a formula given by Mr. C. E. Benham in reply to a correspondent, and this has been reprinted in the 1921 "B.J. Almanac," p. 351. He sums up his remarks

as follows:—"Practically, therefore, a quarter of the distance of lens from object will give the separation distance for objects at close range."

There is not the slightest doubt that greatly exaggerated relief will be obtained if this formula is followed. The substitution of 1-20th for ¼th of the distance will give results more akin to those perceived by the eyes of an observer. The distance of distinct vision he gives as 12 ins., and this may be adopted as a standard. It would be, also, the distance of object from lens when photographing it full size, with a lens of 6 ins. equivalent focus.

In the table below the separations given by Mr. Benham are shown in column A, while those given by Mr. T. J. Ward are in column B. Those recommended by the writer are given under C, and as will be seen, are less than a quarter of those given under A.

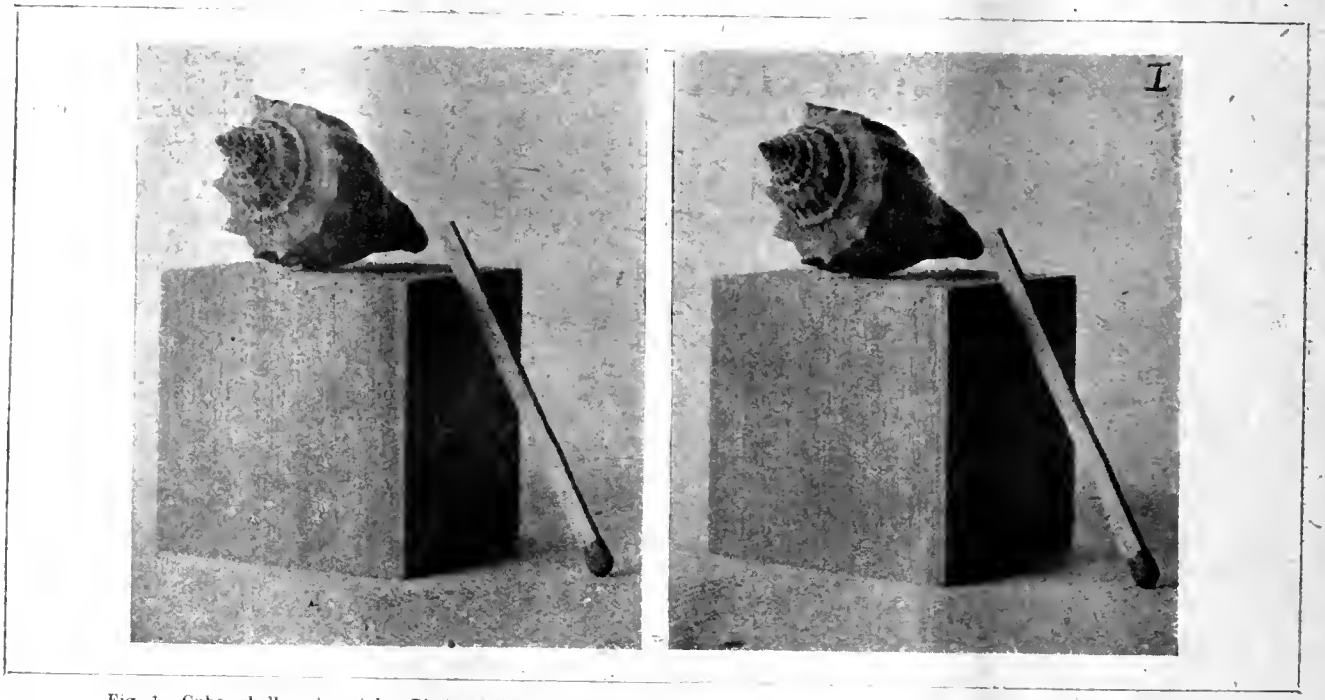


Fig. 1.—Cube, shell and match. Photographed same size. Lens focus, 5¾ in.; stop, f/22 (nominal); separation, ⅝ in.

For easy reference the fractions are given in 32nds of an inch.

Distance of object from lens.	Separation required (inches or part of an inch).		
	A.	B.	C.
12 ins.	2 24/32	1 8/32	20/32
10 ins.	2 9/32	1 1/32	16/32
8 ins.	1 27/32	27/32	13/32
6 ins.	1 12/32	20/32	10/32

When the object is still nearer the lens the separation required may be found by means of a proportional sum either graphically or otherwise.

Using the 6 ins. focus lens for other proportions of images to original the following distances may be taken:—

Scale	×½	×¼	×⅛	× less than ⅛
Separation	1 in.	1½ in.	2 ins.	2¼ ins.—2¾ ins.

It is not advisable to exceed a lens separation of 2¾ ins. for any scene which embraces objects varying in distance from 10 or 12 ft. to infinity. Unfortunately, theory and practice do not always agree, and when they differ it is safer to adopt procedure which has been proved by practical experiments to be correct. Illustrations are shown in support of the separations given under C, and to show the effect of those given under B and A.

To the practical worker who may not have given the matter serious consideration before, probably the first question will be:—How are the small separations given under C to be arranged for? In reply, it may be stated at once that they cannot be satisfactorily used, when it is necessary to give one exposure, with the pair of lenses, as would be required in the case of a subject where movement was possible. In such cases the best thing to do is to take the photograph on a scale small enough to allow for the required separation, and if a larger image is required, to obtain it either by making an enlarged negative or a direct transparency in the camera.

In the great majority of cases, however, the subjects will be such as allow of two successive exposures.

When the required separation is very small a separate plate must be used for each exposure, and a quarter-plate or 3½ in. × 2½ in. camera will serve the purpose very well; all that is necessary being to slide it bodily to right (or left) for the required separation, between the two exposures. Another method is to rotate the object, but this will not be satisfactory unless the angle of light can be altered also to give identical light and shade for each position. If a half-plate camera is employed, the dark slide can be fitted with a carrier to take a quarter plate, and the two exposures may be obtained as with the quarter-plate camera.

Another convenient arrangement for a half-plate or post-card-size camera is to fit a sliding front long enough to allow of a movement of about 1¼ ins. each way without letting in light at the sides of camera front. The sliding front is fitted with a flange to carry one lens and a scale provided with zero mark in the centre, so that the lens may be shifted to right and left successively, the camera remaining fixed. In this case it will be necessary to inspect the image on the screen before each exposure, to see that it comes on the plate, and in order to secure this, it may be necessary to rotate the camera on its axis slightly. As this would reduce the separation somewhat, allowance for it should be made when shifting the lens.

In order to prevent mistakes when the two exposures are made on separate plates, it is well to carry out the work under certain rules. Expose for the left view first, and let this always bear an odd number—1, 3, etc. The drill sergeant's instruction, "left, right, left, right," may help to fix this on the mind. Let the right view be on a plate numbered 2, 4, etc., and if the plates before development are marked L or R with a lead pencil it will prevent mistakes. Bear in mind

that no transposition of prints will be necessary in this case, the negatives marked L will give the left-hand print.

Presuming a half-plate or other size stereo camera is used to obtain the two images on one plate, the probability is that the septum will not extend far enough to allow of an extension of 12 ins. If it will not the best thing is to remove it temporarily, and to fit a black card into the back of camera as near focussing screen as possible to cover up half the space. The two images should be inspected on the ground glass in turn by sliding the front with the one lens, shifting the card, of course, to allow each image to be seen. When one exposure has been made the slide should be closed and withdrawn, the card shifted to the reverse side of camera, the slide re-inserted, and the second exposure made. Always expose the *left* view first, the card, of course, being always on the right hand to start with. The card in the back of camera, where it can be seen, is safer than one in the dark slide, which may or may not work. An alternative method is to make use of a dark-tinted card cut the required length and width to fit roughly, and stand upright down the centre of the bellows and reaching from the lens board to focussing screen. In this case, if the two images are inspected on the screen, and the lens positions noted before the first exposure is made, there will be no necessity to withdraw the slide between the two exposures.

In the opinion of the writer the most suitable lenses for the

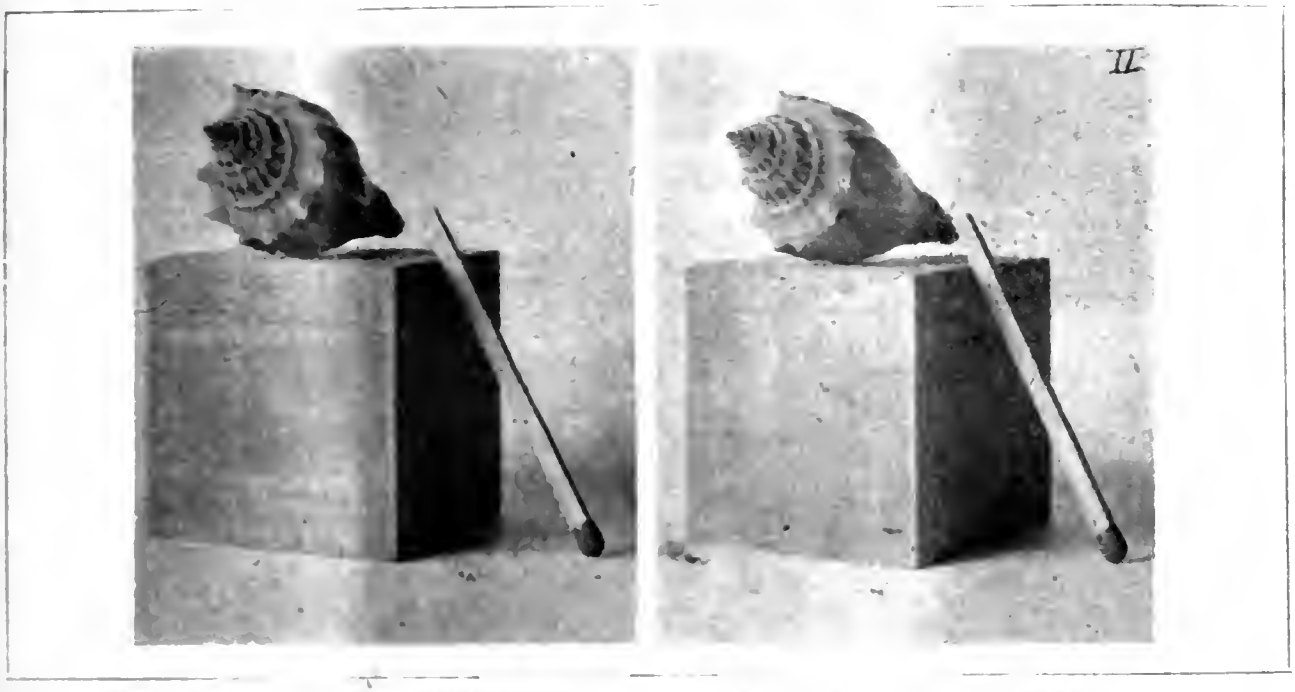


Fig. 2.—Cube, shell and match. Photographed same size. Lens focus 5¼ in.; stop, f 22 (nominal); separation, 1¾ in.

Fig. 3. Cube, shell and match. Photographed same size. Lens focus 5¼ in.; stop, f 22 (nominal); separation, 2¾ in.

majority of stereo subjects are those with an equivalent focus of from 5 to 6 ins. One word with reference to the separation of centres for the mounted prints. Generally, it will be found that a distance equal to the separation of the eyes, i.e., from 2¼-2⅝ ins. will be best. In no case should the separation exceed 2¾ ins. if an easy coalescence of the two images is desired. This will suit any kind of stereoscope in general use. The eye strain produced by trying to combine a wider separation is not conducive to comfortable viewing of prints.

The provision of suitably mounted lenses does not appear to have received the attention it deserves from opticians. The mounts and flanges of lenses for stereo work might often be reduced in size to allow of a smaller separation between their centres being more easily obtained. It ought to be possible to obtain a separation of 1½ ins. between a pair of 6-in focus lenses, working at about *f*/6.5, and a larger aperture than this is not desirable, nor is it often necessary or advantageous to employ one as large as this in stereo work on account of the want of depth of field.

The Illustrations.

Out of a number of experiments the following have been selected to show the effects produced by the three different separations of lenses. Each subject was taken full size, and in each case the distance of object from lens was 11½ ins. All three were taken with a lens of 5¾-in. equivalent focus at *f*/22 aperture (nominal). In the case of fig. 1, the lens separation was ⅝ in.; in that of fig. 2, 1¼ ins.; and in that of fig. 3, 2⅜ ins.

The edges of cube were 1½ ins. long, the longest axis of the shell was 2 ins.

In these examples notice particularly the apparent greater width of the face of cube in shadow in fig. 3 (the widest separation); also that the match does not appear to lie in a vertical plane as it should do, and as it does in fig. 1.

The writer hopes that these examples, from a large number of experiments which he has carried out, may be of interest and practical use to those workers who are striving after the most accurate results in the fascinating branch of stereoscopic nature photography.

E. J. Bedford.

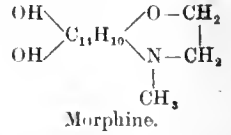
EXPERIMENTS ON DESENSITISERS.

(*Concluded from page* 354.)

Non-Coloured Organic Compounds.

We have examined a great many organic compounds of very different properties, both oxidising and reducing substances. None of the oxidising substances, among which is quinone (the starting point of the safranines), appeared to possess any desensitising action.

Organic compounds having reducing properties are limited to developing substances containing amino groups, and their desensitising properties have been pointed out by Lüppo-Cramer in the case of diamidophenol, diamido-resorcin, triamidophenol, triamido-benzene, triamido-toluene, and paraphenylene-diamine. We have studied the action of other nitrogen organic substances, and particularly a large number of alkaloids. Only one of these has been found to exhibit desensitising properties comparable with those of diamidophenol hydrochloride. This is *apomorphine hydrochloride*, which is regarded as a product of the dehydration of morphine.



Morphine.

The solution, which has oxidised in the air and become of blue colour, is more active than that freshly prepared.[3]

Desensitising Action of Mineral Substances.

Among the most varied mineral substances, both reducers and oxidisers, which we have examined, none appears possessed of desensitising properties of special interest.

Many oxidising substances, such as copper salt, alkaline bichromates, chlorine and bromine water and iodine solution, greatly reduce the sensitiveness of unexposed gelatine emulsion, but equally attack the latent image, and, therefore, are useless in practice.

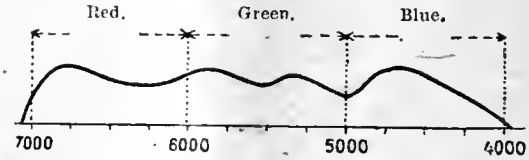
Neutral chromates, and especially neutral potassium chromate in 2 per cent. solution, are the only mineral substances which we have found of any value as desensitisers. Their action is somewhat less than that of diamidophenol, but they have the advantage of giving stable solutions.

(3) The constitution which is generally attributed to apomorphine does not seem in accordance with its reducing properties, and particularly its property of developing the latent image on addition of alkaline sulphite and carbonate to a solution of its hydrochloride.

Desensitising of Colour-Sensitive Plates.

The experiments already described were all made with ultra-rapid ordinary plates (Lumière Violet Label), and the results therefore relate chiefly to the reduction of sensitiveness to blue and violet rays. We have also examined the most active of the desensitisers in respect to their behaviour with panchromatic plates in comparison with safranine, which, as has been shown by Lüppo-Cramer, desensitises emulsion for all parts of the spectrum.

For this purpose we used panchromatic plates (Lumière Chroma VR plates), the colour-sensitiveness of which extends a little beyond 700. The curve of colour-sensitiveness of this plate is as shown in the drawing.



These plates were exposed in the spectroscopic camera and then immersed, in the dark, for one minute in the following desensitising solutions:—

Phenosafranine, 1: 2,000 solution; also in the other safranines mentioned above as giving results comparable with phenosafranine.

Toluylene red, 1: 1,000 solution; immersion for 4 minutes.

Aurantia (ammonium salt), 1: 1,000 solution.

Pieric acid, 1 per cent. solution.

Indian yellow, 2 per 1,000 solution.

Chrysoidine, 1: 2,000 solution.

Diamidophenol, 1 per cent. solution.

Apomorphine hydrochloride, 1 per 1,000 solution.

Neutral potass chromate, 2 per cent. solution.

After immersion in the desensitiser these plates were developed for 1½ minutes in the dark with normal diamidophenol developer, and then for 2 at a distance of from 4 ft. to 18 ins. from a 16 c.p. incandescent bulb screened with tartrazine paper and yielding a very bright light. During this development plates were examined four times (for 3 seconds each time) by transmitted light.

Under these conditions the plates treated with the various safranines already mentioned, and also those treated with toluylene and aurantia (ammonium salt), gave images having

only very slight fog, whilst all the others were strongly fogged.

If this intense light-source be replaced by weaker illumination, *e.g.*, by a small Pigeon lamp, with the maximum height of flame adjusted so that the lamp does not smoke, and with a bright yellow screen round the lamp (without taking any precaution to prevent escape of diffused white light above the screen), by developing under the same conditions as already mentioned and at a distance of 0.50 metres from the light-source, the results are the same as those already described. *Only the safranines, toluylene red and aurantia* gave images which were not fogged. None of the other substances could be employed for desensitising panchromatic plates.

Relative Desensitising Action.

In order to measure the relative reduction of sensitiveness of panchromatic plates for the different parts of the spectrum we made a comparison scale by impressing a spectrum on a series of Lumière Chroma panchromatic plates with exposures which were relatively 1, 2, 3, 4, 5, etc. These plates were treated in a normal diamidophenol developer. Exposures were made in the spectroscopic camera under the same conditions on panchromatic plates of the same emulsion after immersion for 1 minute in the respective desensitising solutions.

The plates were well drained and placed whilst wet in the holder of the spectrograph and exposed for a time 60 times greater than the plate of the preceding series which received the longest exposure. The resulting spectra were developed under the same conditions as those obtained on plates the colour-sensitiveness curve of which has been shown above.

The reduction of sensitiveness in comparison with the untreated plates was thus ascertained, the results being as follows:—

Desensitiser.	Time of Immersion.	Sensitiveness after treatment, compared with original sensitiveness.
	Minutes.	
Phenosafranine, 1/2000.	1	1/750 to 1/800 for blue, maximum about 425. Sensitiveness destroyed for all other parts of spectrum.
Toluylene red = 1/1000 Eurodine.	4	1/400 for blue; 1/3,000 to 1/4,000 for other rays.
Apomorphine hydrochloride, 1/1000.	1	About 1/200 for blue. Sensitiveness to other rays destroyed, except to red, for which rays it was about 1/10,000. Slight chemical fog.
Aurantia (ammonium salt), 1/1000	1	1/750 to 1/180 for blue, maximum at about 425; 1/400 for other rays.
Picric acid, 1 %	1	About 1/200 for blue, maximum about 485; 1/120 for blue, about 475; 1/200 for other rays.
Indian yellow, 1%	1	About 1/30 in blue-green, blue and violet; almost without action for other rays.
Chrysoidine, 1/1000	1	Practically uniform effect (about 1/100) throughout spectrum.
Potass-chromate, neutral, 2%	1	Practically uniform effect (about 1/40) throughout spectrum.

NOTE.—These tests could not be made with diamido-phenol, since the long period of exposure required by the wet plate allows the oxidation products to stain the plate, and every trace of the image is destroyed.

The experiments show that the safranines are the best desensitising for the whole spectrum. Nevertheless, desensitising is not as complete for the blue as for rays of the other parts of the spectrum.

Toluylene red acts on the blue almost like safranine, but leaves a slight sensitiveness for the other parts of the spectrum.

Oxidised apomorphine behaves similarly to the safranines for all parts of the spectrum with the exception of blue. In this latter region the desensitising action is one-quarter that of the safranines. It is to be noted that the use of apomorphine hydrochloride leaves a very slight residual sensitiveness to red and that there is slight chemical fog.

Aurantia (1 per thousand ammonium salt) shows desensitising action towards the blue equal to phenosafranine, but reduces the sensitiveness towards rays of other parts of the spectrum only to 1-400th.

Picric acid in 1 per cent. solution acts chiefly as a filter, and its action, which varies greatly with the concentration of the solution, is particularly marked as regards blue, for which rays its desensitising effect is greater than that of safranine but is negligible for other rays.

Indian yellow exerts a weak action, the sensitiveness to blue being reduced to about 1-50th; for other rays of the spectrum its action is extremely small.

Lastly, neutral potassium chromate acts uniformly as a desensitiser for all the rays of the spectrum, reducing the general sensitiveness to about 1-40th.

Rationale of Desensitising by Safranine.

In considering the nature of the action which the safranine dyes exert on bromide emulsion, it may be thought that this action is simply that of a light-filter. This hypothesis obtains little support when it is observed that phenosafranine solutions transmit both red and violet, yet desensitise plates for both these rays. Moreover, the use of a dark-room lamp, the safelight of which consists of a 1: 2,000 solution of phenosafranine, does not prevent the production of fog on plates, and particularly on panchromatic plates. Further, violet safranines are desensitisers of ordinary and panchromatic plates, as red safranines are, although the absorption spectra of the dyes are very different. It must, therefore, be concluded that the desensitising is not an entirely physical process. If plates which have been treated with phenosafranine are washed, it is found that the sensitiveness possessed by the plate before treatment slowly reappears as the dye is washed out and is completely restored when the dye has been completely removed.

These results are obtained, in the case of panchromatic plates, for all the rays of the spectrum.

It is therefore clear that the phenomena require for their explanation the assumption that the bromide emulsion forms an adsorption complex of much lower light-sensitiveness, and that this complex is gradually decomposed by water in the case of both ordinary and panchromatic plates.

Choice of Desensitisers.

It may be asked what is the best choice of a desensitiser for a given purpose among the many desensitising substances which have been mentioned.

Undoubtedly the safranines, and particularly phenosafranine, are the best desensitisers for general use with both high-speed ordinary and panchromatic plates. The drawback which these dyes possess as regards staining the fingers and requiring long washing for removal from the gelatine film may, however, cause others to be preferred on those numerous occasions when complete desensitising of red-sensitive emulsion is not required. Aurantia, the properties of which are very similar to those of safranine, does not suffer from these drawbacks.

Under conditions when it is not required to examine plates by transmitted light, as, for example, in the development of Autochromes, a 1 per cent. solution of picric acid, a 1: 2,000 solution of chrysoidine, or a 2 per cent. solution of neutral potassium chromate, may be employed as effectively as Aurantia. The preliminary treatment of the plate for half a minute in one of these solutions will allow, in the case of safranine or aurantia, of noting the appearance of the image at a distance of 5 ft. from a candle or Pigeon lamp, and of watching the progress of development at frequent intervals. At the same time is is advisable to avoid unnecessary continuous exposure of the plate to the light.

These last mentioned desensitisers, which are free from staining action on paper, whilst safranine cannot be completely removed from paper, thus serve equally for desensitising bromide paper prior to development.

A. AND L. LUMIÈRE.
A. SEYEWETZ.

THE H. AND D. DOCTRINE.

In the preceding chapter the law of the production of a theoretically perfect negative has been considered in reference first to the time of exposure. That law is that the difference between any two of a series of densities is *proportional* to the difference between the logs of the producing exposures.

Correct exposure thus lays the basis for the making of the theoretically perfect negative, in which the difference between each pair of a series of densities is *equal* to the difference between the logs of the corresponding exposures.

By experiment it is found that this exposure law operates only when a plate is exposed for a longer time than will give some kind of a negative; also, that the law ceases to operate when the plate is exposed for longer than a certain time.

By plotting the densities against the log exposures the range of exposures over which the plate behaves in accordance with the law is shown by the straight line part of the resulting curve.

This straight line portion shows the latitude of the plate and also—when the range of light-intensities in the subject is approximately known—the latitude in exposure.

But correct exposure, as shown by the straight line part of the curve, is only one stage towards correct reproduction of the tones of the subject in negative form.

It shows that the differences between successive pairs of densities are equal to one another, *i.e.*, proportional but not necessarily equal to the difference between the logs of the corresponding exposures where these exposures proceed by a common factor.

Since, however, the whole series of densities are *proportionately* increased as development is continued, the common difference is similarly increased, and hence at a "correct" stage of development the negative corresponds with theoretical requirements.

Development may be carried short of or beyond this point as required by the subject or printing paper.

Consideration of development from this standpoint in the present chapter is concerned chiefly with the contrast or gamma of a negative, from which it will be seen that contrast in a negative is related, on the one hand, to the contrast in the subject, and, on the other hand, to the contrast properties of printing papers.

III.—DEVELOPMENT AND THE REPRODUCTION OF CONTRAST

Let us consider how far we have arrived at this stage towards realising the condition for a theoretically perfect negative, viz., that the light-intensities which its various parts transmit require to be in inverse proportion to those emitted by the corresponding parts of the subject.

But so far we have only seen that, provided a certain "correct" length of exposure be given, the densities (silver deposits) produced by the various light-intensities are in that logarithmic relation which we may most speedily visualise by remembering that as the light-intensities increase by a common *multiple* the densities receive an equal *addition*. Evidently this in itself does not fulfil the above condition. Correct exposure has determined simply a constant *difference* between two densities; but that difference may be smaller or larger than the difference between the corresponding log exposures. To borrow the image of the staircase in fig. 7, we have got each step the same height, but we have not done anything towards fixing what that height requires to be, or what means to take to make it the required height. In order to find our way to this next step it is clear that we must consider again the relation of density to opacity. Why? Well, we have got a series of densities in relatively correct relation to the exposures. We have now to modify them to such an extent that the opacities corresponding with them shall be in the correct relation, viz., proportional to the light-intensities in the subject. The densities are, so to speak, a half-way house on the road to the theoretically perfect negative.

Consider then again for a moment that illustration of density from which was seen its peculiar (logarithmic) effect on opacity. Adding one grass per unit area we reduced our traveller's power from 1-10th of its full strength to 1-100th of its full strength; or, the other way about, increased the opacity of the region from 10 to 100. Addition of another grass increased it to 1,000. The analogy correctly shows the relation of density to opacity. For each successive equal addition to density, the resulting opacity is the previous one multiplied by a factor, in this case 10; or, in general, as the densities increase by addition, opacities increase in multiple. An increase of 0.3 in density means a factor of 2, or doubling the opacity.

Pursue this relation of density to opacity just one step farther. We have seen that the effect of continued development on a series of densities is to increase them all, not by an equal addition to each, which is the law of their formation by successive multiples of such unit exposure as lies within the period of correct exposure, but proportionately (the Law of Constant Density-Ratios). It therefore follows that the relative opacities are enormously increased in this process. An example will make this clear.

Density.	Corresponding opacity.	Ratio of opacities.
1	10	1
2	100	10
3	1,000	100

Suppose now by longer development these densities are proportionately increased, say doubled. We then have:—

Density.	Corresponding opacity.	Ratio of opacities.
2	100	1
4	10,000	100
6	1,000,000	10,000

It will be seen that while the density ratios remain the same the opacity ratio has been increased a hundredfold. The above are impossible values in practice, but they present the question in the simplest form.

Now we can see the part played in the production of the theoretically perfect negative by this rapid growth of opacity during development. Suppose that light-intensities (from the subject) of 10, 100, 1,000 produce, first latently and then by development, the densities .5, 1.0, and 1.5, that is differing from each other by .5, whilst the log exposures differ by 1.0. We shall then have:—

Light-intensities	10	100	1,000
Densities, say	.5	1.0	1.5
Ratio of densities	1	2	3
Opacities	3.2	10	32
Ratio of opacities	1	3	10
Relative transparencies	1/1	1/3	1/10

Plainly this does not fulfil the condition of the theoretically perfect negative; the transmissions are not in inverse proportion to the light-intensities which produced them, but are in too small a ratio. For correct representation the transmissions should be:—

1/10	1/100	1/1,000
or 1/1	1/10	1/100

It is clear that in printing such a shortly developed negative long enough for full depth in the darkest tone (of the subject) the deposit representing the two others will let through too much light, *i.e.*, will print too dark, *i.e.*, the print *will* be flat.

In the case of the negative of three times the densities obtained by longer development we have, say:—

Light-intensities	10	100	1,000
Densities, say	2	4.0	6.0
Ratio of densities	1	2	3
Opacities	100	10,000	1,000,000
Ratio of opacities	1	100	10,000
Relative transparencies	1	1/100	1/10,000

Here we have departure from the theoretically perfect negative far in the opposite direction. The ratio of transmissions is enormously too great. In printing the darkest tone (of the subject) to full depth, the opacities of the other two are such that scarcely any impression would be obtained. An extreme example of a hard negative.

It is hardly necessary to point out that between these two times of development is one, and only one, which yields opacities of the required ratio 1:10:100, corresponding with transmissions of 1/1:1/10:1/100, in inverse proportions to the light-intensities from the original; that is to say, densities of 1, 2.0, 3.0, equal respectively to the logs of 10, 100, 1,000. That is the correct period of development, and we must now turn to see how this theoretically correct degree of development can be represented in figures: how it is related to the correct degree of contrast in the negative; how we arrive at an important property of a plate, its contrast-yielding property; and finally how the time of development to a required and specified degree of contrast can be calculated. We are, in short, proposing to become familiar with a characteristic of negatives and of plates which plays a leading part on the sensitometric stage—gamma.

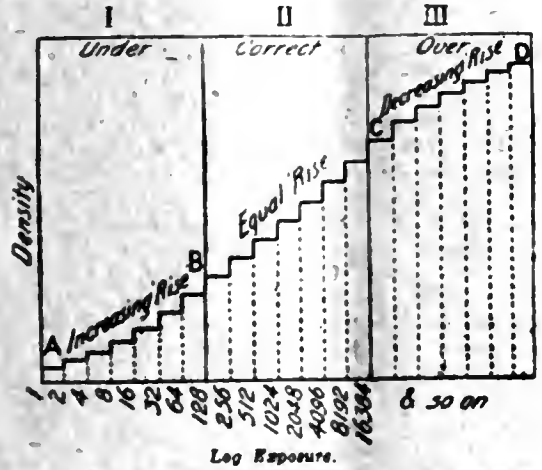


FIG. 7.—HOW DENSITY IS ADDED AS EXPOSURE IS MULTIPLIED.

In II. (correct exposure and correct development), increase in density at each step is equal to the increase in log exposure. In I. (under-exposure), addition of density is *greater* at each *equal* increase in log exposure. In III. (over-exposure), addition of density is smaller at each equal increase of log exposure. (Hurter and Driffield.)

Contrast.

We have seen that in a correctly exposed negative the differences between the densities are proportional to the differences between the logarithms of the exposures, and if the negative is developed to a certain "correct" degree the opacities are proportional to the exposures. But if the negative be developed less or more than this correct degree, that is to say, if the densities are all proportionately less or greater, the opacities are not in any simple relation either to the exposures or to the logarithms of exposures. For example:—

Exposure (E)	1,000	100	10
Log E.	3	2	1
Density (D), say	3	2	1
Opacity	1,000	100	10
Ratio of opacities	100	10	1

Here line 3 represents development to such a (correct) degree that the opacities corresponding with the resulting densities are proportional to the exposures. But trace the effect on the opacities of development to such degrees that the densities are all uniformly 25 per cent. less and 25 per cent. more; that is, are respectively .75 times and 1.25 times the values in line 3. We then have:—

Density	2.25	1.50	.75
Opacity	177.8	31.6	5.6
Ratio of opacities	32	5.6	1
Density	3.75	2.50	1.25
Opacity	5624	316.4	17.8
Ratio of opacities	316	18	1

It will thus be seen that when the densities are altered (as they are by development) in a very simple manner, the opacities alter in a manner which bears no simple relation either to the exposures or to the logarithms of the exposures.

One Way of Expressing Contrast.

The contrast of a negative is evidently the ratio of its opacities to the light-intensities from different parts of the subject in the case of a camera negative. If light-intensities of, say, 20 and 1, produce in a correctly exposed negative opacities of 20 and 1 (or 40 and 2; or 60 and 3) the contrast is obviously correct, whilst a negative of opacities 10 and 1 would be soft, and one of 50 and 1 would be hard. If we were concerned only in measuring the contrast of negatives which had been made it would be convenient enough to denote contrast as the ratio of the two ratios—opacities in the negative and light-intensities from the subject, *e.g.*, in the case of the correct negative from a 20 to 1 subject.

$$\frac{\frac{20}{1}}{\frac{20}{1}} = 1.$$

Similarly such a measure in the case of 10–1 and 50–1 negatives would be

$$\frac{\frac{10}{1}}{\frac{20}{1}} = \frac{1}{2} \text{ (a flat negative)},$$

$$\frac{\frac{50}{1}}{\frac{20}{1}} = 2\frac{1}{2} \text{ (a hard negative)}.$$

But, as will be seen directly, we require not only to measure contrast after we have got it, but also to calculate how long to develop in order to get such and such a degree of contrast; and for this latter purpose the irregularity (really the mathematical complexity) of the growth of opacities as development proceeds is a serious drawback to the use of opacities in the measurement of contrast. For this reason contrast is preferably expressed in another way in terms of density and log exposures; that is to say, the units employed in the production of the characteristic curve. Hurter and Driffield called this the "development factor," and denoted it by γ (gamma). It is now more usually known as gamma.

Gamma as the Measure of Contrast.

Gamma is the ratio of the density range in the negative to the range of the logarithms of the exposures producing those densities.

In setting down the range of density in a negative we are dealing with the physical stuff of which the image consists. Therefore, we specify the range by subtracting the lowest density from the highest; and similarly we specify the range

* The greater and lesser density values in preceding examples in this chapter are illustrative only. Round values have been chosen in order to avoid encumbering the tables with a mass of figures, but the examples correctly exhibit the effect of proportional increase of densities on the ratio of the corresponding opacities.

of log exposures by subtracting the lowest log exposure from the highest. Gamma is therefore:—

$$\text{gamma} = \frac{\text{difference of maximum and minimum densities of a given series}}{\text{difference of the logs of the respective exposures}}$$

or, in the language of the characteristic curve,

$$\text{gamma} = \frac{D_1 - D_2}{\log E_1 - \log E_2},$$

E_1 being the exposure which produced D_1, and E_2 the exposure which produced D_2. Thus gamma, as a measure of contrast, stands in somewhat the same relation to the ratio

$$\frac{\text{opacities of negative}}{\text{corresponding light-intensities from subject}}$$

as densities do to the corresponding opacities. Gamma also is a measure, not only of the intrinsic contrast (range of gradations) of a negative, but of the contrast relatively to that in the subject. A gamma of less than 1 indicates a contrast less than that of the subject: one of more than 1, a negative of greater contrast than the subject, always providing—and this applies to each and every value or calculation of gamma—*that the range of the subject is such that it can be recorded within the straight-line part of the curve of the plate, and is so recorded.*

If we calculate the densities, and from them, by the formula just given, the gammas of the negatives (correctly, over- and under-developed), representing a subject of light-intensities ranging from 20 to 1, we shall see the much smaller range of gamma values as compared with the values of

$$\frac{\text{ratio of opacities}}{\text{ratio of exposures}}$$

which represents the same facts in different terms.

Correct development.

Exposures	20	1
Log exposures	1.3	0
Opacities	20	1
Densities (log opacities)	1.3	0

$$\text{Gamma} = \frac{1.3-0}{1.3-0} = 1$$

Under-development.

Opacities	10	1
Densities	1	0

$$\text{Gamma} = \frac{1.0-0}{1.3-0} = \frac{1.0}{1.3} = .77$$

Over-development

Opacities	50	1
Densities	1.7	0

$$\text{Gamma} = \frac{1.7-0}{1.3-0} = \frac{1.7}{1.3} = 1.3$$

Since the range of light intensities in the great majority of subjects (interiors, open doorways, etc., are exceptions) *can* be recorded within the range of correct exposure of a plate (its latitude as previously defined), it follows that, if exposure has been correct, a high gamma necessarily signifies development to a degree yielding contrast considerably greater than that of the original subject On the other hand, a low gamma signifies development to a degree yielding contrast considerably less than that of the original subject.

Gamma and the Qualities of Negatives.

The student must not be misled into thinking that a high gamma necessarily represents what he calls a "contrasty" negative and a low gamma a flat negative. Such may, or may not, be the case, dependent on the range of contrast in the subject. Unfortunately, the terms we use for the contrast qualities of negatives are both loose and undescriptive. Perhaps when we speak of a "flat" negative we mean one in which the contrast is less than in the subject: by a "contrasty" negative we mean one the contrast of which is rather more than that of the subject; and by a "hard" negative, one the contrast of which is a good deal greater than that of the subject. But these terms are somewhat loosely applied, and I daresay many photographers use them to describe the intrinsic contrast of a negative (without reference to the subject). If we could agree to use the term "weak" for a negative which is flat because the subject was flat, and the term "strong" or "vigorous" for a negative which is of this character because the subject had a considerable range of contrast, it would be to the advantage of our vocabulary. But that is too much to expect, for the eye is not expert enough in judging contrast, particularly in negatives of great opacity such as result from maximum correct exposure of a plate of great latitude followed by development to the correct degree. Nevertheless, it must be borne in mind that a subject of small contrast and one of great contrast will respectively yield negatives, which, if correctly exposed and both developed to a gamma of 1, are both of the theoretically correct degree of contrast, though the one would be called flat and the other contrasty.

As regards negatives which have not been correctly exposed, that is to say correspond with the under-exposure or over-exposure part of the characteristic curve, the applicability of gamma as a measure of correct reproduction of contrast obviously breaks down. It is beyond the scope of these articles to consider to what approximate extent the gamma may be taken as a rough indication of the best development of negatives which are wrong at the start. Plainly, if the differences between two densities are not proportional to the differences between corresponding logs of exposures, no degree of development is correct, and therefore no value of gamma greater or less than 1 is a true measure of the degree to which the contrast of the subject has been increased or diminished in the negative. The most that can be said here is that under-exposure simulates the effect of a high gamma; and over-exposure that of a low gamma, which is only the statement in sensitometric language that an under-exposed plate yields harsh contrasts on continued development, whilst an over-exposed plate yields a flat negative unless very thoroughly developed. But in the absence of correct exposure, gamma as a measure of correct development must be regarded as of no significance.

Having thus obtained a conception of what gamma is and of the limits within which gamma is applicable, we can proceed to consider the simple way in which its value is indicated on the system of plotting densities against log exposures adopted for the production of the characteristic curve.

Gamma and the Characteristic Curve.

In the straight line part of the characteristic curve, as plotted in Fig. 9 and as diagrammatically shown in Fig. 8, each density differs from the preceding and succeeding one by the same amount. The slope of the curve, that is the angle it makes with the log exposure scale, is thus a measure of the rate at which densities increase by this repeated addition for each multiple of exposure. If by longer development the densities are all increased proportionately, say doubled, this equal difference between each is also doubled, and the rate of rise to a given density is doubled in the same way that a tradesman makes a given profit twice as quickly when the cost price and the selling price of his goods in regular demand are both doubled. Fig. 8 is a diagram which illustrates this steeper ascent of the straight-line part of the characteristic curve produced by longer development.

It is, therefore, clear that the angle made with the base line is related to the difference between the lowest and highest densities falling in the straight-line part of the curve; that is to say, is related to the contrast or steepness of gradation of the negative, relatively to the logs of the respective exposures.

This relation is expressed in an exceedingly simple way by means of a little geometry applied to the characteristic curve. Fig. 9 will explain.

By giving a plate two exposures denoted at A and B on the log exposure scale, we obtain densities denoted by the heights of the vertical lines A C and B D. The horizontal lines O A and O B, therefore, measure the log exposures in like terms.

Now apply the formula which we have previously arrived at from our definition of gamma, that is:

$$\text{gamma} = \frac{D_1 \quad D_2}{\text{Log } E_1 - \text{log } E_2}$$

In the diagram fig. 9 draw C E parallel to the log exposure base line O B

$$\text{Then gamma} = \frac{BD - AC}{OB - OA} = \frac{D\,E}{A\,B} = \frac{D\,E}{C\,E}$$

Now this ratio $\frac{D\,E}{C\,E}$ is one way of measuring the angle D O E or θ (theta) as we will call it. It is the tangent of the angle θ, the ratio of the side (in any right-angled triangle) opposite one of the other angles to the side connecting this opposite side to the angle: the ratio $\frac{\text{perpendicular}}{\text{base}}$ of our days in the elements of trigonometry.

This tangent of the angle θ, or tan θ, as it is called, is equal to gamma, for it is plain from the diagram that the angle D C E is equal to the angle C F A, which is the angle of the slope of the straight part of the characteristic curve.

We could measure the angle and find the value of its tangent in the published tables, but there is a very much simpler way of arriving at the value of tan θ by means of the chart itself. It is as follows:—

From the point 100 on the log exposure scale we draw a line H G parallel to the straight-line curve C D and meeting a vertical scale, drawn through the 1,000 point on the log E scale, at G. It is clear that since H G is parallel to C D, the angle K H G is also equal to θ and therefore tan K H G = tan θ = gamma. But tan K H G = $\frac{G\,K}{H\,K} = \frac{G\,K}{1}$ since the difference between the log of 1,000 (viz. 3) and the log of 100 (viz. 2) is 1.

Therefore, if we mark on the vertical line K G a scale corresponding with that of the densities on the left hand side of the chart the point where the parallel from H meets the scale indicates the gamma without any calculation at all.

This very simple method of ascertaining the value of gamma by means of the chart of the characteristic curve was originated by Hurter and Driffield. Mr. Watkins uses a very similar one, also illustrated in fig. 9. It will be noticed that the straight-line part of the curve when produced to meet the log E scale meets it at F (0.3 C M S.). (As we shall see later

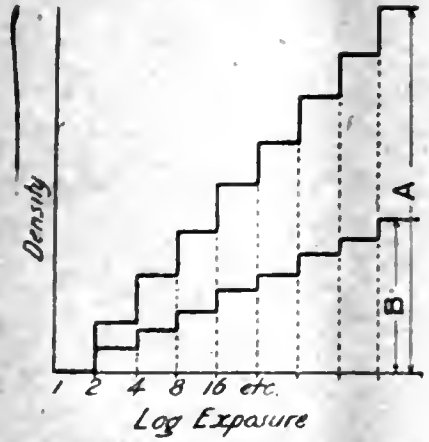


FIG. 8.—CORRECT EXPOSURE: SHORT AND LONG DEVELOPMENT.

In staircase A, representing correct development of a correct exposure, each increase of density is equal to each corresponding increase in log exposure. In B, representing a lesser time of development, the increase of density is equal at each step but less than that of the corresponding log exposure. (Hurter and Driffield.)

on this point indicates the inertia or slowness of the plate.) If from this point we set off a distance on the log E scale equal to 10 times the inertia, i.e., 10 times .3 = 3.0, the density at this point equals the gamma. Again, the base of our angle θ is 1, since it is log 10, and therefore the density value = tan θ. In the diagram it will be seen that the vertical line representing this plotted density at 3 on the log E agrees with the gamma reading on the right-hand scale. But the H and D method is the more convenient of the two. Other

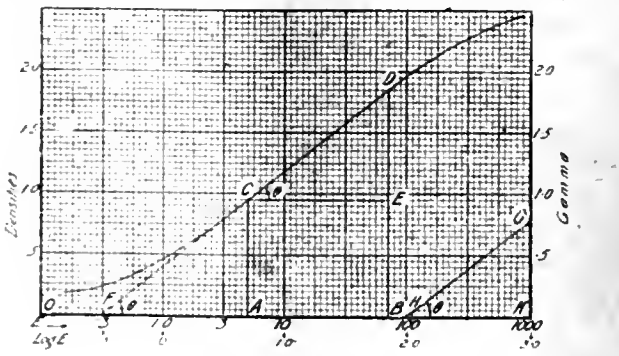


FIG. 9.—THE GEOMETRY OF GAMMA.

By drawing H G parallel to the straight part of the characteristic curve the distance K G on the right hand scale represents gamma.

methods of measuring gamma have also been devised which do not require any plotting of densities, but a description of them is beyond the scope of these notes.

G. E. B.

(To be continued.)

Patent News.

Process patent applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, June 6 to 11:—

ROLL FILMS. No. 15,633. Roll films for photography. C. W. R. Campbell.

CAMERAS. No. 15,764. Plate cameras. G. E. Cole.

CAMERAS. No. 15,668. Photographic cameras and lens and arrangements for same. G. W. Cooper.

MOUNTS. No. 15,563. Mounts for photographic prints, etc. C. W. R. Campbell.

PHOTOGRAPH FRAMES. No. 15,758. Photographic, etc., frames. Edmonds, Ltd., and H. Edmonds.

PHOTO FRAME STANDS. No. 15,881. Stands for photo frames, etc. H. A. Mackenzie.

CAMERAS.—No. 15,818. Photographic cameras. E. F. Stratton.

RADIOGRAPHY. No. 15,607. X-ray tubes. W. E. Schall.

CINEMATOGRAPHS. No. 15,721. Motion-picture machines. De Vry Corporation.

CINEMATOGRAPHY. No. 15,106. Shutters for cinematograph apparatus. W. Gardiner.

CINEMATOGRAPHY. No. 15,593. Shutter for cinematographic apparatus. S. G. Griffiths.

CINEMATOGRAPHY. No. 16,053. Cinematographic apparatus. M. A. J. Harper.

CINEMATOGRAPHY. No. 15,995. Appliance for reflecting electric arc of a cinematograph lamp upon a screen, etc. W. Holmes.

CINEMATOGRAPHY.—No. 15,912. Cinematographic apparatus. Akt.-Ges. F. Krupp.

CINEMATOGRAPHY. No. 16,043. Parlour cinematographic apparatus. W. F. Lidbury.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

AERIAL PHOTOGRAPHY. No. 160,869. (October 31, 1919).—Topographical photographs taken from an aeroplane give distorted views, dependent on the angle to the vertical at which the expo-

sure has taken place. Hence a correct view of the area photographed cannot be obtained without laborious corrections, especially of areas which are not on one level.

The object of the invention is to provide apparatus whereby the photographic view can be corrected and reproduced quickly and accurately, thus converting the photographs obtained from the aeroplane into reliable and correctly proportioned maps of the area photographed.

Various methods and constructions of projection copying apparatus have been already proposed having for their purpose the correction of the flat negatives deformed by reason of their being taken on a negative at an angle with regard to the plane of the object itself. But in these constructions it was always presumed that it was possible to fix the relative and known position of these two planes so as to allow of the reproduction of the original picture on restoring the parallelism of the lines. Such methods and apparatus are, for example, described in Scheimpflug's Specifications 16,812/1906 and 1,196/1904.

The apparatus which forms the object of the invention provides on the other hand for the correction of a photograph taken from an aeroplane that is to say, from a position unknown as regards the object; all that can be supposed to be known in this case being practically limited to the centre of the photograph and the focal length of the objective.

The use of the apparatus involves two successive operations. In the first operation the apparatus is adjusted in the manner described further on to obtain, by successive experiments, the exact coincidence of the images of three reference points selected on the photograph with the corresponding points marked upon the projection screen. (Preferably and in the simplest example these reference points are points on the same contour, *i.e.*, at the same altitude). When this coincidence has been established there can be read off upon the apparatus certain factors, namely, the factors p^1, α and α', referred to below and which are needed to determine other factors i, A, MV and μ, in accordance with the formulæ referred to.

The second operation comprises the effecting of the corrected reproduction taking into account the angle of decentralisation μ obtained in the manner set forth. In order to obtain the corrected reproduction of the aerial photograph it is first necessary to determine the elements which define exactly the position of the camera in space at the moment of exposure.

These elements are as follows:—

I. The angle i of inclination at the moment of exposure of the photograph.

II. The altitude A at which the aeroplane camera is situated at the precise moment.

III. The horizontal distance on the ground between the foot of the vertical line prolonged from the centre of the photograph taken in the aeroplane to the point of the ground corresponding to the said centre.

IV. The direction of the line of greatest inclination passing through the centre of the photograph.

In order finally to obtain a corrected reproduction of the aerial photograph, it is also needful to ascertain the amount of

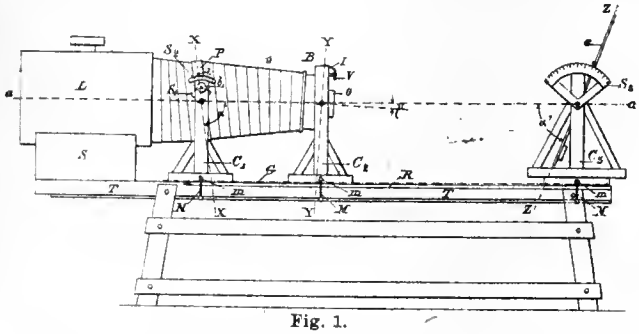


Fig. 1.

decentralisation which has to be given to the objective of the reproducing apparatus, that is to say, the angle formed by the central axis of this objective with regard to the horizontal line passing through the centre of the nodal points, in order that such objective may occupy the position corresponding to the angle at which the corrected reproduction must be effected; this angle which we call the angle of decentralisation will be indicated hereafter in the specification by the Greek letter μ.

The apparatus forming the object of the present invention enables the user quickly to ascertain the data above set forth in the manner which will now be explained.

In the drawings *a*, *a* indicates the principal axis of the apparatus; X—X the plane of the negative; Y—Y the plane of the objective, and Z—Z the plane of the reproduction frame.

The apparatus comprises a table T supported on legs and provided with rails on which the moving parts of the apparatus travel. The lantern L (preferably an arc lamp of 15 ampères,

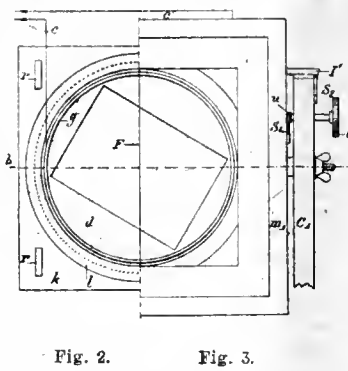


Fig. 2.

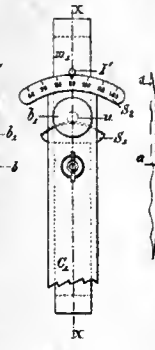


Fig. 3.

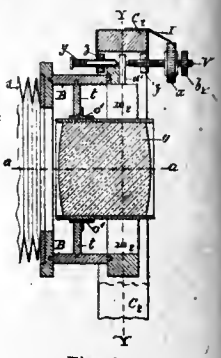


Fig. 4.

Fig. 6.

110 volts) is supported on the foot S and raised about half a metre above the table level. The negative holder P is supported by the frame C_1, the objective O by the frame C_2, and the reproduction plate *e* by the frame C_3; all these frames travel on the rails of the table T and are adjusted by hand by means of pinions *m* engaging in the rack C on the table, the pinions being turned by the handles M.

The negative holder P and the lantern body L are connected light-tight to the box B enclosing the objective by folding bellows in the usual manner.

The angle α corresponding to the inclination of the negative with relation to the horizontal is measured off on the graduated scale S^2 fixed to the support C^1 by means of the pointer 1.

The angle α' corresponding to the inclination of the plane of projection Z—Z with relation to the horizontal line *a a* is measured off on the scale S^3 fixed on the vertical support of the carrier C_3.

The relative positions of the negative lens and the focal plane *e* are determined by aid of the scale R fixed upon the table T.

In order to adjust the position of the negative in its own plane, the negative carrier is constructed as shown in figs. 2 and 3 having the disc *d* with an aperture for the negative exactly centred. The rotation of the disc in the plane of the negative may be effected in any convenient way, for instance, by means of the wheel *q* and cords c.

The disc *d* and the external support in which it turns are encased in the grooved frame *k* rotatable on its horizontal axis *b*, *b*. As shown in figs. 3 and 4, this turning is effected by means of the toothed sector S^1 fixed upon the upright m^1 engaging with the pinion *u* actuated by the milled stud b^1. The pointer I^1 on the frame m^1 facilitates the adjustment, *l* are brass rings; *r* check springs in the frame, F a wire in the vertical plane through the centre of the plate holder.

In order to adjust the objective to the angle at which the projection must be effected, the principal axis of the objective is caused to swing about the horizontal passing through the centre of the nodal points.

The corresponding angle is designed by the letter μ (so-called angle of decentring); the angle corresponds to the decentration of the objective relatively to the principal optic axis of the apparatus and to the centre of the plate.

The adjustment of the objective may be obtained by various means, and in particular by means of the construction illustrated in figs. 6 and 7, in which:—

Y—Y indicates as in fig. 1 the plane perpendicular to the optical axis of the objective passing through the centre of the nodal points.

C_3 indicates the supports of the carrier of the objective.

m_2 the supports of the frame fixed to the horizontal axis of rotation.

B the box supporting the objective O and connected to the negative holder of the bellows *s*.

t indicates the plate supporting the objective.

O^t a metal ring supporting the objective.

a^1 a piece of brass forming a straight-edge.
V a set screw.
x a milled and graduated disc.
b^3 a fine adjustment screw disc.
I a pointer fixed to the objective carrier C^2.
y a spring-supported plunger resting against the straight-edge a^1.
z screw nuts.

The use of the apparatus above described is as follows :—

The photograph is first roughly orientated in the plane of its support P, taking into account that the parts of this photograph which are to be most magnified must be projected upon the upper part of the screen e. Then by means of successive experiments the operator seeks to obtain the perfect coincidence of the image of the three reference points selected upon the photograph with the corresponding points marked upon the projection screen. In order to obtain this, he turns the handles m, which move along the graduated scale R, the frame C^1 supporting the photograph, the frame C^2 supporting the objective, and the frame C^3 supporting the projection screen e; the photograph is also adjusted in its plane, and there is also adjusted on the screen e the plotted sketch upon which the reference points have been marked. As soon as this coincidence has been established and the perfect sharpness of the corresponding images secured, the operator reads upon the scale R the dimensions p and p^1, which correspond to the well-known general optical formula :—

$$\frac{1}{f} = \frac{1}{p} - \frac{1}{p^1}$$

in which f denotes the focal length of the objective O and p, p^1 the distances which determine respectively with regard to the centre of the objective the position of the centre of the photograph and that of the horizontal axis of rotation of the projection screen.

The operator can also read off on the Sectors S^2 and S^1 respectively the angles a and a^1, which determine the inclination of the planes of the photograph and of the projection screen respectively in relation to the general optical axis a—a of the apparatus in question.

The knowledge of these lengths and of these angles admits of the immediate determination of the value of the factors referred to at the commencement of this specification, which factors are necessary to obtain a corrected reproduction of the aerial photograph. It will be at once noticed that one of these elements, that is to say the direction of the line of greatest inclination passing through the centre of the photograph, is marked upon the projection screen e by the photographic image of the wire F stretched in the plane of the picture and passing through the centre of this latter.

The other elements are defined by means of formulæ set forth in a complete study of the photo-restitution apparatus which forms the subject of a book deposited in the Library of the Patent Office, entitled "Application of Aerial Topographic Views

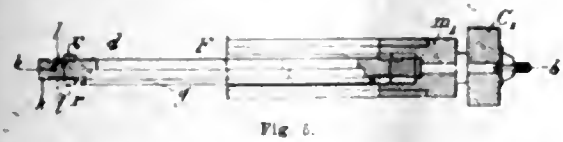


Fig. 6.

Apparatus for Photo-Restitution," by H. Roussilhe, Chief Hydrographic Engineer.

The formulæ are very simply ascertainable in practice, because the focal length of the photographic objective employed in the camera can be the same as the focal length of the objective employed in the reproduction apparatus. In practice, the objectives used for taking from the aeroplane photographs of 18 × 24 at an altitude varying between 1,500 and 2,500 metres have a focal length of about half a metre. This focal length is hereinbefore indicated by the letter f according to the formula :—

$$\frac{1}{f} = \frac{1}{p} - \frac{1}{p^1}$$

and will be indicated by the same letter in the formula No. 5 given further on.

Further, in practice with negatives 17 × 24 cm. taken at an altitude A between 1,500 and 2,500 metres, the scale E of reproduction which is adopted is equal to the inverse of the mean altitude, that is to say that $E = \frac{1}{2{,}000}$.

Under the aforesaid conditions the formulæ giving the angle i, the altitude A, the situation of the foot of the vertical from the camera negative on the horizontal plane selected as the base and the angle of decentering μ, are the following :—

(1) $\cos i = \frac{\sin a'}{\sin a}$

(2) $A = 1{,}000\,(2p^1 - 1)\cos i$,

(3) $MV = 1{,}000\,(2p^1 - 1)\sin i$.

In this formula M indicates the point on the ground corresponding to the image of the centre of the negative, and V indicates the foot of the perpendicular from the camera station.

(4) $tg\,\mu = \frac{\sin i \cos i}{2K\,(K + \cos i)\sin a}$.

In this formula K indicates a coefficient which is given by the equation :—

(5) $K = \frac{A.E}{f}$

that is to say a coefficient which is well determined when the altitude A is known, the values of the quantities E and f being themselves known as above specified.

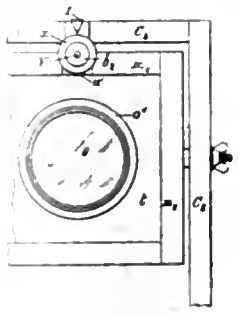


Fig. 7.

By reading the values of the angles a and a' on the graduated scales S_2 and S_1 respectively, and the value of the length p^1 on the scale R, it is possible to obtain immediately the values of the quantities i, A, MV and μ above specified.

For the rapid calculation of the quantities, suitable graphs or abacuses can be worked out for giving immediately the corresponding values. These abacuses and the manner of using the same are explained in detail in the French book above referred to.

It is to be observed that if the selected reference points above specified in paragraph I of this specification are not on the same contour, i.e., at the same altitude, the coincidence of the points cannot be obtained exactly in a single operation, and this latter constitutes only a first approximation which must be completed by additional calculations and corrections necessary for exactly positioning the negative, the objective and the projection screen; these subsequent operations are dealt with at length in the book referred to, and it is unnecessary to give a complete explanation of them in the present specification.—Henri Roussilhe, Soisy-sous-Etiolle, Seine et Oise, France.

FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Particulars from the Secretary, Royal Photographic Society, 35, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Cracket, 10, Parkgrove Terrace, Tollcross, Glasgow.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, JUNE 28.

Hackney Phot. Soc. "Desensitol." The Ilford Co.
Manchester Amateur Phot. Soc. "More about Carbro." J. Chapman.
Scottish C.W.S.C.C. (Glasgow). Holiday Hints.

WEDNESDAY, JUNE 29.

Bradford Phot. Soc. Evening Excursion to Tong.

THURSDAY, JUNE 30.

Hammersmith (Hampshire House) P.S. "Lighting in Portraiture." S. Taylor.

SATURDAY, JULY 2.

Manchester Amateur Phot. Soc. Ramble to Poynton Park.

CROYDON CAMERA CLUB.

A paper on "Surnames, Photographic and Otherwise," mainly based on the investigations of Prof. Weekley, was read by Mr. F. Ackroyd. Surnames, he said, became fixed in about the thirteenth century, and he interestingly classified and described the origin of a large number.

One learnt that the name "Harpur" descends from a musical instrument, hence Mr. Harpur's fondness for the gramophone. By direct descent from Job, Mr. Vivian Jobling exists, but with sadly changed character, for tread on his toes and the band plays. "Brown" merely indicates that some past Brown was brown or ginger—an appropriate name for a photographer, the lecturer thought, in these sepia-toning days. Surnames are often not what they sound, "Boosey," for instance, originally meaning a cattle buyer.

In the discussion, Mr. Gardner regaled all with many good tales dating from about the same period as the fixation of surnames.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held at 35, Russell Square, on June 10. There were present Messrs. Marcus Adams, A. Basil, A. Bennett, Frank Brown, W. B. Chaplin, Gordon Chase, T. Chidley, A. Corbett, C. F. Dickinson, Alfred Ellis, S. H. Fry, W. E. Gray, R. Haines, G. Hana, W. Illingworth, H. Lambert, H. A. St. George, R. N. Speaight, F. G. Wakefield, A. Swan Watson (president), W. H. O. Wedlake, and H. Wheeler, and Lang Sims (secretary). Mr. Alfred Ellis took the chair, and apologies for absence were read from Messrs. Chapman, Read, and Turner.

The secretary reported, with regard to Mr. Fry's letter of resignation from the Council, that he had written to Mr. Fry, who had now consented to continue his membership, although unable to attend the meetings with the regularity he desired. A letter was also read from Mr. Fry acknowledging very feelingly the gift of the souvenir presented to him by the members of the Council.

With regard to the application of a lady for membership, and the deferring of the matter until it was found whether the position she occupied in a business was one which made her eligible for membership, the secretary reported the result of his inquiries, and these being satisfactory, her application was agreed to.

The secretary also reported that the dispute between the two photographers (particulars of which were brought before the last Council meeting) was on its way to settlement. A copy of "Le Photographe" of May 20 was also brought forward, in which appeared an interesting account of the recent Congress. A cordial letter had also been received from the Editor of this publication.

The report of the Cape Section of the Professional Photographers' Association had also been received, and showed that the Section had made considerable progress. The Council in London were asked to accept exhibits from this Section for the next exhibition, and a cordial letter had been sent in reply.

Among other correspondence, the secretary reported that Messrs. Burroughs Wellcome and Co. desired to include in their forthcoming handbook the amended scale of reproduction fees, fixed by the Association, and this was agreed to. With reference to the new postal arrangements, the secretary reported that he had, after consultation with the chairman of the Council and the solicitor, sent a letter to the Postmaster-General in the name of the Association protesting against the proposed increase in postal charges, and had also seen Sir Davison Dalziel, Bart., M.P., on the subject. The Council unanimously endorsed this emergency action.

The secretary read particulars of three applications for membership: M. E. Brough (Hampstead), Andrew Paterson (Inverness), and Reginald Alec Rower (Reading). These were accepted, together with one resignation.

A letter was read from a member of the Council (Mr. Marcus Adams) with regard to an extortionate charge made against a well-known firm by a firm of photographers (not members of the Association) for some photographic work, and, after some discussion, it was agreed that the Council could take no action in the matter.

The secretary read a letter from a member, a lady photographer, complaining of the somewhat unscrupulous activities of a canvasser in her neighbourhood. Mr. Brown suggested that it might be the same canvasser who had already received a serious warning in his own locality, and he agreed to write the complaining member on the subject.

The secretary reported that he had compiled a list of towns which, it was hoped, would form in time a complete directory of professional photographers, members of the Association, arranged according to their localities.

The Council then turned to the consideration of the draft Memorandum and Articles of Association and devoted several hours to their detailed consideration, Mr. Vaughan (the honorary solicitor) being present. The chairman said that he himself had already spent the best part of three days on the draft. He had also spent a day with the secretary, going over the suggested emendations and additions which had been sent in by various members of the Council. A meeting of London members had been held, and subsequently a day was spent with the solicitor. The result of these labours would be brought before the Council meeting that afternoon for confirmation or alteration as the Council saw fit, and he proposed to go through the Memorandum and Articles clause by clause. One member of the Council wanted the title altered to "The Institute of Professional Photographers," but this matter was decided in the negative by a vote at the annual meeting, and therefore could not be reopened. The solicitor said that he would like to remark that all the criticisms sent in by members of the Council were practical, and showed how much care and thought had been bestowed upon the document. The various clauses were then taken seriatim.

The Council adjourned after a sitting of four-and-a-half hours

THE R.P.S. EXHIBITION.—The following is the complete list of judges who have kindly consented to act at the Royal Photographic Society's 66th Annual Exhibition, to be held at 35, Russell Square, from September 19 to October 29:—Section I.—Pictorial: Messrs. Marcus Adams, Bertram Cox, Dr. Charles Jaeger (Member of the Pittsburgh and Los Angeles Salons), J. Dudley Johnston, Alexander Keighley, F. J. Mortimer and Hector Murchison. Section II.—Colour Transparencies and Colour Prints: (a) Pictorial, Messrs. F. T. Hollyer and W. L. F. Wastell, (b) Scientific and Technical, Messrs. Charles R. Davidson (Royal Observatory, Greenwich), J. Willis Grundy, Robt. Knox, M.D., F.R.M.S., Hugh Main, B.Sc., G. H. Rodman, M.D. Section III.—Scientific and Technical Exhibits, Natural History Photographs, Lantern and Stereoscopic Slides: Messrs. Charles R. Davidson (Royal Observatory, Greenwich), J. Willis Grundy, Robt. Knox, M.D., F.R.M.S., Hugh Main, B.Sc., G. H. Rodman, M.D. Attention may be drawn to the following alterations in the rules concerning the Pictorial Section:—Photographs in this Section must be on white or cream mounts of the following standard sizes: 24 x 19 inches, 19 x 16 inches, or 16 x 11 inches, and not more than four photographs may be submitted for selection.

News and Notes.

CANADIAN IMPORTS.—A resolution adopted by the Canadian Parliament provides that goods imported into Canada from October 1 next shall be marked or stamped in English or French so as to indicate the country of origin.

ART NOT A LUXURY.—During a debate on duties on manufactured goods in the House of Commons last Thursday, Sir Martin Conway is reported by "The Times" to have said that "no work of art was a luxury," and asked "what did civilisation exist for except to produce works of art?"

BUTCHER'S "CAMERA HOUSE JOURNAL" for June contains particulars of many new things of interest, e.g., an electric dark-room lamp, over-size printing frames for roll films, Japanese tissues for cleaning lenses, and a holder for old Gillette razor blades for use as print trimmers.

KODAK IN CHINA.—A Reuter telegram states that a large number of Chinese have taken up amateur photography as a hobby and their numbers are growing day by day, and with a view to developing the business of supplying photographic goods Kodak Ltd., of London, has lately established a branch in Shanghai, a distributing centre for China.

AN AMERICAN SLOGAN.—It is stated in "Pure Ginger" which is the title of the monthly news sheet of the Photographers' Association of America—that the slogan in use to-day is "Be Photographed This Year on Your Birthday." A prize of 250 dollars is offered by the Association for a new slogan, to be made known at the Buffalo Convention next month.

NEW "WESTMINSTER" LISTS.—Two new lists of second-hand and shop-soiled photographic apparatus have reached us from the Westminster Photographic Exchange, Ltd., of 111, Oxford Street, W.1, and 119, Victoria Street, London, S.W. The lists, each of over forty pages, contain particulars of some hundreds of cameras, lenses, etc., and copies will be sent to any of our readers who apply to the firm for them.

A BIG ROSS LENS.—A writer in the "Westminster Gazette," referring to the collection of early photographs—mainly studies of flowers—the work of Mr. Stevens the well-known auctioneer, says:—"He (Mr. Stevens) has shown me the lens with which these were taken—a most formidable instrument by Andrew Ross, heavy enough to confine the photographer in his picture making to the immediate vicinity of his house. I suppose the brass mounting would hold something like a gallon of liquid. The original cost of that lens was £90, which brings it near to some of the largest anastigmats now made, so far as price is concerned. The back lens itself must be eight or nine inches in diameter, and the focal length some feet, while the working aperture is small. Such a lens working on plates fifteen inches by twelve, would give a clearness and precision of definition such as would not be excelled by the finest anastigmat to-day, but only because the photograph was confined to a small part of the field of the lens."

FACE FASHION CHANGE.—The lay press gravely informs us that Madonna faces are to be fashionable this season, and should the fashion become the craze—as the leaders of fashion hope it will—photographers will no doubt have a busy time. A "Daily Chronicle" reporter, on hearing the news wended his way towards the West End to ask certain experts if women really could change their faces, and he was told that they could. That is, they can make alterations in certain little points, which have the effect of giving a totally different effect to the same features. Hair parted in the middle and smoothly turned back from the ears would be a necessary part in a Madonna "make-up." Women who wish to dress up to that ideal must remember, too, to keep their eyes downcast, to smile slowly and sadly, to clasp their hands demurely in front of them, and, whenever possible, to carry a book with a binding which suggests serious meditations. Plain gowns, beautifully and artfully cut—which, by the way, will probably cost as much each as two "frilly" frocks—will fill in the picture. Small hats with plain, long veils will help to maintain the illusion. These are mere suggestions. Clever women who want to attain the fashionable face will think of others for themselves.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

POSTAGE ON PICTURE POSTCARDS.

To the Editors.

Gentlemen,—In addition to being a professional photographer and a maker of picture postcards, I have also a stationer's business, in which I deal largely with picture postcards of all kinds. Many others besides myself have been trying to solve the problem of the new and increased rates of postages on cards, and what will go through the post for a penny.

The problem is a rather puzzling one, and the increase of a halfpenny on the postage of a postcard—small though the increase be—is likely to lower the sale of commercial postcards, though, happily, it will not make much difference in the business of taking postcard portraits, for the simple reason that such portraits (those taken privately) are rarely sent "naked" through the post, but are usually enclosed in a letter.

However, much doubt exists, and your readers may be interested to know that under the heading of "Postcards—what are they?" a circular has been sent out by the Central Districts Branch of the London Master Printers' Association.

After referring to the new rates which came into force on June 12–13 last, the circular goes on to give the following facts, which I am sure will interest all your readers:—"There are several kinds of postcards in use, namely: (1) The picture postcard on which a communication in the nature of a letter may be written, 1½d.; (2) the official postcard, on which a communication in the nature of a letter may be written, 1½d., (3) printed Christmas, New Year, Easter, birthday picture and visiting cards on which formulæ of courtesy, not exceeding five words, may appear. The date, name and address of sender and addressee may also appear; (4) a printed card (postcard size) bearing a business announcement on the back, and on the front the words, 'Printed Paper Rate.' The left-half on the front can also be used for printed matter, leaving the right-half for the address, 1d. Millions of this class of card are used by commercial, industrial, and publicity firms, etc.

"Another fact not generally known, is that a card can be sent through the post measuring up to 24 inches by 12 inches containing a business announcement on the back and on the front the words 'Printed Paper Rate.' The left-half on the front of the card can also be used for printed matter, leaving the right half for the address, 1d. The P.M.G. may explain that numbers 3 and 4 come under heading of printed paper rate, but the general public will better understand the explanation given above. A card sent through the post, whether it is a picture card, official card, or a printed paper rate card, is to all intents and purposes a postcard."—Yours faithfully,

H. GREEN.

COOLING THE TANK.

To the Editors.

Gentlemen,—During the present spell of hot weather, when the temperature of the developer has ranged between 70 and 76 deg. Fahr., I have had trouble with flatness and general veiling of the shadows, together with an increased tendency to halation in portrait subjects when using ultra rapid plates.

By increasing the concentration of the developer and adding extra bromide, shortening the time of development in accordance with the augmented strength of the solution, the trouble has been got over, and negatives with clear shadows and of good density have been obtained.

The increased concentration was got by adding one-half as much again of the stock solutions (pyro and soda), and the same of the bromide, then developing for three-quarters of the normal time. For finding the times of development at varying degrees of temperature, Anderson's Calculator has proved reliable.

Your note in last week's issue on cooling down the tank developer leads me to give the above alternative method, as it appears to me that if the developer is cooled down beforehand, the temperature may rise sufficiently during development to upset one's calculations.—Yours faithfully, ALBERT O. FORREST

Pontypridd

FINE ART ESSENTIALS.

To the Editors.

Gentlemen,—Whilst thanking you for your pleasant surprise in the shape of your editorial note commending my Course, may I point out that the postal direction you gave as W.C.2 will probably divert many inquirers to John Street, Adelphi. The address of the Course is: The Art of Life Movement, 28, John Street, Bedford Row, W.C.1.—Yours, etc., F. C. TILNEY.

RADIOLOGISTS AND RADIOGRAPHERS.

To the Editors.

Gentlemen,—In your issue of June 10 I notice you refer to medical men as Radiographers and to others as lay-workers. This is not so. Medical officers are known as Radiologists, and qualified non-medical men as Radiographers.—Yours faithfully,

A. O. FORDER,
Radiographer, King's College Hospital.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

J. C.—We must confess we are at a loss to explain the reason of your failure, but would suggest that the print had come in contact with another in either the fixing or bleaching bath in such a way that the solution was not allowed to act properly.

D. J. C.—There is no very cheap soft focus lens on the market, but an excellent substitute will be found in the front lens of a small Petzval lens used at full aperture. This will work at about *f*/6, and will give quite a considerable amount of diffusion, quite as much as your sitters will care for.

R. L.—The pyro-soda formula required is probably that advocated by the Rev. H. O. Fenton, namely: (A) Water, 18 ozs.; pot. metabisulphite, 60 grs.: pyro, 120 grs. (B) Water, 20 ozs.: soda carbonate (anhydrous), 1 oz.; soda sulphite (anhydrous), 1 oz. For use take A, 1 part: B, 1 part and water, 1 part. Factor 6.

H. J. S.—We constantly use a hypo-metabisulphite fixing solution made as you describe, and have found it to keep fairly clear. We should advise you to try chemicals from another source. If there is still a precipitate it is probably due to your water supply. Have you tried filtering out the precipitate, and does a precipitate occur without any plate having been fixed?

A. G.—(1) We do not know of any book entirely devoted to pastel finishing. Winsor and Newton, 37-40, Rathbone Place, London, W.1, publish one on crayon drawing and painting, and there is a good deal of useful information in "Johnson's Retouching and Finishing," published by Messrs. Marion. (2) We have found a small piece of camphor floating on gum to keep it from moulding but we prefer a very small trace of pure carbolic acid.

S. S. P.—If the cards are actually copies of yours—you should be particular to satisfy yourself as to this, e.g., by their inclusion of figures—they are palpable infringements, and you are entitled to delivery of all stocks of them and also damages. Both makers and sellers of the infringing cards are equally liable; it will probably be better to address yourself to one or two retailers. First write asking them what they propose to do, and without naming any sum. It may then be necessary to send a solicitor's letter. It is immaterial whether copyrights were, or were not, registered under the old Act.

P. T. M.—(1) The permanganate, iodine-cyanide, and the Nietz permanganate-persulphate reducers given on page 278 ("B.J.," May 13) act as reducers of negatives and bromide prints. As regards gradation, the effects on negatives and bromide prints are broadly as indicated in your question, although it is not very clear from the paper if measurements have been made on bromide prints. The Nietz formula undoes, so to speak, the effect of continued development; permanganate, rather more "softening" effect than this: iodine-cyanide, less. (2) For bromide, same strength; for negatives, say double

J. M.—(1) We do not think there would be any appreciable difference between the lenses you mention and those of other first-class makers. (2) It is usual for users of cinematograph film to do their own perforating, although the makers will do so if requested. Again, we must say that you will find no appreciable difference between various makers. (3) We do not think you will, with any certainty, get the colour you require from either of the processes you mention. Vanadium is very uncertain as to colour. Probably a process of treating the image with a bleacher and dyeing it (as was done in the Kodachrome process) would give you the colour you require.

P. H.—The synopsis of your proposed lecture is very good, and we cannot suggest any further headings. Latimer Clark and Josiah L. Clark are the same, his full Christian names being Josiah Latimer. You will find all the biographical details you need in the "Dictionary of National Biography" (Supplementary Volume, 1909). His camera for taking stereoscopic pictures with a single lens was invented in 1853 (see "Journal of Photographic Society," May 21, 1853). According to the "Dictionary" named above, there is a good portrait of him in Bright's "Life of Sir C. T. Bright" (ii., 19), the latter being at one time in business partnership with Latimer Clark, not, however, in photographic work.

W. E. D.—Your practical friend probably alluded to contact printing with the enclosed arc when he said that it "got through" the silver deposit. We have, however, successfully made hundreds of carbon prints by this light from fairly strong negatives. We do not think, quite irrespectively of colour of light, that carbon enlargements can be made in a reasonable time by projection, even if continuating action is utilised, otherwise such firms as the Autotype Company would not make enlarged negatives to obtain single prints. A cinematograph arc lamp would probably be the most satisfactory illuminant, but even with this a great degree of enlargement could not be obtained.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3191. Vol. LXVIII. FRIDAY, JULY 1, 1921. Price Fourpence.

Contents.

SUMMARY.

In our next issue (July 8) we shall commence a series of chapters on photography for the newspapers by Mr. Lancelot Vining, late art editor of the "Sunday Pictorial."

Mr. Alfred Watkins contributes an important article on testing development speeds of plates, a point Messrs. Hurter and Driffield explained, but did not tabulate or standardise, and describes a most ingenious calculating instrument he has made. (P. 383.)

In a second portion of the chapter on the H. and D. doctrine, dealing with the effect of development upon the contrast or gamma of a negative, the variation in gamma which is necessitated by the different contrast properties of printing papers is considered and illustrated by a partial though not completely accurate description of the behaviour of printing papers. (P. 386.)

Many photographers find a difficulty in calculating the focal length of lens which is permitted by studios of different sizes for particular classes of work. In a leading article we give and explain a simple formula which, though not of universal application, is quite sufficiently accurate for the particular circumstances of studio portraiture. (P. 382.)

In a contributed article Mr. R. R. Rawkins points out the widely different degrees of quality obtained by different photographers with the same printing paper, and emphasises the need of greater consideration of the characteristic qualities of printing media and the importance of negatives appropriate to them. (P. 388.)

Under-exposure, followed by over development, is probably a cause of want of success with panchromatic plates which is overlooked by beginners in their use. (P. 381.)

Entry forms for the Royal Photographic Society's sixty-sixth annual exhibition are now ready and obtainable from the Secretary, 35, Russell Square, W.C.2. (P. 390.)

A full report of the Memorial Lecture on the Life and Work of Sir William Abney appears in the July issue of the Royal Photographic Society's "Journal." (P. 390.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

Details of an instrument serving for both the taking and projecting of two-colour or three-colour cinematograph film pictures have recently been given in a patent specification of Mr. E. C. S. Parker. (P. 25.)

Some of the considerations which are of importance in obtaining pleasing effects in pictorial photography, particularly as regards composition and massing of colour tones, are dealt with in an article on page 27

EX CATHEDRA.

Exposures and Panchromatic Plates.

Many photographers when working panchromatic plates for the first time fail to get the finest possible results through overlooking the fact that these plates demand a full exposure if their highest qualities in the matter of colour rendering are to be obtained, particularly when the subject is composed of great extremes of light and shade. It is sometimes imagined that anything like over-exposure tends to give the snowy effect, very much like over-correction, that is sometimes found upon photographs taken upon these plates. But this is quite a mistaken idea; for the defect referred to is far more likely to be caused by under-exposure, coupled with over-development. For exposures to be always accurate an exposure meter should be consulted, and no harm will be done if double the indicated time is given. An experience of the Paget colour process confirms our belief that the best colour renderings upon panchromatic plates will be obtained upon very fully-exposed negatives, together with a development stopped well before the image gains great density. If any photographer who has not been so successful as he desired with panchromatic plates will try the experiment of exposing by meter and developing with one of the modern single-solution concentrated developers, by the time and temperature system, using a factor for soft contrast, and thereby standardises his working conditions, we venture to predict that a very much better technical standard of results will be achieved.

* * *

Camera Cases.

Many photographers pay far too little attention to the camera case, especially when we come to consider the amount of wear the average camera is subjected to, be its user amateur or professional. We were reminded of this only the other day when we saw a photographer using one of the high-grade pocket cameras, which he carried in a limp canvas case that was obviously neither proof against dust or hard usage. Speaking of the term pocket camera it may be pointed out that the pocket is one of the least suitable places for the carrying of a good camera, unless it be one of the ultra small instruments so constructed to be entirely dustproof, a difficult proposition; and even then a well-made leather case would be required if the good appearance of the instrument is to be preserved. Some time ago we were shown a nearly new 3½ x 2½ pocket plate camera that had travelled some hundreds of miles in its owner's pocket upon a cycling holiday—its condition had to be seen to be believed. Experience teaches us that though a well-made leather case is a more or less expensive item, and is listed by camera manufacturers as an extra, it should be regarded as essential, particularly if the camera is a small and valuable one, like many of the pocket instruments in use to-day. The older-fashioned type of field camera is capable of standing a great

amount of rough usage without showing any ill effects, but the modern small camera cannot be put in the same category as its more solidly-built predecessor, and if it is not given due protection, trouble, sooner or later, is certain to occur.

* * *

Colour Screen Photography. Photographs by one or other of the screen-plate processes have been produced mainly by amateurs in the past. Only a few professional workers have touched this class of work, and they, we believe, without much financial success, due perhaps to the idea that the demand would be greater than it actually has been. During the war materials were practically unavailable, but at present it is possible to obtain at least two makes of colour plates, Autochrome and Paget, and it might be worth the while of photographers with a well-to-do clientèle to make a trial of them. The process is, perhaps, at its weakest in portraiture, but there is plenty of scope in other directions, such as views of gardens, reproductions of works of art, flower pictures and the like. The working is not a matter of great difficulty, and the speed with which a finished result can be obtained is attractive. Among many members of the public there is an interest in Autochrome transparencies, whilst the special facility of the Paget process in affording a number of identical transparencies, *e.g.*, for lantern projection, has its appeal to others.

THE LENS IN REFERENCE TO THE SIZE OF STUDIO AND DESCRIPTION OF WORK.

One of the most frequent inquiries which is put to us by portrait photographers relates to the most advisable choice of focal lengths of lens for a studio of given size. Very often the particulars which accompany a question of this kind are not sufficient for a useful answer to be made. After all, if the dimensions of a studio are comparatively small, the use of only one lens inevitably sacrifices something in one direction or another. In a studio of 30 ft. to 40 ft. run, it is different; and a lens of 10 or 12 inches focal length can be used for all descriptions of work. For some years past we have published in the "Almanac" a table which gives a fairly comprehensive guide to the choice of a lens under the conditions which are determined by the length of the studio and by the size of a portrait negative which it is required to make from a full-length, half-length, or head and shoulders subject. It is possible, however, to prescribe a comparatively simple arithmetical rule by which anyone can work out for himself in a few seconds on a postcard the focus of lens which is necessary under any given conditions.

Before explaining this rule in a few words, it is, perhaps, worth while pointing out once again that where the conditions permit it is always advantageous to use a lens of the longest focus, at any rate up to a focal length of about 12 inches. Beyond that focus it may often not be advantageous to go, chiefly for the reason that a longer focus further increases the distance between the sitter and the camera without material benefit to the "drawing" of the subject, and frequently with disadvantage to the quality of the negative if the atmosphere of the studio is even to a slight extent obscured by fog. On the other hand, it must be borne in mind that the focal length which is the longest permissible in a given length of studio for a given class of work may still be too short for covering the plate to be used. In such a case the alternatives which present themselves are, first, to resign oneself to the circumstances and be content with head and shoulders or half-length instead of full-length, or, second, to sacrifice speed of lens and obtain the necessary covering power by means of a smaller aperture, or, as may sometimes be necessary, by means of a slower type of lens.

Coming now to the method of calculation to which we have referred, let it first be borne in mind that as a rule the distance between the sitter and the plate, which is all that we are concerned with from the optical standpoint, usually requires to be a few feet less than the over-all length of the studio. A foot or two requires to be provided for placing of the background behind the sitter, and likewise a foot or two behind the camera. A fair allowance for both these together is 5 ft., so that in the calculation to be referred to the so-called "studio space" requires first to be arrived at by making the necessary reduction from the over-all length. In some cases, for example, where there is a doorway at one end of the studio, subtraction of a lesser length than 5 ft. can be made.

Optically, the factor, apart from the focal length of the lens, which determines the space required, is the degree of reduction in photographing; that is to say, the height of the sitter divided by the height of the image on the focussing screen. Taking the height of a full-length standing figure as averaging 68 inches and of a head and shoulders as averaging 30 inches, it is a simple matter to draw up a little table which will show the degree of reduction—reduction figure, as we will call it—for various descriptions of work. Such a table is the following:—

Name and size of photograph	C. de V.	Cabinet.	Boudoir*	Imperial†
Height of image on photograph	3	5	7½	9
For full-length portraits, reduction figure is ..	23	13	9	7½
For head and shoulders portrait, reduction figure is	10	6	4	3 nearly

* 8½ × 5. † 10 × 6⅞.

The reduction figure in any particular case can very easily be found. It is found by dividing the longest dimension of the subject by the corresponding dimension of the image required in the photograph, both being expressed, of course, in inches. For example, if a group of people occupies, say, 6 ft. across the studio and it is required to make a whole-plate photograph in which the width of the image is, say, 8 inches, then the reduction figure is simply 72 inches (=6 ft.) divided by 8, that is to say, 9.

Now for our rule, which is as follows:—The greatest focal length of lens which can be used for a given description of work is equal to the "studio space" divided by a number which is the reduction figure plus 2; that is to say, if the reduction figure is 10, the divisor is 12. This rule can be perhaps set out more plainly in a kind of formula—

$$\text{Focal length} = \frac{\text{Studio space}}{\text{R} + 2}$$

where R is the "reduction figure."

This rule is not an absolutely correct one, because it leaves out of account the extra camera extension which is required when photographing objects which are nearer than the "infinity" corresponding with a camera extension equal to the focal length of the lens. But this factor is a very small one in the case of reduction figures from about 24 to 10; and in the case of smaller reduction figures (that is to say, copying on a larger scale), the

error is of no importance since, in these circumstances, there is always ample room in the studio even for a lens of much longer focus than is likely to be available or desirable.

One or two examples will serve to remove any difficulty which even those quite unacquainted with optical calculations may experience. Suppose we are making full-length cabinets in a studio of an over-all length of 20 ft. Allowing 5 ft. as pointed out above, the studio space is 15 ft. For reduction of a full-length figure to cabinet size, the reduction figure is 13. Therefore, the greatest focal length which can be used is the studio space (15 ft. = 15 × 12 inches) divided by 15 (reduction figure plus 2), that is to say, the focal length is 12 inches. On the other hand, if the studio space were only 10 ft., corresponding with an over-all length of 15 ft. the greatest focal length which could be used for full-length cabinets is 8 inches. Here it will be seen that the maximum permissible focal length is somewhat too short to allow of a portrait objective being used, since the covering power of the average *f*/4 Petzval lens is insufficient for a half-plate. An anastigmat of from *f*/5.6 to *f*/8 aperture would, however, cover a plate of this size satisfactorily.

In the case of the smaller reductions, it will be seen that the formula indicates that there is ample margin for choosing a focal length considerably less than the maximum permitted by the studio space, whilst still affording ample covering power. For example, if the available studio space is 15 ft., what is the maximum focal length which can be used for an Imperial head and shoulders portrait? From the table, the reduction figure in this case is 3, so that the maximum permissible focal length is 15 × 12 ÷ (3 + 2) = 36. Although for such close-up portraits there is certainly an advantage in using a long focus, for the sake of good "drawing," yet few portrait photographers would think it necessary to employ a focus of such length as 36 inches. For one thing, if the relative aperture was large, the lens would be enormously bulky; and also the difference in "drawing" between a 36-inch lens and one of 20 or even 15 inches focus would not be very large. This, however, is a side issue from the subject which we have endeavoured to set forth in the simplest manner in these notes, which are written simply to indicate a most simple method of calculating the greatest focal length which can be used in a studio of given dimensions for various descriptions of work.

TESTING DEVELOPMENT SPEEDS OF PLATES.

The speed method of Messrs. Hurter and Driffield provides a means of measuring and recording the degree or steepness of development attained in the development trial of a plate. This result they term the development factor. They point out that in another trial the same development factor will be attained if the same batch of plate is developed in the same developer for the same time at the same temperature. But that a change of temperature will (other factors remaining unaltered) result in a different development factor. Also that different makes and batches of plates attain different development factors even when developer, time, and temperature are standardised and fixed.

Since their researches, other investigators have tabulated the influence of temperature on the time required with various developers to attain a standard development factor or result, and knowing from trials the time change required for a temperature change of 10 deg. Centigrade (which is 18 deg. Fahr.), and which change is called the "temperature co-efficient," it is easy to draw up a table of times and temperatures for a given developer, so that if regard be paid to this table the impossible task of always developing at a standard temperature need not be attempted.

I think that I was the first to point out that this relation of time to temperature can be given in a graphic way by placing an even-division (arithmetic progression) temperature scale against a logarithmic-division (geometric progression) time scale; the even divisions being so spaced that the distance of 10 deg. Cent. (9 or 18 deg. Fahr.) is the same as the temperature co-efficient on the time scale, that is, from 1 to 1.9 for a large number of developers.

I applied this principle of movable adjacent scales to slide rule instruments for calculating times and temperatures, and I also applied it in my time thermometer for development, in which a logarithmic time scale is placed against the column of mercury, with the result that the mercury indicates times for development instead of temperatures, and all calculation for this one influence of temperature is saved.

But there remains the second influence, which Messrs. Hurter and Driffield explained, but did not tabulate or standardise, namely, that of the character of the plate itself, or, rather, of the sensitive film, some plates giving a desired result of density or contrast (development factor) in a much shorter time than others with the same developer, temperature, and time.

It is this influence of development speed of the plate itself that I deal with in this paper. I have for some years, in giving the exposure speed of the various brands of plates in the speed card issued by my firm, also indicated the development speed, and used such information in the instructions for my time thermometer. Mr. W. B. Ferguson, K.C., pointed out to me that I had never expounded fully the methods used in my testing laboratory for arriving at such speeds. Hence this article. The plates are exposed as for H. and D. tests, and the H. and D. chart used for noting the results.

Standards.

Temperature 60 deg. F. But as it is practically impossible to ensure this, the temperature of the room and developer is taken and the time variation necessary made by the thermo-calculator, as illustrated at the foot of fig. 1, or by the time thermometer.

Developer, metol-quinol, formula as in the Watkins Manual, 1 dram of each solution (Nos. 1 and 2) to each ounce of completed developer—no bromide. In practice No. 1 and No. 2 are made in one concentrated solution to 10 ounces, and 12 drams of this (which has a flocculent deposit) made up to 12 ounces of developer.

Contrast or Steepness of Result. A development factor of .9 in the H. and D. system. The theoretical steepness of 1.0, which Messrs. Hurter and Driffield stated to give the same contrast in the print as in original, was found to be too high.

Adopting the above standards, the test is to ascertain how many minutes' development are required to attain .9, the standard result. But in classifying the development speeds, I found it convenient to divide them into groups, and to give the speeds by letters for these groups. The central group taken was one which required 5 minutes to attain the stated result with the stated standards; this was called M (medium), and quicker developing plates were grouped as M.Q., Q., and V.Q., while slower ones as M.S., S., and V.S. The times for these groups must be in geometric proportion, and were decided upon by dividing a log. scale from 1 to 5 into six equal parts, also from 5 to 25 into six parts. The groups,

with their times in minutes (the central time for each group), are as below, temp. 60 deg. F.:—

V.V.Q.	V.Q.	Q.	M.Q.	M.	M.S.	S.	V.S.
1¾	2¼	3	3¾	5	6½	8½	11¼

For scientific purposes the development speed of the plate is the exact time required under the stated standards, and the group system was adopted for commercial reasons because I found it convenient to make the allowance for varying temperature by time, and the allowance for varying brands of plates by the dilution or concentration of developer, which concentration could be indicated best by group letters. My time thermometer is set to the M.S. (not the M.) group, viz., at 6½ minutes at 60 deg. F. This for practical reasons.

The calculating instrument shown in fig. 1 consists of three calculating scales or diagrams, each one for a separate purpose. the top (fan-shaped one) representing development factors; the middle one, temperatures; and the lowest one, the grouping of development speeds. The object in each case is to calculate the influence of time, and the one logarithmic time scale A is so mounted on a double slide B that not only has it a horizontal movement for calculation as hereafter described, but the carrier in which it slides moves vertically on the main body (brass plate) of the instrument, so that the time scale can be applied to any part. For reasons of space the full length of the slide is not illustrated.

Although the illustration, fig. 1, has no movement, most of the calculations can be done on it. For example, the grouping is shown set at 60 deg., the limits of M.S. group being from 5¾ to 7½. Suppose the temperature is not 60 deg., but 52 deg. Take the distance between these temperatures from the temperature scale on the edge of a slip of paper and at the same distance to the right of 5¾, and 7½ will be found the new limits for 52 deg., namely, 7½ and 10 minutes. In a similar way divisions and figures can be copied from the log. time scale on to the edge of a slip of paper and moved to any part of the diagram for calculating.

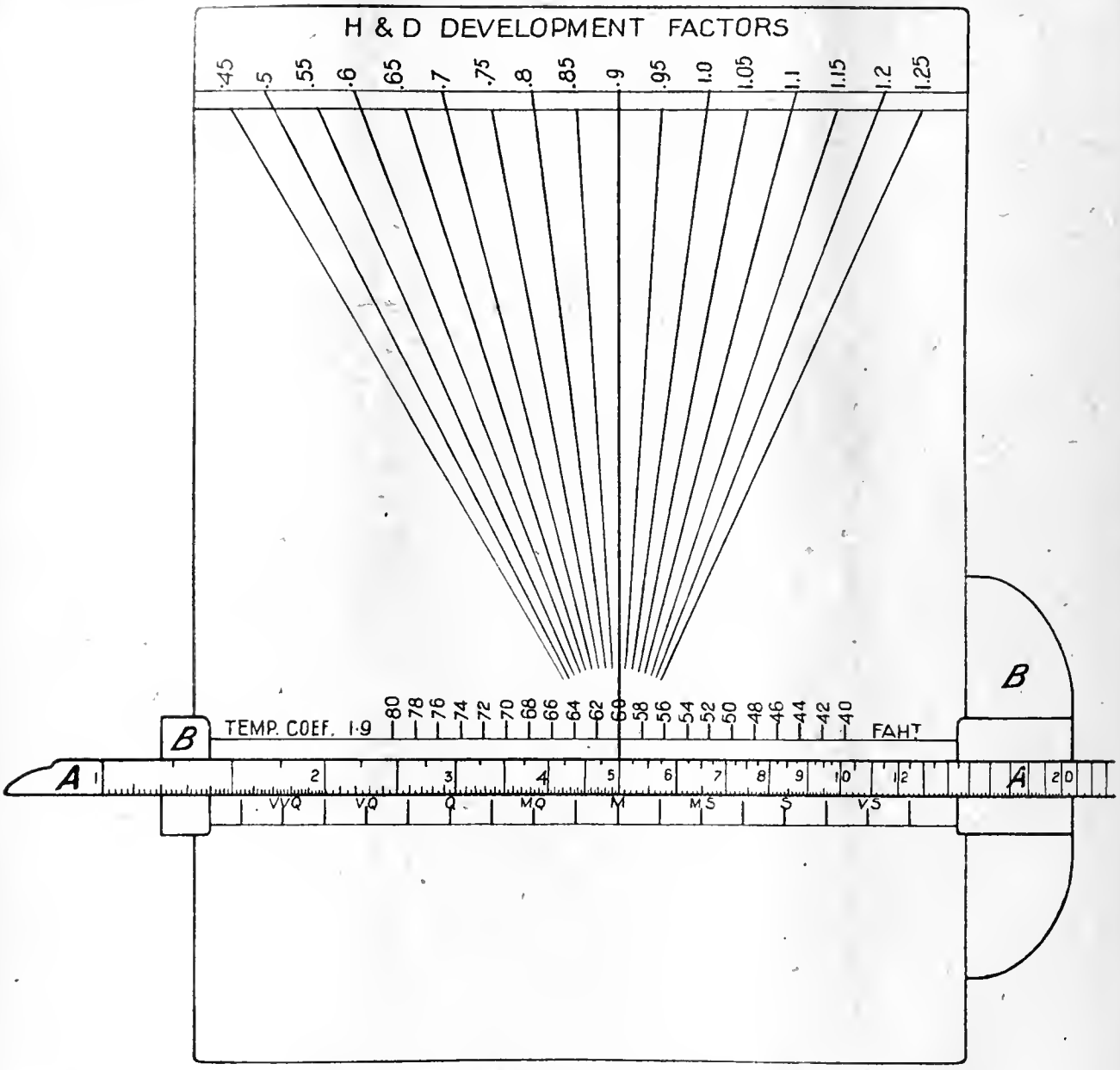


Fig. 1.—Instrument and scales for calculating development speeds.

Procedure.

Four different brands of plates (quarter plates, not strips) are exposed behind the revolving sector in the H. and D. exposing apparatus. They are developed in the tank illustrated in fig. 2, which permits each plate to be developed for four different times, the four times corresponding to four of the groups above described. The plates in the examples given

not being likely to be quicker in development speed than M., the groups from M. to V.S. were taken. If the temperature had been 60 deg. F., the trial development times would have been 5, 6½, 8½, and 11½ minutes. But as the temperature was 63 deg., the actual times are found by using the thermo-calculator part of the instrument illustrated in fig. 1, sliding up the log. slide until 5 minutes is against 60 deg. F., then against 63 deg. F. will be found 4½ minutes, which is right at that temperature for the M. group. The log. scale is therefore brought back to the lowest scale (letter groups), and 4½ is set to M. It is then found that the desired times for development (these being carefully set down in the nate book) are:—

M.	M.S.	S.	V.S.
4½	6	8	10½ minutes.

Now to develop the four quarter-plates set on edge lengthways in the tank (fig. 2), which is provided with an external spout into which developer can be poured when it rises from an aperture at the bottom of the tank. Twelve ozs. of standard developer is mixed up, and the aim is to pour in 3 ozs. at a time at such intervals that four strips of the plate are

Fig. 2.—Tank for development speed tests.

developed for the four different times indicated above. A table of times (starting from 0) at which to pour in must be set down as follows:—

Pour in first 3 ozs. at 0.
Pour in second 3 ozs. at 2½ (difference between 8 and 10½).
Pour in third 3 ozs. at 4½ (difference between 6 and 10½).
Pour in fourth 3 ozs. at 5½ (difference between 4½ and 10½).
Pour off at 10½ (longest time).

Each plate when fixed will have four strips across the H. and D. gradations developed for 4½, 6, 8, and 10½ minutes. Each developed strip has its gradations measured in a photometer and plotted out by the H. and D. method, which ascertains the inertia (used in giving the exposure speed of the plate) and the development factor required for the present test. In some cases a developed section, obviously too much or too little developed for the test, is not measured, to save time.

Now to ascertain from these results the exact time in minutes required to attain a steepness or D.F. (H. and D. method) of the standard .9. It occasionally happens that a strip shows exactly .9 in the measured result. But usually one developed strip is under and the next over the standard of .9.

The resulting factors in actual tests of the batch of four plates were as below:—

Group letter Minutes Developed	M 4½	M.S. 6	S 8	V.S. 10½	Development speed in minutes.
Plate A, development factors	.73	.92	1.06	—	5½
,, B, ,,	.62	.82	.94	1.02	7½
,, C, ,,	.62	.76	.88	1.0	8½
,, D, ,,	—	.65	.73	0.8	14

The final column gives the desired result—the minutes required for the standard result at 63 deg.

This result is ascertained from the data of the tests on the instrument illustrated in fig. 1 as follows:—

Plate A: Move the log. slide both horizontally and vertically over the fan-shaped diagram until 6 (minutes) on the log. slide coincides with .92 (2/5ths between the lines for .9 and for .95) at the same time 4½ (minutes) on the log. scale coincides with .73 (3/5ths between the lines for .7 and .75). Against the central line for .9 will be found on the log. scale 5½ minutes, the result. The results for plates B, C, and D are found in the same way, taking the M.S. and the S. results for B plates, and the S. and the V.S. results for C plate—that is, taking in each case a result on each side of the standard of .9 so as to ascertain on the log. scale the position of .9. Plate D illustrates a difficult type of plate, one which does not attain .9, and probably would not with longer development, as it increases in general density without increasing contrast before it gains .9. The 14 calculated result is therefore theoretical only. It would seem to be in a V.V.S. group, but I have not found it desirable to indicate such a group, but to advocate that with such plates development should cease as if in the V.S. group.

The above gives the result in figures, but, as I have explained, I prefer to give (for practical use) development speeds by dividing into lettered groups.

The limits of these groups (for a development at 60 deg.) is shown at the foot of fig. 1, the figures on the log. scale below the group letters being the centres of the groups, and those below the half-way divisions being the extreme limits of the groups. Thus (in the drawing) the central value of the M. group is 5 minutes, but anything from 4½ to 5½ minutes is within the M. group. But this is at 60 deg. F., and the trial I have detailed above was at 63 deg., the central time for M. being 4½ minutes. Set, therefore, M. to 4½, and then it can be seen at once within which group the results of the above trials come.

Plate A, result 5½, comes within the M.S. group.
,, B, ,, 7½, ,, ,, S. ,,
,, C, ,, 8½, ,, ,, S. ,,
,, D, ,, 14, comes outside the V.S. group, but for practical purposes is classed as V.S.

If the development speed is to be given in figures, not groups, the above figures, which are those resulting from the 63 deg. test, must be adjusted for 60 deg. To do this set the 63 deg. figure on the log scale to 63 on the temperature scale, and then against 60 deg. will be found the desired development speed at 60 deg., viz., A, 6½; B, 8; C, 9½.

There are probably some small theoretical errors in these graphic methods of ascertaining development speeds, but I feel that they are too small to falsify the result. In practice I (or now my assistant) do not use the thermo-calculator part of fig. 1, but simply dip the time thermometer in the developer, which (being set at 6½ minutes for 60 deg.) at once indicates the right number of minutes for the M.S. group at the temperature prevailing.

The tests given were a batch of rapid plates which were guessed to be slow developers. A batch of slow or process plates would be tested for V.Q., Q., M.Q., and M. times, and a batch of medium-type and ortho. plates as if from Q to M.S.

ALFRED WATKINS.

THE H. AND D. DOCTRINE.

In the preceding chapter the law of the production of a theoretically perfect negative has been considered in reference first to the time of exposure. That law is that the difference between any two of a series of densities is *proportional* to the difference between the logs of the producing exposures.

Correct exposure thus lays the basis for the making of the theoretically perfect negative, in which the difference between each pair of a series of densities is *equal* to the difference between the logs of the corresponding exposures.

By experiment it is found that this exposure law operates only when a plate is exposed for a longer time than will give some kind of a negative; also, that the law ceases to operate when the plate is exposed for longer than a certain time.

By plotting the densities against the log exposures the range of exposures over which the plate behaves in accordance with the law is shown by the straight line part of the resulting curve.

This straight line portion shows the latitude of the plate and also—when the range of light-intensities in the subject is approximately known—the latitude in exposure.

But correct exposure, as shown by the straight line part of the curve, is only one stage towards correct reproduction of the tones of the subject in negative form.

It shows that the differences between successive pairs of densities are equal to one another, *i.e.*, proportional but not necessarily equal to the difference between the logs of the corresponding exposures where these exposures proceed by a common factor.

Since, however, the whole series of densities are *proportionately* increased as development is continued, the common difference is similarly increased, and hence at a "correct" stage of development the negative corresponds with theoretical requirements.

Development may be carried short of or beyond this point as required by the subject or printing paper.

Consideration of development from this standpoint in the present chapter is concerned chiefly with the contrast or gamma of a negative, from which it will be seen that contrast in a negative is related, on the one hand, to the contrast in the subject, and, on the other hand, to the contrast properties of printing papers.

III. *(continued from p. 375).*—DEVELOPMENT AND THE REPRODUCTION OF CONTRAST.

Gamma and the Printing Paper.

It will have been evident from the foregoing that so long as we limit ourselves to regarding negatives as records, in inverted light and shade, of subjects which are within the latitude of the plate, every negative should be developed to a gamma of 1.0 in order to be theoretically perfect. Then the light-intensities transmitted by its various parts are inversely proportional to the light-intensities emitted by the corresponding parts of the subject.

But this view of the theoretically perfect negative leaves out of consideration the different methods by which prints are made—on papers of very different character, and by enlarging as well as by contact printing. For reasons connected with the properties of printing media, the gamma of a negative requires to be less than 1 in some cases and greater than 1 in others in order to reproduce the light-intensities from the subject correctly—or rather as correctly as possible—in the prints. The useful range of gamma for this purpose is from about 0.8 (low) to about 1.5 (high). The relation of the value which the gamma of a negative requires to bear to a printing process may now be briefly outlined. The reader will see that it is simply a numerical rating of the proportionately greater or less contrast which the negative requires to have according to the lesser or greater contrast properties possessed by the printing paper.

In the respect we are now considering, we may, for the sake of simplicity, look upon printing papers as differing in what may be called their "exposure range"; that is to say, the number of exposure units which are necessary to produce the blackest deposit which the paper will yield when the faintest visible deposit is produced by one unit. This is not by any means an adequate description of the property of a printing paper, but it will serve to display the effect of the gamma of the negative. Let us assume, what is about correct as far as it goes, that a contrasty gaslight paper has a range of 10 : 1, and a bromide paper one of 50 : 1. For practical purposes this may be expressed:—

	Exposure in seconds to produce faintest visible deposit.	strongest black.
Gaslight paper	1	10
Bromide paper	1	50

If now we have a theoretically perfect negative of a subject having a scale of light-intensities from 20 to 1 the light-intensities transmitted through the heaviest and lightest deposits are relatively 1/20 and 1/1 (gamma = 1).

In printing on the gaslight paper, an exposure which just produces the full black image through the lightest deposits (the shadows) of the negative does not transmit enough light through the heaviest deposit—only 1/20 instead of the 1/10 which the paper requires. Hence under-exposure in the high-light parts of the print.

In printing on the bromide paper, the exposure which just produces the full black image through the lightest deposits transmits too much light through the heaviest shadows—1/20 instead of 1/50, which is all the paper requires. Hence over-exposure in the high-light parts of the print.

The reader may trace for himself the opposite effects if we expose the printing paper correctly for the high-lights.

It is plain that for the best results we require not a theoretically perfect negative (gamma = 1), but a flatter negative (gamma less than 1) for the gaslight paper, and a more contrasty negative (gamma greater than 1) for the bromide paper.

But how much less and how much greater must the gamma be? An exceedingly simple calculation serves to find the value which the gamma requires to have.

We have seen that

$$\text{gamma is } \frac{\text{difference of densities.}}{\text{difference of log exposures producing them.}}$$

$$i.e.\ \frac{D_2 - D_1}{\log E_2 - \log E_1}$$

This formula applies to any pair of densities (recorded in the straight-line curve) and their corresponding log exposures. In our case of a 20 : 1 subject we are dealing with the extremes of each.

Exposures are (relatively) 20 1

Therefore log exposures are 1.3 0

As regards the densities in the formula, for gaslight paper we require the transmissions corresponding with the extremes of our 20 : 1 subject to be 1/10 : 1; that is to say, the opacities to be 10 : 1.

The densities, therefore, require to be log 10 and log 1

So the required gamma is

$$\frac{\log 10 - \log 1}{\log 20 - \log 1} = \frac{1 - 0}{1.3 - 0} = .77$$

Similarly for the bromide paper, the extreme transmissions of the negative require to be 1/50 : 1/1, and the opacities 50 : 1. The densities, therefore, are log 50 and log 1, that is 1.7 and 0, and the required gamma is

$$\frac{\log 50 - \log 1}{\log 20 - \log 1} = \frac{1.7}{1.3} = 1.3$$

If we call the range of light-intensities in the subject x:1 and the exposure range of printing paper y:1, then, generally, the gamma necessary for the negative of a subject of extreme light-intensities x:1 (if recordable on the straight-line curve) which is to be printed on a paper of exposure range y:1 is $\frac{\log y}{\log x}$ If the gamma has this value, the negative is one which (1) best fits the exposure range of the printing paper, and (2) at the same time yields a print correctly representing the tones of the original subject. The second of these results is obtained only if the paper produces densities proportional to log exposures over a sufficient range. This condition is not fully realised in practice, but the behaviour of papers in this respect would lead us too far from our present subject.

To digress, however, for the moment, to a side-issue from the gamma of a negative. If we know nothing about the range of light-intensities from the subject which a negative represents, but are concerned only in finding a measure of the suitability of a negative for a given printing paper, that measure is supplied by the difference between the highest and lowest densities. That this is so will be obvious from the following:—

Densities, say	1.90	.3
Difference of densities	1.60	

Since density is the log of opacity, a difference of two densities represents the ratio of the corresponding opacities. Therefore, since 1.60 is log 40.

ratio of opacities is	40	1

that is to say, the negative is a little flatter than one best suited to bromide paper of exposure range 1:50. This value (difference of maximum and minimum densities) is, thus a measure of intrinsic contrast in any negative whatever, whilst gamma is a measure of contrast in a negative in respect to correct reproduction of the tones of a subject. Providing that a negative has been correctly exposed the difference between minimum and maximum densities (which is the log of the ratio of the corresponding opacities) tells us what printing range of paper is necessary for correct reproduction of a subject once the negative has been developed to an unknown degree. Hence, if a correctly exposed negative representing an unknown range of light-intensities is just correctly printed on a certain paper, the range of light-intensities in the subject is equal to the exposure range of the paper, that is to say, when the full scale of the paper is used. This follows from the relation we have already seen, viz., that the gamma necessary for the negative of subject range x:1 (if recordable on the straight line curve) to be used with a printing paper of exposure range y:1 is $\frac{\log y}{\log x}$ An example will illustrate. Imagine negatives of subject range 1:20 developed to gammas respectively less than, equal to, or greater than 1.0, *e.g.*:

Subject Range, 1:20.

	Gamma	Range of opacity
(1)	.77	1:10
(2)	1.0	1:20
(3)	1.6	1:100

But for a negative (of a subject of unknown range) of $\gamma = .77$,

I. printed correctly on a paper of range:—	II. the corresponding subject range is:—
1:10	1:20
1:20	1:50
1:100	1:400

The figures in Col. II. follow from the relation:

$$\text{necessary gamma} = \frac{\log \text{printing range}}{\log \text{subject range}}$$

whence $\log \text{subject range} = \frac{\log \text{printing range}}{\text{gamma}}$

Similarly, for a negative of $\gamma = 1.6$,

I. printed correctly on a paper of range:—	II. the corresponding subject range is:—
1:10	1:4.3
1:20	1:6.5
1:100	1:20.0

In the case of a negative of gamma = 1.0, it is obvious that the range of the paper is equal to that of the light-intensities.

Thus the practical significance of the difference between maximum and minimum densities (= log opacity ratio) in a negative is best appreciated by looking upon it as the gamma of a negative of a subject range equal to the exposure range of the paper on which the gradation of the negative is fully nd correctly recorded. In other words $D_{Max.} - D_{Min.}$ indicates the contrast quality of printing paper required by the negative and, if that quality is known in definite figures, the range of the tones in the subject.

Gamma, on the other hand is a measure of contrast in known relation to the subject and by calculated time of development can be obtained larger or smaller, as required by the printing paper.

The Gamma of a Plate.

So far gamma has been referred to as a measure of the contrast of the negative relatively to that of the subject, but it is used in another way, viz., as a measure of the ability of a plate to yield negatives of intrinsic contrast. It is necessary to consider this property in a few words before dealing with the calculation of the time of development required to produce a negative of given gamma.

As we have seen, the longer development is continued within certain limits, the greater the value of gamma becomes. In practical language the contrast or vigour of a negative increases with the time of development. But the rate of increase in the growth of gamma becomes slower as development proceeds, so that after a time no further appreciable increase in gamma takes place. This maximum producible gamma is a characteristic quality of the plate. As it is produced by a period of development which theoretically is infinitely long, the gamma produced under these conditions is denoted as gamma ∞ (gamma $_{\infty}$). But it is not necessary that development should be enormously prolonged in order to obtain a value for gamma sufficiently near to that which theoretically would be obtained by development for an infinite time. In the development of a plate, according to a calculation of Ostwald's, quoted by Dr. Mees, about seven times the period necessary for half the process is long enough to make the action within 1 per cent. of theoretical completion.

But in the actual practical measurement of gamma it is not necessary, nor indeed accurate, to develop for an abnormal time. Although plate-makers attach great importance to gamma as a measure of the quality of a plate, they are able to calculate its value from lower gammas (and other properties) which are more accurately determined owing to the lesser densities involved.

G. E. B.

(To be continued.)

Advertise Your Business.—A little varnishing and retouching of yourself and your business is excusable; nay, necessary in presenting your merit to the public. Photography is still a bit of occult science (says the Philadelphian "Bulletin of Photography"), and requires some little ostentation and assumed gravity in the profession. A plain unostentatious background is not always the best setting to personal merit. There is demanded to set it off to advantage a few blazonings or touches. No man's merit can be fairly gauged if he is not known, and how can he be known or appreciated if he recedes entirely in the background? We are commanded to put our light in a candle stick and not under a bushel, that it may be seen of men. A great name in art goes but a very little way, and is chilled as it creeps along the ground surface of the world unless it gets something to revive it. If you don't let the public know about you—that is, advertise yourself—the public won't trouble itself to hunt your greatness out.

THE TREND OF PHOTOGRAPHIC PRINTING.

A COMPARISON of modern printing methods again proves the overwhelming predominance in the use of papers of the bromide and gaslight type, and although I am an ardent supporter of development papers and believe them to be capable of producing very beautiful results, I feel regret that the daylight printing processes should be so sadly neglected and, to many modern printers, not properly understood.

In these times of rush, competition, and mass production, photographers must perforce adopt the method of printing that gives the best business results, and therefore the trend is, and always will be, towards papers of the development type that can be exposed by artificial light. Manufacturers are showing great energy in producing new development papers in various grades to suit the professional photographer, trade printer, and amateur, and I have ample evidence that papers of the gaslight type will eventually oust bromide papers from their exalted position. In America, bromide paper is used for enlarging but seldom for contact printing, whilst gaslight and slow development papers are used almost exclusively for contact work, a state of things that will obtain here in the near future.

The reason for this change to slow development papers is not that it is a vogue or fashion, but is caused by the demand of the modern professional workers for a paper that will give results equal to a print-out paper, but without the drawbacks of daylight printing. Many of our leading photographers are now turning out as a matter of daily routine magnificent prints on the slow development papers, mostly of the warm-black type, with the long scale of gradation that makes the most of a well exposed and fairly plucky negative.

The excellence of modern development papers and the ease with which they are worked tends to make some printers careless, and this can be confirmed by making a comparison of work done by two different workers on paper of the same make. One may produce results such as our leading professionals obtain, the prints being of a quality almost equal to the finest carbon or platinum prints, whilst the other worker will show third-rate results. Without going into the subject of suitable negatives (beyond a personal opinion that the bulk of portrait negatives are under-exposed), why is it that one man can get better results than another on the same make of paper? I have frequently heard of photographers who swear *by* a particular make of paper, and others who swear *at* the same make. Yes, even photographers have been known to emulate the golfing enthusiast! Personally, I think it is all a matter of proper instruction in the handling of the papers. How many printers read and carry out the instructions sent with the papers? Very few indeed, I am afraid, but even this is not the key to success. The personal element comes into play, and a specialised knowledge of the process gives one man a pull over another. A careful and close study of negative gradation and its characteristic rendering by the different grades of paper is all important. In my experience as a teacher of professional-printing I find that many would-be printers have a very vague notion as to what constitutes a "good" negative, and what paper will be best suited to it. It has been said that the "printers' dream" is of negatives which never vary as to density and gradation; but, alas! it is only a dream. Even in the best appointed studios there are various factors that make for results of varying characters.

After all that has been written in this Journal and all that has been published by the manufacturers as to the best paper to suit a particular type of negative, there are still printers who are hankering after the impossible, viz., a paper that will give perfect prints at will from "ghosts" and "soot and whitewash." A little study of relative gradation of different negatives, and the colour of the deposit, will well repay any printer who wishes to be thoroughly *au fait* with his work. This, with a knowledge of the scale of gradation the different grades of papers possess, should enable the printer quickly and accurately to sort his negatives for printing. The very descriptions of the various grades of slow development papers are a stumbling block to some printers, and a great deal of misunderstanding exists as to the meaning of soft, normal, vigorous and contrasty. A soft paper does not necessarily mean that only soft results can be obtained on it, because it is quite easy to obtain prints of rich quality from "good" negatives. Most of the high-class professionals use the soft grade of paper. The vigorous or "contrasty" paper would not give good results from a vigorous negative, and is made solely for printing "ghosts" and negatives of poor contrasts. The terms used by the manufacturers refer to the scale of gradation possessed by the particular grade, and it is, I think, an excellent practice, because it gives the printer the knowledge as to which grade will best render the gradations of the negative, or, further, which grade will be suitable to falsify the gradation of the negative, should this be necessary. To print on a vigorous paper from a "ghost" can be classed as a deliberate falsification of the gradations of the negative in order to obtain good results.

The warm-black or green-black colour by direct development is quite a feature nowadays, and many printers produce beautiful results, the success of which is due first to the good quality of the negatives, and secondly to the intelligent use of a restrained and diluted developer. The exposures are always on the full side; indeed, some two to six times the normal exposure is given to obtain special colours, but if the prints are required for sepia toning the procedure is usually different. A correct exposure, correctly followed by full development of all light action, gives the best type of print for toning.

One of the many advantages of these slow development papers is the comfort in working—a dark-room that is no longer dark, but illuminated by strong yellow light by which the depth of the image can be judged to a nicety. The correct depth of the image on the slow papers is judged by visual examination by reflected light, and is not arrived at by development to time.

Bromide paper is necessary for enlarging, and may eventually be used solely for that purpose, and by printers who live in remote country districts where gas or electric light cannot be obtained. The gaslight type of paper has come to stay, and this fact should be borne in mind by photographers who are fitting up new premises, and all prints by contact should be made in a brightly lit printing-room, and not in a very dark dark-room.

There are, however, many of us who still admire the pearly whites that nothing but platinum will produce, or the rich carbons of exquisite gradations and colour. It is true that these processes are in daily use by some photographers, but they are greatly in the minority. The platinum process is considered quite simple to work, yet (as most photographers have probably found) good platinum printers are very hard to get, and a man who can produce regularly good sepia platinum prints with small waste is "some" printer. Carbon printing calls for considerable skill in dealing successfully with the variety of everyday work. Old methods die hard, and there are photographers who are still printing portraits in P.O.P. glazed and embossed. Speaking to one of these workers recently, he assured me that his sitters preferred P.O.P. to any other process, and did not mind waiting for delivery. The combined toning and fixing bath considerably simplifies the handling of P.O.P., but the results are of doubtful permanence, and the colour inferior to that obtained by separate baths. It is a severe test of a printer's skill to produce daily batches of perfectly toned P.O.P's., and calls for the greatest cleanliness and judgment.

The self-toning papers are very popular amongst amateurs, and are gaining popularity in professional studios. The

collodion self-toning papers give particularly fine results, and now that manufacturers are making these in a variety of surface and colour of base the demand is sure to increase. There seems to be some doubt amongst certain photographers as to the permanence of self-toning papers, but I cannot see why they should not be as permanent as any other silver print, if properly fixed. I have prints which were made over ten years ago (on Paget and Seltona), and they are as perfect as they were when made. Two essentials in the use of self-toning papers are (*a*) an alkaline fixing bath, (*b*) dry-mounting with adhesive tissue.

In conclusion, there is one point I would like to emphasise, and that is to impress upon photographers the absolute necessity of giving their assistants proper instructions and training in the working of the printing papers used, particularly in bromide and slow-development papers, as there is an unfortunate tendency to regard these papers as so simple to work that a junior assistant is expected to produce the prints without training.

R. R. Rawkins.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications June 13 to 18.

Processes.—No. 16,626. Photographic processes. D. E. Batty and S. Whyte.

Finders.—No. 16,276. Range finders and focussing-devices for photographic cameras. H. G. H. Embrey.

Shutters.—No. 16,695. Locking device for triggers of photographic shutters. F. B. and H. J. Holmes-Higgin.

Cameras.—No. 16,766. Photographic cameras. G. Waterlow.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Colour Cinematography. No. 156,980 (December 11, 1919).—The invention consists in a system of additive colour cinematographic projection in which several negatives are made simultaneously and are similarly deformed side by side upon each unit area of the film, the projecting system causing an inverse deformation which reconstructs the final projected picture in correct proportions. Edward Constant Southwarth Parker, c/o Navy Department, Washington, U.S. (Owing to the number of drawings illustrating the details in the specification the latter is transferred to another page of this issue in the "Colour Photography" Supplement.)

Submersible Cameras. No. 161,730 (February 21, 1920).—The camera comprises a hermetically closed case having one or more chambers each designed to contain a camera, the lens of which is positioned adjacent to, and preferably almost flush against, an optical flat fitted in the wall of the case and the shutter of which is controlled from the surface by electrical means. The case is also furnished with one or more powerful electric lights for illuminating the objects to be photographed, and means may be provided for adjusting the positions of the camera or cameras and the illuminant in order that the camera, when submerged, can photograph objects at any desired angle.

A suitable construction of apparatus comprises a case composed of three superposed castings, preferably of gun-metal, of which the central casting is displaced at an angle of 45 deg. to the top and bottom castings. Each of these castings, is provided with four symmetrically disposed chambers within each of which is fitted a mercury vapour lamp, and the central casting is, in addition, furnished with four separate chambers between the lamp chambers for the reception of the cameras, the shutters of which are electrically operated as above described. The camera cases are provided with removable doors for enabling access to be had to the interior for any purpose and with optical flats adjacent to which the camera lenses are placed as stated above.

Each lamp chamber is fitted with a water-tight lens for the projection of the light-beam and also with a packing gland for the cable which conveys current to the lamp, all the cables being connected to main leads in a common terminal box provided on the top of the upper casting. Furthermore, means may be provided for tilting each of the lamps.

In practice the apparatus is advantageously lowered by a pair of weight-bearing cables running over separate pulleys in order to prevent undue oscillation and the current supply cable is mounted on an independent winding gear.

When the apparatus is used in mine shafts it may be so placed that a complete circle of exposure may be made simultaneously, and this can take place successively at different depths, in order that such a succession of exposure may be obtained without the necessity of bringing the apparatus to the surface between each operation, the cameras may be fitted with mechanism by which the plates are changed automatically after each exposure.—Robert Henry Davis, of Siebe, Gorman and Co., Ltd., 187, Westminster Bridge Road, London

The following complete specifications are open to public inspection before acceptance :—

Apparatus.—No. 164,708. Apparatus for cleaning films. Meester-Film Ges

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Kinatome.—No. 413,806. Cinematograph projection apparatus. Herbert George Ponting, 47, Oxford Mansions, Oxford Circus, London, W.1, company director. March 30, 1921.

Desium.—No. 414,023. Light-filters for cinematograph projectors. David Kennedy, 215, Selhurst Road, South Norwood, London, S.E.25, manufacturer. April 6, 1921.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

The Amateur Photographer and Photography (title design).—A periodical publication. Iliffe and Sons, Ltd., 19, Hertford Street, Coventry, publishers.

Luxor.—No. 412,700. Photographic lenses. Taylor, Taylor & Hobson, Ltd., Stoughton Street Works, Stoughton Street, Leicester, scientific instrument makers.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, July 4.

South London Phot. Soc. "Further Chat on Pictorial Photography." S. Bridgen.

Tuesday, July 5.

Manchester Amateur Phot. Soc. "A Talk on Soft-Focus Lenses." H. N. Holland.

Thursday, July 7.

Hammersmith (Hampshire House) P.S. "Composition." M. O. Dell.

Saturday, July 9

Bradford Phot. Soc. Excursion to Marley and Druids' Altar.
City of London and Cripplegate P.S. Outing to Hook.
Manchester Amateur Phot. Soc. Ramble to Birtles and Redes Mere.
South London Phot. Soc. Excursion—Watford to Brickett Wood.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given of the dissolution, by mutual consent, of the partnership between Edward Lawford Hughes and Ernest Vernon Howell, carrying on business as dealers in pleasure craft, including the sale of photographic requisites, etc., at Horning, Norfolk, under the style of Hughes and Howell.

NEW COMPANIES.

HOOPER STORE CHEMISTS (LYNTON), LTD.—This private company was registered on June 7, with a capital of £700 in £1 shares. Objects: To deal in patent and proprietary articles, photographic apparatus, etc. The first directors are:—Mrs. B. Hooper, Fairmead, Lynton, N. Devon; T. Luke, Stourton House, Lynton, N. Devon. Qualification: 10 shares. Secretary: W. J. Hooper. Registered office: Churchill, Lynton, N. Devon.

A. J. RAWLING, LTD.—This private company was registered on June 20 with a capital of £2,500 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in photographic apparatus, meteorological instruments, etc. The first directors are: A. J. Rawling, 7, Lennard Road, Croydon; J. W. Timmis, 79, Waddon Park Avenue, Croydon; D. O. Rawling, 7, Lennard Road, Croydon. Registered office: 8, High Street, Croydon.

J. R. HOWARD, LTD.—This private company was registered on June 6, with a a capital of £2,000 in £1 shares. Objects: To carry on the business of manufacturers, exporters and importers of and dealers in optical, astronomical and scientific goods, lens, microscopes, etc. The subscribers (each with one share) are:—J. R. Howard, 41, Wigmore Street, W.1, optician; R. J. Howard, 46, Normanby Road, Dollis Hill, N.W.10, optician. The first directors are not named. Registered office: 41, Wigmore Street, W.1.

WRENCH, LTD.—This private company was registered on June 7 with a capital of £1,000 in £1 shares (500 preference). Objects: To carry on the business of opticians, photographic dealers, etc. The subscribers (each with one share) are: F. W. Wrench, 12a, Carlton Road, Bournemouth, pharmaceutical chemist; Miss R. S. Osmond, 15, Florence Road, Boscombe; C. H. Osmond is the first director. Qualification: £100. Remuneration as fixed by the company. Secretary: Miss Robina S. Osmond. Solicitor: F. A. Johns, 375, Holdenhurst Road, Bournemouth.

B. NORTON, LTD.—This private company was registered on June 21 with a capital of £100 in £1 shares. Objects: To take over the business of a pharmacy and drug store proprietor carried on by B. Norton at 219, Harehills Lane, Parade, Leeds, and to carry on the business of chemists, druggists, manufacturers of and dealers in proprietary articles, chemical, photographic, scientific apparatus and materials, etc. The first directors are: B. Norton (managing director and chairman), 219, Harehills Lane, Leeds; Lily Norton, 219, Harehills Lane, Leeds; R. H. Norton, 219, Harehills Lane, Leeds; J. Punch, 38, Seaforth Place, Leeds. Registered office: 219, Harehills Lane, Leeds.

FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

News and Notes.

THE R.P.S. WORKROOMS.—A charge is to be made for the use of the Royal Photographic Society's enlarging and dark-rooms, the proceeds to be devoted to the cost of the renewal of equipment and improvements of these facilities.

THE ABNEY MEMORIAL LECTURE.—The memorial lecture on the life and work of the late Sir William Abney, given by Mr. Chapman Jones before the Royal Photographic Society on April 26 last, is published *in extenso* in the July issue of the "Photographic Journal," copies of which may be obtained from the publishers, Messrs. Harrison & Sons, Ltd., St. Martin's Lane, W.C.2, price 2s. 6d., postage extra.

THE R.P.S. EXHIBITION.—Entry forms and all particulars of the 1921 Exhibition of the Royal Photographic Society are now ready, and may be obtained from the Secretary, 35, Russell Square, W.C.1. Exhibits delivered by hand must be presented, unpacked, on or before August 27, but those sent by carrier must reach the Society on or before August 26. The private view is to be on Saturday, September 17, from 2.30 p.m. till 5 p.m., the exhibition opening to the public on Monday, September 19, and remaining open daily, Sundays excepted, from 11 a.m. till 9 p.m., for six weeks.

PHOTOGRAPHY IN ADVERTISING.—We learn from the American journals that the principals of one of the largest firms of clock manufacturers in the United States are giving a prize of $250 for the best photographic illustration of one of their clocks in a still life composition. The prize is to be awarded at the Buffalo Convention, July 18 to 23, 1921. A representative of the company will be at Buffalo with a cheque to hand the winner when the award is announced. The photographs are to be judged for their photographic merit, for their advertising and reproducing value, and for their artistic quality.

METAL DUST MARKING PRINTS.—A writer in "Work" states that the finely powdered metals as used for decorative purposes and on mounts are dangerous things to have near silver prints, as any of the metallic dust remaining long in contact with the print is sure to leave a mark. This does not apply to gold itself, but to "Dutch metal" and similar gold substitutes. For this reason photographic mounts which are to be "blocked" with gold should be obtained from a firm on whom dependence can be placed. Photographers may also be cautioned against keeping fancy mounts near their stock of sensitive paper. Metallic dust falls from such and penetrates into unopened packets of sensitised paper and spoils it.

THE PATIENT PHOTOGRAPHER.—Mr. F. M. Sutcliffe states in the weekly edition of the "Yorkshire Post" that he once saw two photographers weather bound, waiting for the rain to stop to make a picture of a fine subject. They had waited all the morning and all the afternoon. At five o'clock one said, "If we are to catch the train—the last one—we must be off at once." The other said, "You can go if you like, but I am going to wait even if I stay here all night, and sleep in that barn." The photographer who stayed was rewarded about an hour later with the most glorious sunset sky behind his subject it is possible to imagine. That he nearly cracked his skull the next morning against the roof of the loft in which he slept is neither here nor there.

PHOTOGRAPHERS' ASSOCIATION OF THE PACIFIC NORTH-WEST.—The sixteenth annual convention and exhibition of this Association will be held in Vancouver, B.C., from August 2 to 5, inclusive. The secretary-treasurer (Mr. A. T. Bridgman, 413, Granville Street, Vancouver), sends us a considerable amount of literary matter, telling what is to take place at the forthcoming meeting, with a letter in which he says: "We are particularly anxious to have our exhibition this year on a much wider scope than heretofore, and so take the liberty of asking you for your co-operation in bringing this matter before the photographers of the United Kingdom. We require not more than eight pictures not larger than 11 x 14, mounted, but not framed. Each exhibitor will receive special mention, and his exhibit will be decorated with his name and city, as well as the country to which he belongs. He will be sent all press notices referring to the exhibition, and if he so desires we will ship

his pictures back to him without cost, and securely packed. There is no entry fee, and special care will be taken of all pictures entered in the British exhibit. We expect to have displays from all parts of the British Empire, especially Australasia, and we do not want the Mother Country to be neglected."

PROTECTION FROM X-RAYS.—The preliminary report of the Special Committee of Radiologists which was appointed to consider the question of protection against X rays has been published, and the "Times" of Friday last dealt very fully with the matter. We learn from the report that ventilation is regarded as being of very great, even of supreme, importance. The X-ray room should not be below ground level. Artificial ventilation is necessary in most instances, for, with very high potentials, so-called coronal discharges are difficult to avoid, and these produce ozone and nitrous fumes, both of which are prejudicial to the operator. Dark-rooms should be capable of being opened up to sunshine and fresh air when not in use. The walls and ceilings of these rooms "are best painted some more cheerful hue than black."

THE FOX TALBOT CAMERAS.—A writer in the "Westminster Gazette," referring to the visit of the Convention to Lacock Abbey and the exhibition of its treasures, says: "I called attention to this photographic apparatus in these columns about two years ago, and suggested that it might be acquired for the nation. Arrangements have now been practically completed, I understand, by which the more interesting items will be placed in the museum of the Royal Photographic Society. Full justice has never been rendered to the work of Fox Talbot. He is distinguished among all the early research workers in photography by the fact that he invented the process upon which all later photography has been built up. The process of Daguerre was barren; it had no progeny. It produced with a single exposure one positive image. Fox Talbot made negatives from which any number of positives could be obtained. The large collection of early cameras which he possessed is due to the fact that he was working when very long exposures were required. In his earliest paper upon "Photogenic Drawing" he describes his practice of setting up a number of cameras taking a scene from different view-points, and evidently contemplated that such would continue to be the practice. He did not foresee the time when a boy with a hand-camera, giving exposures of a fraction of a second might move from point to point and exhaust his supply of plates in less time than it would take to impress one of Fox Talbot's "drawings" on a sheet of paper.

Correspondence.

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

*** No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

MICROPHOTOGRAPHY.

To the Editors.

Gentlemen,—May I be allowed to question the statement made by your correspondent, W. T. L., in your issue of 17th inst., that the late Mr. J. I. Pigg reduced a page of the "British Journal" down to one thirty-second of an inch, "and every letter in this miniature reproduction could be read distinctly under the microscope." Unless it was an advertisement page having only specially large type, that does not seem to me to be possible. Your pages are 7½ ins. × 9¾ ins.; if the width were reduced to one thirty-second inch, the reduction would be about 230 times. The thick strokes of your present type do not exceed 1/80 inch, consequently a 230 times reduction would bring their width down to 1/18400 inch.

By means of my own process of Grainless Photography the finest lines I have been able to produce have been about 1/12500 inch, but these were contact prints from diamond scratches; by photographic reduction using short focus Zeiss micro-planar lenses, I have been unable to secure lines of less than 1/6000 or 1/7000 inch width. With a wet collodion process, in which the plate shows grain, however fine, I much doubt whether lines exceeding, or even as fine as 1/5000 inch could be secured.

If I am mistaken, and your correspondent could say where any finer line reductions than this, by the wet collodion process, can be seen, it would be very interesting.—Yours faithfully,

JULIUS RHEINBERG.

ADVERTISED ELECTRICAL APPARATUS.

To the Editors.

Gentlemen,—I have noticed repeatedly, nearly all advertisers, when offering electric apparatus for sale in the "B.J.," invariably omit to state the voltage for which the lamps are made, and in the case of arc and mercury vapour lamps, whether for alternating or continuous current.

I feel sure if they did this it would save correspondence and trouble, and prevent purchasers buying lamps unsuitable, and in some cases useless for the current supplied by the Electric Company in their town or district.—Yours faithfully,

ALEXANDER CORBETT.

48, Baker Street, London, W.1.

THE WOMAN IN PHOTOGRAPHY.

To the Editors.

Gentlemen,—From time to time I have been very highly tickled by some of the letters appearing in the "B.J.," but the letters under above heading are really the funniest of all, especially the one appearing in the issue dated June 3, from "The Woman in Photography."

The confessions of this lady give the whole show away, and prove conclusively that she has no right to be in our ranks. How can she look after her big house as she should if she attends to her studio properly? Perhaps the poor "one little maid" has to do the whole housework, from front steps to back door. And what about hubby? Surely he can keep the "home fires burning" and have his wife in her proper place at home, and not have her keeping a man photographer out of a job! And, finally, how was it possible for a group of footballers (a team, I take it) to win a cup "from a good many teams"? A cup can only be held by one team for a season. I can understand a team beating a good many teams in winning a cup.—Yours truly,

A MAN IN PHOTOGRAPHY.

To the Editors.

Gentlemen,—My first experience of photography was being taken at the age of 7 in 1854. In 1857 a Mrs. Atkinson came into the town with a caravan, and made some very good glass positives, and those she took of my mother have often been admired quite recently.

Photography as a profession does not date back very much further than 1857, so this is a clear proof that women photographers have been in existence for quite a long time. Mrs. Atkinson was the operator, there being no Mr. Atkinson about.—Yours faithfully,

W. T. WILKINSON.

Birmingham.

STEREOSCOPIC LENS SEPARATION FOR NEAR OBJECTS.

To the Editors.

Gentlemen,—Referring to the article by E. J. Bedford, under the above heading, in your issue of June 24, it would be of interest if the author would give the standard he adopts, i.e., that with which the final appearance of relief, as seen in the stereoscope is compared in order to determine its accuracy.

From the context I assume that the author's standard is the relief shown by the actual object situated 12 inches in front of the eyes. If this is so will he please explain why a lens separation of 2½ inches (corresponding to the average interocular distance), with the object 12 inches from the lens yields a stereoscopic slide showing exaggerated relief? That it does so we know, and as can readily be seen by examination of the slide reproduced (Fig. 3). Why then do we get correct relief with a more or less distant object photographed with a lens separation equal to the interocular distance of 2½ inches? In both cases we photographed the object under the

same angle as that under which we view it, and yet when we view the results in the same stereoscope one shows correct, and the other incorrect, relief.

The author apparently assumes that the separation values he gives will yield slides showing correct relief with whatever form of stereoscope is used for viewing, but on consideration it will be obvious that the angle under which the stereo image (not the actual prints) is viewed will depend upon the focal length and separation of the stereoscope lenses. Of stereoscopes at present on the market this angle varies from 3 deg. to 12 deg. when using a slide having a print separation of 2½ inches, so that great variation in relief of the stereo image of any particular slide may result. Such a difference is readily seen on viewing either of the slides reproduced to illustrate Mr. Bedford's article, first in an American lenticular-prismatic stereoscope with lenses of 8-inch focal length, and, again, in a Baird's "Lothian" lenticular stereoscope of 5½-inch focal length.

It is absolutely essential for the production of correct relief that the object be photographed under *the same angle as that under which it is to be viewed in the stereoscope.* There are several methods of determining this, but unfortunately all of them are difficult for the average stereo worker to employ.

With reference to the three illustrations showing the cube, shell, and match: for accurate comparison all factors should be constant with the exception of the one under consideration (lens separation), but here a variation in print separation is noticable, amounting to 1-16 inch between Figs. 1 and 2. Since this factor also exercises an effect upon the stereo image it should and could have been avoided with very little trouble.—Yours faithfully, THOS. J. WARD.

Leytonstone, E.11.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

J. Y. L.—We regret that the subject is not one that we can deal with. If you are a member of the P.P.A. we would advise you to write to the secretary, as we believe there is some agreement on the question. If you are not a member we would advise you to become one. The secretary is Mr. Lang Sims, 437, Brixton Road, S.W.9.

H. L. E.—It is almost impossible to advise you on the question of lighting without knowing size of studio and the class of work you intend to do. 3,000 c.p. is about the minimum you could do with, and for this we should recommend three 1,000 c.p. lamps. If you write to the General Electric Company, Magnet House, Kingsway, London, W.C.2, and ask for their photographic list you will find out all about lamps and fittings.

W.B.—The following is a simple waterproofing solution for wood:—

Asphalt	4 ozs.
Pure rubber	30 ,,
Mineral naphtha	10 ,,

Apply with a stiff brush and give three successive coats, allowing to dry between each. The vapour from this solution is very inflammable. See also the process advocated by Mr. D. R. Gibbs, on page 328 of the current "Almanac."

C. L. S.—We should think one of the commercial finders composed of a concave lens with a sighting vane would be most convenient with the camera you mention. If you want to make one you must fix a rectangular wire frame, 6½ x 4¾ inches, with cross wires at right-angles on the front, and a sighting vane on a level with the intersection of the wires on the back frame of the camera at a minimum distance of 7½ inches. On placing the eye at the vane you will see the exact view included in the frame. This finder will be correct for any lens.

C. H. A.—You can easily replace your incandescent gas light by an ordinary metallic filament lamp, one of 32 c.p. is sufficient for bromide paper. For gaslight paper a small half-watt of, say, 200 c.p. would be better. We are afraid that you would hardly find it worth while to have your premises wired for electric light for this purpose only. There are several good incandescent mantle lamps which burn paraffin, or you might fix an acetylene light in place of the present burner. We do not think there would be any appreciable difference in cost with any of these systems, probably acetylene would cost the most. The gas shortage is not likely to continue very long now, so that we do not advise you to go to any great expense. Why not try a good ordinary duplex wick paraffin lamp? Many camp photographers printed by these during the war.

S. H. A.—The method of removing the letters from your shop-window will depend upon the nature of the cement used for fixing. "The Pharmaceutical Journal," dealing with the subject recently, said that if the cement is a water-soluble one, it is possible that the application of water containing some hygroscopic material, such as glycerin or calcium chloride, would be effective if applied with a pipette to the top part of each letter where it joins the glass. Allow some time for the moisture to take effect, and then apply a suitably folded pad of cloth, wrung out of hot-water, to the letter, avoiding the window glass as far as possible. This will cause some slight movement of the letters, and, at the same time, tend to soften the cement and promote action of the liquid used. Other solvents may, however, be necessary—hydrochloric or sulphuric acid, for example

W. D. O.—We think that you need to study some work on the art of projection before you start on the construction of an enlarger, as you do not seem to have a very clear idea of its requirements. Replying to your specific queries we can say: (1) The general idea is quite correct. (2) There is less spherical aberration in the double form. (3) The focal length of a condenser is usually half its diameter; with a large condenser it may be rather more. You can alter this by making the curves deeper or shallower. (4) It is useless to attempt to construct a practical condenser on the lines you indicate. In the first place, the curvature of a clock glass is not nearly accurate enough, and it is almost impossible to keep the cells liquid proof, with the great range of temperature to which it is subject. Water will answer as well as any other liquid. (5) The negative carrier should move. The axes of the objective lens and the condenser should be in the same straight line. (6) No. To enlarge from a whole-plate you require a lens capable of taking a whole-plate negative. You would require a lens of abont 10½ ins. focal length, with an aperture of at least *f*/8. (7) An inverted mantle would be sufficient for anything except great enlargement from dense negatives.

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IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the high price prevailing for everything in connection with newspaper production prohibits the distribution of surplus copies for chance sales. It is therefore necessary in order to ensure the regular delivery of the "B. J." to place an order definitely with a dealer, newsagent or bookstall clerk, or to send a subscription to the publishers.

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THE BRITISH

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Contents.

SUMMARY.

The first of a series of chapters on photography for the newspapers, written by Mr. W. Lancelot Vining, until recently art editor of the "Sunday Pictorial," appears this week. It is, we think, the first occasion on which the subject has been dealt with by one regarding it entirely from the inside office standpoint. The first chapter sets forth the altered conditions which now favour the free-lance press photographer, and the second gives an insight into the working of the "art" department of an illustrated newspaper. (P. 395.)

In his presidential address before the Photographic Convention assembled at Bristol, Mr. C. H. Bothamley reviewed photographic progress of the past twenty or thirty years, particularly in reference to the work of Hurter and Driffield, and to the origination of the methods of physical chemistry. He urged that current communication of scientific research should be expressed in more comprehensible language. (P. 398.)

The fourth chapter on the H. and D. doctrine deals with the time of development required, with a given plate and developer, to produce a given degree of contrast relatively to the subject on one hand and to the printing paper on the other. The calculation of this necessary time of development follows a complicated mathematical law, but the application of the law is rendered a matter of ordinary arithmetic by means of tables worked out some years ago by Mees and Sheppard. (P. 401.)

In a leading article we draw some comparisons between ancient and modern lenses, and raise the question of the advisability of more ample bonding and substantial build of the lens mount for those who do not regard ultra portability as the chief consideration. (P. 394.)

An often neglected point in the making of enlargements is the use of a mask on the negative for the purpose of cutting out the illumination of the margins of the sensitive paper or of the white paper with which many enlarging easels are surfaced. (P. 394.)

Wear of the light-trap in plate holders is often an unsuspected cause of fog. Some hints on renewal of the material used in preventing entrance of light when the shutter of a plate holder is withdrawn are given in a paragraph on page 394.

For the maximum physical permanency of the emulsion film on the glass of negatives, experience is in favour of the recommendation to avoid the use of an acid or alum bath at any stage in the making of a negative. (P. 393.)

EX CATHEDRA.

Cabled Photographs of the Fight.

The "Daily Mirror" is certainly to be congratulated on the reproductions of the photographs of the Dempsey-Carpentier fight which were obtained by telegraphic transmission and appeared in its issue of Monday last. It is, we suppose, the most successful, as it is also the most notable application of the method in which the "Daily Mirror" has interested itself for some years past. Inasmuch, however, as a boxing contest is one of the most difficult of events to represent at all adequately in a few photographs, we cannot help thinking that the results of such a technical feat as this scarcely repay the labour and expense of getting them. The public no doubt sets great store by pictures, however imperfectly they may represent a prominent event, but there can hardly be two opinions that an impression of Carpentier's fight with his opponent is much more vividly conveyed by his own written account of it, which is also published by the "Daily Mirror." There are, of course, many other news events which lend themselves better to photographic representation, and one will watch with interest the progress made by the "Daily Mirror" in transmitting such photographic results by cable. Meanwhile, we feel some satisfaction in noting that the word "telephotograph" has been dropped as a description of these results, although without any substitute being offered. "Telectrophotograph" is, perhaps, not too cumbrous for regular use, and is sufficiently descriptive.

* * * *

Preservation of Negatives.

The time has perhaps gone by when it is necessary to caution the technical photographer as to the importance of thorough fixing and washing, and particularly the former, as a condition for the reasonable permanence of negatives. But it may be doubted if makers of negatives generally give sufficient consideration to other factors which greatly determine the physical permanence of the gelatine film which bears the silver image. It is quite true that in many cases this is not a matter of great importance, since defects of this kind make their appearance only after the lapse of a considerable number of years. Nevertheless, instances have come before us of very grievous experiences, for example, the rotting of the films of a whole series of valuable negatives. Although precise evidence of the cause of such deterioration as this is lacking, it is probably more than a coincidence that negatives which have suffered in this way were made in the days when it was customary, on account of frilling difficulties, to use an alum bath before fixing. Apparently, the employment of the modern fixing-hardening bath is less open to objection on this score, but at the same time we think it is a sound maxim that for the utmost permanence of the gelatine film of a negative the latter should have come in contact only with neutral or alkaline solutions from start to finish. Alum, apart from its tanning properties,

is a weakly acid substance, and the deleterious effects which it appears to produce in course of years may very likely be occasioned also by purely acid baths, for example, the weak solution of hydrochloric acid, which is recommended for removing the final traces of phenosafranine dye from plates which have been de-sensitised before or during development. The experience of years undoubtedly points to the advantage of following development by a fixing bath which is neutral or alkaline.

* * *

Developing Cut Films. A good many people who have been adopting cut films for portraiture and commercial work have found some difficulty in getting as perfect negatives as they have been accustomed to with glass plates, not with reference to the quality of the image, but to what may be termed mechanical defects. The principal trouble seems to be unevenness, caused by the fact that the film does not sink to the bottom of the dish as a plate does, but has a tendency to float, the slight curl causing the edges to be thin and streaky. Again, in fixing, if films are allowed to overlap there will usually be a line, especially if the developer is not well rinsed off. With care these defects may be avoided, but it is very much better to eliminate them, and also the risk of scratching during any of the manipulations by using the special clips and tanks made for the purpose. The film is inserted in the clip with the minimum of handling, and can remain in it until dry. The cost of the clips or frames is rather heavy where a large number of films is handled daily, and we think that a simple form would be welcomed by those who appreciate the undoubted advantages of film negatives.

* * *

Light-Traps. It is within the experience of most photographers that inattention to seemingly small details has resulted in defects in negatives difficult to trace, perhaps even resulting in total loss of valuable exposures. An instance came under our notice recently. A photographer after using a camera for some years began to be troubled with a band of fog across his negatives. At first the dark slides were suspected, but after careful tests it was found that these were not responsible for the trouble, which was at last traced to the fact that the strip of velvet glued to the back frame of the camera, for the purpose of a light-trap, had become worn, thus admitting stray light. After long use velvet loses much of its original "pile," and then is, of course, totally unfit for its purpose. Many camera makers now fit plush in place of the velvet originally used for their cameras and dark-slides, and in some cases the extra "spring" of plush has a better light-stopping power than that possessed by velvet, though there is a tendency for small particles of the material to become loose and find their way to the surface of the plate, where they become a cause of white spots that are exceedingly difficult to touch out on account of their peculiar shape. Especially when the slide is new this should be watched for; and it is a good plan to brush the finger rapidly over the plush prior to loading the slides or exposing plates so that any loose particles will be removed.

* * *

Masks in Enlarging. It is not generally appreciated that when a negative is not masked by the edge of the carrier of the enlarging lantern it is necessary to use some means of preventing any unnecessary light from reaching the easel upon which the bromide paper is fixed. It is quite a common thing to sandwich a small film negative, say $3\frac{1}{4} \times 2\frac{1}{4}$, between two half-plate or smaller glasses, and to allow a flood of light of much greater intensity than that passing through the negative to emerge from the lens. If the easel has a dead black or even a deep yellow surface, this does little harm; but if it falls upon what is often used, viz., a white card marked with the various paper-sizes, it is extremely detrimental to the resulting enlargement. A simple and convenient arrangement is a mask with an opening rather smaller than the film cut from stout black paper; that which is used for packing bromide paper answers perfectly. Along one edge of the opening is pasted a strip of the same paper, so as to make a narrow groove, into which an edge of the film is slipped. This keeps the film in place and prevents it moving while the second glass is placed over it. For small glass negatives a cardboard carrier, made upon the lines of a dark slide plate carrier with one clear glass, will be found perfectly effective.

THE BEHAVIOUR OF LENSES.

It has been announced, and, indeed, almost goes without saying, that the very complete photographic equipment of the Mount Everest Expedition underwent severe preliminary examination at the National Physical Laboratory at Teddington. That is as it should be, since in such cases, not only ought no risks to be taken, but it is necessary also to select by careful competition among various available types the best, at any rate for the purposes in view. In all ordinary circumstances the individual photographer who buys a new first-class lens may be satisfied that his instrument has undergone tests which, if not as comprehensive as those applied at the National Physical Laboratory, are eminently practical, and calculated to assure the performance of the objective under any reasonable conditions. But lenses are often acquired as to the behaviour of which no sort of certainty can be felt. Even if they bear the names of good makers they may have been subjected to rough usage, or their qualities may have been impaired by the mere effluxion of time. As a matter of fact, most of the lenses made forty odd years ago are "wearing" very well. The glass is hard, and the mounting solid and generally of excellent workmanship, as befits a product of the Victorian Age. Here and there re-balsaming and a touch of dead-black varnish may be needed, but there are thousands of old rapid rectilinears, rapid and "portable" symmetricals, and wide-angle lenses now doing just as good work—and very good work it is—as they did nearly half a century ago. With some of the later introductions it is impossible to feel the same confidence. The formulæ to which they have been constructed may be impeccable. But not infrequently some of the glasses used are soft or liable to change of colour, the mounting is flimsy, and the quality of endurance is sacrificed in order to procure extreme and often unnecessary portability.

It is a postulate that the potentialities of modern lenses are greatly in advance of those of the older instruments, but we are talking now, not of possible performance, but of actual behaviour, and our belief is that the actual behaviour of many fine up-to-date objectives after hard wear and tear, or in difficult circumstances, is not all that could be desired. Some of the deficiency, no doubt, is unavoidable. Where extreme rapidity and other special qualities are essential it may be necessary to use abnormal glasses, the surface of which is rather tender, and the permanence of which in regard to colour

cannot be guaranteed. But the all-round standard of mounting is not as high as it ought to be, and would be if more attention were paid to the behaviour of the lens in the hands of the average worker, and less to its size and appearance. It was a bad day for lens-making, for instance, when aluminium first came to be used for lens mounts. Some of the later alloys of aluminium, no doubt, are very satisfactory, and the gain in lightness is often most acceptable. But we shudder to think of the hundreds of good lenses which have been put into mounts utterly unfitted to stand even ordinary usage for more than a few years at most. As to aluminium screws, especially when their intercourse with brass flanges has been "frequent and free," the less said the better.

The average British manufacturing optician doubtless knows his own business extremely well, and it might not be entirely to his advantage if his lenses, and more particularly, perhaps, his photographic lenses, lasted indefinitely. But still less will it be to his ultimate advantage if, say, twenty years hence, it will be a not uncommon observation that So-and-So's old lenses can no longer be trusted, because their mounting has become defective, and can only be replaced at prohibitive expense. Lens-makers accordingly might consider the suggestion that, as an alternative to the mounts which they are constrained to supply to amateurs craving for extreme portability, and to makers of cameras in which the size of the lens is an important consideration, they should make a mounting of a more substantial and really workmanlike description. This in most cases might advantageously include a hood, which all the old lenses used to have, and which unquestionably often improves the behaviour of lenses, especially when working against the light. Of course, the extraneous light can be screened to some extent from a hoodless lens by holding a hat over it, but nowadays amateurs, at any rate, are not as a rule very thoroughly taught, and this simple precaution, very seldom omitted by practical workers, even when lenses were hooded, is often neglected with anything but pleasing results.

The behaviour of a lens may depend, not only upon the manner in which it is handled, but also upon the reasonableness or unreasonableness of the demands imposed upon it. The protean capacity of some lenses, as quite legitimately advertised for the edification of those who cannot afford more than one or two objectives, is responsible for some exaggerated hopes of the performance of these instruments when used otherwise than in their normal arrangement. With a very few notable exceptions the single components of double and triple combinations do not work really satisfactorily at full aperture, a point which may readily be determined by going over the image on the focussing screen with a focussing magnifier, and comparing the definition with that given by the complete lens. The same remark may be applied with increased emphasis to the behaviour of ordinary telephoto combinations, as distinct from highly-corrected single focus tele-lenses, such as the Telecentric, the Dallon, and the new Cooke. But the mistake is often made of expecting too much from complete double and triple combinations, especially where these have a very large full aperture. It is probably safe to say that only very occasionally does an *f*/4.5 lens stopped to *f*/11 cover a plate two sizes larger than that for which it is listed as satisfactorily as an *f*/6.3 lens of the same focal length may reasonably be expected to cover it at the same aperture. It is not quite fair to ask that it should, any more than it would be reasonable—assuming that one dared to ask a highly-trained chef or "upper housemaid" to do the work of a "general." Photographic lenses are mostly very excellent tools, doing what they profess to do with precision, and often doing a great deal more quite passably, or even admirably. But if, to borrow a term from another science, their potential is high, they must be, as Dickens's butcher in "Martin Chuzzlewit" said of meat, "humoured and not drove."

PHOTOGRAPHY FOR THE NEWSPAPERS.

[Below we commence the publication of a series of eight chapters on the supply of photographs to the newspapers written by Mr. W. Lancelot Viming, until recently art editor of the "Sunday Pictorial." So far as we know this is the first occasion on which the subject has been dealt with by a writer intimately acquainted with the production of an illustrated newspaper and considering the matter from the angle of the art editor. Mr. Viming, who has spent his life in press photography, first as a free-lance and subsequently as a press photographer on the "Daily Graphic" and "Daily Mirror," begins by emphasising the altered conditions which at the present time create more opportunities for the non-staff photographer of news subjects than has previously been the case. His articles will appear week by week until our issue of July 29.—Eds. "B.J."]

I.—INTRODUCTION.

The time has now been reached when the supply of photographs for illustrating both newspapers and magazines has fallen far below the ever-growing demand, a demand that is not a myth, but a very solid fact, and this demand is far more likely to increase rather than diminish in the future.

Up to the year 1914, the staff photographers of picture papers and photographic agencies covered the country, or, to be more correct, the world from London; but times have changed with the War, which is responsible for the enormous increase in travelling expenses, and also in the cost of every article used in the production of photographs and process blocks.

The result of all this is that where, previous to the War, a photographer was sent 200 miles to cover a news story or work up a "stunt," to-day that same event or a similar one will be allowed to pass without having a plate exposed on it, the only reason for this being that the expenses would have been greater than the value of the photographs obtained, and no newspaper or agency, unless they are philanthropic institutions, will stand for this.

The fact, however, remains that had one of these missed events been photographed by a local correspondent and the prints sent to the newspapers, they would certainly have been published. This is where the local photographer, whether professional or amateur, should come into his own, provided he can handle the situation in a workmanlike manner.

There will always be a certain number of big news events which will have to be covered from headquarters; but the

events which can be called "hardy annuals" or those which occur suddenly ought in future to provide a regular source of income for the correspondent photographer.

I am often asked the question:—"Are local photographic agents reliable?" Like the curate's egg, they are good in parts, and there is plenty of room for improvement in the majority of their work, which would earn for them far more money than they are at present making, and thus help meet the ever-increasing demand for good news photographs.

A great deal has been written from time to time in the photographic press on the subject of amateur photographers making their hobby pay its way, or at least meet some of the expenses, and the method recommended was to supply photographs of news and other subjects of interest to the illustrated papers and magazines.

In the days when photography was my hobby, and not a business, I diligently read all the articles on this subject, and carefully carried out the instructions and advice; but I must confess that I never succeeded in earning the amount of my plate bill, and that was when quarter-plates were 1s. per dozen.

Since that time I have earned my living with my camera, working for the "Daily Graphic" and the "Daily Mirror." With this experience, together with my present work as art editor of the "Sunday Pictorial,"* I think I can see why so many photographers fail to extract cheques from picture papers, and it is my hope that what I am going to tell them will at least help to put them on the right road for success.

The articles I read in the past were very helpful as far as they went, but that was just where they falied—they did not go far enough—and I am inclined to think that the majority of the writers had not been through "the mill." of Fleet Street with a camera, nor had filled positions as art editors of illustrated papers, and that is why their advice stopped short of the details, which mean the difference between failure and success.

Many of my readers have, I expect, often submitted their work to the art editor of their favourite picture paper. They have perhaps done this over and over again, and yet not had a single publication. They then give up in disgust, and blame the art editor, but never themselves, whilst if only they knew the truth the fault was theirs seven times out of ten.

I have hundreds of prints sent in every week, and I feel like shedding tears morning after morning when I see what the post brings and the good material wasted by having been badly handled; pictures that over and over again I was in need of, and would have published.

The figure in £ s. d. lost by correspondents in one week is surprising, and in the majority of cases poor composition is to blame.

Picture papers must be bright, and, as you all know, bright photographs are well thought out and composed, not just "any old snap."

I have noticed very often that where a commission has been given to an agent he has not been too careful in executing it, whilst the agent sending in on chance seems to take far more care with his work. Always put your very best work into every process of making a photograph when you intend sending it to a newspaper. If you are working on an undated event, and your first attempt is not your best work, do it again and secure an improvement. It will pay you in the end.

Here is an illustration of what happened quite recently. A photographer called upon me to submit a series of prints of a well-known footballer at home, to be used in the series running weekly in the "Sunday Pictorial." The photographs were very bad, and seemed to me to contain all possible faults, and would have been a disgrace to a very medium photographer. I declined them with thanks, and was then informed that as the photographer had sole rights of this football player, he would be pleased to do him again, and show me some better work.

An art editor wants to see the best work the first time. I have no sympathy for a photographer working on these lines, but I am sorry for the person who has given exclusive rights of his photographs to such a slack worker.

I want to make it quite clear, before I proceed any further, that I am not out to teach anyone photography, and I shall only touch very briefly on the technical side when necessary; but what I am hoping to provide is information (which I think will prove valuable), the result of personal experience during the past ten years in Fleet Street, and obtained during my journey from press photographer to art editor.

I am going to take it for granted that my readers can correctly expose a plate or film, and obtain a clear and clean print, either enlarged or contact, from their negatives. If they cannot do this ten times out of twelve they had better set to work and unearth the cause of their failures, and set matters right before they commence sending undeveloped plates or films to newspapers. Nothing does a correspondent so much harm as to wire an art editor that good pictures are on the way to the office, and then when the plates are developed they turn out to be "duds," because in all probability space will have been kept, and another story will have to be found, and this may not be an easy matter if it is near the hour of going to "press." One result is certain—the sender will be noted as unreliable, and commissions will not go his way.

The motto of every photographer working with a view to publication should be "Give them something new." I will illustrate exactly what I mean by this when I tell you how I came to turn up civil engineering for the very uncertain life of Fleet Street. As an amateur photographer I can say without fear of contradiction that I was a very keen one. I did not put my camera away during the short and dark days of winter. I used these days to test fast plates and experiment on under-exposure. Lens testing was also a favourite of mine, but with present prices I cannot recommend this as a hobby. But, looking back at those days, I think the experience gained was worth the price paid in hard cash. Sports of every description were my favourite subjects, and during the football season I turned my attention to League matches. There were not a great many papers publishing photographs in those days, and I realised that I must get something new and different from the staff photographers of the "Mirror," "Sketch" and "Graphic." This must also be the aim of every photographer taking on press work. Take any old subject, and treat it in a new way.

At a football match I found that all the photographers took up positions near the goals, and week after week produced the same type of result. This made me decide to work from the side touch line, using a long-focus lens when possible, and getting an entirely new view of "attacks on the goal." Sunday morning found me early in Fleet Street with enlarged prints, and on Mondays I usually found that I had two or three publications, and I always put this down to the fact that I was sending in a new type of picture. I had not been doing this for many weeks when I received an invitation to join the staff of London's largest photographic agency, because I had been beating their own photographers at football matches. I accepted, after much anxious thought, as I was warned on all sides of the dangers of the "Street of Ink," and I realise now that these warnings were not given without a good reason, and I want my readers to think, not twice, but many times, if there are any of them thinking of giving up work they may be doing now to take up press work as a profession. The life may sound easy and pleasant, but really it is very hard and very exacting. You may make a mistake in your present work, and nothing very serious will happen. In press work, every mistake, however small, is serious.

My endeavour will be to make these chapters a guide to the photographer who may from time to time have photographs which may be valuable for illustrating papers and magazines, but who at present is quite ignorant as to how to turn his work to good account.

How many photographers who happen to have negatives of some really big news event know how to deal with them, and realise their full value? From what I have seen as an art editor, I can say that very few do.

* These articles were written before Mr. Vining had resigned his position some two months ago.—Eds., "B.J."

II.—THE ART ROOM.

Have you ever visited a picture paper office and seen the working of the art room where all photographs are dealt with? I expect the answer is in the negative, so we will pay a visit to one, and you will then know exactly what happens in the day. The art room is under the charge of the picture editor, who alone will decide whether a photograph is published or returned to the sender with a polite "regret form." This individual must be studied through the paper he produces, as all art editors have their likes and dislikes, and it is very important that contributors should find them out by carefully watching his paper day by day or week by week. To the art room is attached the photographic section, which comes directly under the control of the art editor. Each evening the diary of events for the following day is fixed up, and where these are at a distance, the decision is made as to whether to send a staff photographer or instruct a local man. If the former, the photographer will pack his bag and start away. He may say that he has an engagement, and "she" will be waiting and he cannot let "her" know, but it is all to no purpose—"she" just waits. A photographer is the most uncertain person to make an engagement with, because his time is never his own. He is rather like a fireman. I remember an occasion when I arrived at the office one morning, and within an hour had left on the boat-train for the south of Spain. I was away three weeks, and returned late on a Thursday night. When I reached the office on the Friday morning I was sent off to Monte Carlo for nearly a month. Both these jobs were very enjoyable ones, and there were no complaints from me, although I believe my wife had a few "words" with the art editor over the 'phone. Having fixed up his own staff, the art editor will select the events to be covered by local correspondents, and instructions will be sent to them by telegraph or telephone. A card index is kept in the art room giving the towns (large and small) and the names and addresses of the local photographers. Some of these will no doubt have been appointed local correspondents, whilst others have earned their places on the cards by their work in the past.

Papers and agencies make a careful note of the class of work sent in, and a record is kept for future reference. Once it has been proved that Jones, of Blanktown, can be trusted to turn out good work, commissions will often be sent to him, and news events in his district will not be covered by staff men. A note may also be made that Smith is very good at social events—weddings, hunt meets, and even funerals, but Wilson is the man for sports, or anything requiring high-speed work.

The following morning the remaining photographers will be given events to cover according to the news which has come in during the night, and very often one or two more local correspondents will be instructed to cover certain news in their district. The post has by this time arrived and been opened, and the art editor will make his selection, very often using horrible language over the "might-have-beens" had a little more care been expended over their production. By the time the post has been dealt with, the "office conference" will be ready to "sit," and here the policy of to-morrow's paper is decided upon, and yesterday's work is criticised. The photographic agencies will now be calling with their photographs, and the first edition for Ireland and Scotland will soon be taking shape.

We will suppose that during the morning news arrives over the tape machine that a serious railway accident has taken place near Blanktown, and that the Mayor and one or more prominent men of the town have been killed or injured. This is what will follow. The card index is first of all consulted, and under Blanktown we find, Jones, A., 40, High Street (reliable), 'phone 62. Will take message. A trunk call is put through, and the following telegram is also sent:—

"Cover railway accident. Rush pictures for early edition. Collect portraits. Wire time of arrival."

If the story looks like being a big one, a staff photographer will be sent to help the local man. Later in the day a wire will be received from Jones something after this style:—

"Undeveloped plates arrive King's Cross 6.20. Hope to send portraits later. Please return slides at once."

All day long photographic salesmen are calling with prints, and staff men are returning from their engagements, and once the first edition is finished preparations are made for the next. About five o'clock the night art editor arrives, and the evening conference is held, after which he will take over the picture pages. He will know by the list of events what is coming in, and the time they are expected to arrive. His work will go on until the last edition has been "put to bed," and this will be somewhere round about the early hours of the morning. It is almost certain that some of the agencies will also have prints of the Blanktown smash, sent to them by their local agents, and they will have warned the art editor of the time that they expect to submit them. But Jones' ordered photographs will be used, unless he is badly beaten by a local rival, either on the score of photography or time of arrival. But even if Jones does fail he will receive a cheque to cover his time and expenses, because he was given a definite order, but a note would be made of his failure in this instance.

The work in the art room is always carried out against the clock, and more often than not at a very high speed. Pictures are changed from time to time to suit the edition, or to keep pace with the latest news. For instance, the edition of the "Sunday Pictorial" which appears in Ireland is entirely different from the one published in London.

Every care is taken of plates and prints received from correspondents, but these people must get it out of their heads that their photographs are the only ones arriving at the office, and that therefore it would be quite out of the question for them to get mixed up with any others, so that there is no need to put any name or address on them. I am sure this is what many of them must think, because every day this is what happens, and it causes endless annoyance and trouble to the art room staff, as well as to the sender, who will never under any consideration see or believe that the fault is his or hers. If you are sending prints, put your name and address on each one, and write as clearly as possible. When sending developed plates or films write it along the edge, and when these are undeveloped see that your name and address is clearly written on the box, as well as being inside with the titles. Unless you do this, the fault is the sender's if they are lost.

W. LANCELOT VISING.

(To be continued.)

CAMERAS AND CHARACTER.—In an article appearing under this heading in the "Oldham Chronicle," the writer says: Mankind is a mine inexhaustible, and the exploration of that mine always yields some profit to the photographer, be he seeker after beauty, or student of men and women. A photograph is much more to the man taken than to the taker. Accordingly, a wise man destroys many plates, for a broken plate may save a broken friendship. Photography is an absorbing pursuit, but if it costs you a friend you have paid too dear for your whistle. With the bold lovers of truth, those who like Cromwell want the wart on the nose, there is no difficulty. They know that little mannerism is a bad one; they know that trait which the camera reveals is in the character, and don't mind acknowledging it. The average man and woman want a "nice" picture, and put niceness ahead of truth. It is a bit of that self-deception with which most of us go through life, a light cloak that a gust of truth blows aside, but which does well enough in fair weather. Thus in photography, as in other pursuits, the moment we touch human beings we enter into the realm of moralities. No photographer can ignore it. And as a building arises out of many bricks, so out of his numberless observations a fine structure of solid knowledge is erected. If the proper study of man is mankind, no one can surpass the photographer in opportunities for such study. A sitter sometimes shows more of himself in five minutes than in five hours. In those minutes a short study may be made which reveals the essential, the often unseen bases of character. The face may be all that goes to the plate, but the sitter's mind often goes into that mental portrait gallery which the man with the camera is forming, for though he began with the sole notion of becoming a photographer he ends by becoming one who knows—in short a philosopher.

THE PHOTOGRAPHIC CONVENTION.

UNDER continued conditions of fine weather, the Photographic Convention of the United Kingdom met at Bristol on Monday last, July 4, to hold its 33rd annual meeting. The proceedings opened in the great hall of the Merchant Venturers' College, which is the headquarters of the Convention, with a meeting at which a welcome was extended to the members by the Lord Mayor of Bristol. The new president, Mr. C. H. Bothamley, M.Sc., F.I.C., was then installed in his chair of office, and delivered his address, the text of which appears below. At the annual general meeting which followed, suggestions for the place of meeting of next year's Convention were considered. It was resolved that, if practicable, next year's Convention shall be held at Shrewsbury. York was named as an alternative place.

In the evening a reception was held at the Bristol Art Gallery, at which members were received by Alderman Dr. C. H. Cook and Mrs. Cook, on behalf of the Lord Mayor.

On Tuesday Conventioners visited Gloucester under the guidance of Mr. Sydney A. Pitcher. By courtesy of the Dean of Gloucester, Dr. Henry Gee, permission to photograph in the Cathedral was granted, and members had the privilege of being personally conducted over the Cathedral. In the afternoon parties were formed for viewing the antiquities of the city and the Norman Chapel of St. Mary Magdalene under the guidance of Mr. George Embrey, F.I.C., F.S.C. On return to Bristol a lecture was delivered at headquarters by Mr. C. F. W. Dening, F.R.I.B.A., on "The Old Houses of Bristol."

Wednesday was spent in Bristol, when special facilities were afforded to Conventioners for photography in the cathedral and the great church of St. Mary, Redcliffe, and for visits to the chocolate factory of Messrs. Fry and the tobacco factories of Messrs. Wills. In the afternoon Mr. Roderick J. Fry and Mrs. Fry entertained the members at their home at Abbots Leigh, when the official group of the Convention was taken by Mr. F. Bromhead, of Clifton. The annual dinner was held in the evening, when a crowded company assembled under the chairmanship of the president.

Yesterday, Thursday, the Conventioners were to visit Chepstow and Tintern under the leadership of Mr. Bothamley, and to-day are making excursions to Bath and Lacock Abbey with Mr. Herbert Lambert, of Bath, as their guide. At Lacock, by permission of Miss Talbot, grand-daughter of Fox Talbot, photography will be permitted throughout the picturesque Abbey, which was Fox Talbot's home and where he carried out his classical experiments in the origination of photographic processes. A collection of Fox Talbot relics had been arranged by Mr. Lambert for the inspection of visitors, who would have the opportunity of examining the various models of cameras employed by Fox Talbot for the making of negatives on paper and also his appliances for the working of the Daguerreotype process. To-night the formal proceedings of the Convention will be brought to an end by a lecture by Mr. C. P. Crowther on "The Making of Portraits."

At the headquarters of the Convention an exhibition of photographs is being held during the week, and includes a collection by the Professional Photographers' Association and a large number of prints representative of amateur work and including some notable colour Bromoils by Mr. Hazell, president of the Bristol Photographic Club. A considerable exhibition by members of the photographic trade is also a feature of the week.

THE PRESIDENTIAL ADDRESS.

My first duty is to express to the members of the Council my thanks for the honour they have done me in electing me as President of the Convention for the second time. It gave me great pleasure to accept the honour, although I am not unmindful of the responsibility that attaches to the office at the present time when we are trying to revivify the Convention and make good, and more than good, the set back which, in common with many other societies, we have experienced as a result of the war. I can only say that it will be my earnest endeavour to discharge the duties of the office to the best of my ability, and I am confident that I can rely on the sympathetic co-operation of the Council, the members in general, and our honorary secretary. We are still the only photographic society which at the same time includes in its membership all classes of photographers and those interested in photography, and, by meeting in a different place each year endeavours to stimulate interest in and promote the advancement of the art and its applications. We are all, I hope, convinced that the Convention has a distinct and specific place amongst photographic societies, and if rightly administered may discharge very useful functions.

It is now thirty-one years since I first had the honour of holding this office, and I find the temptation irresistible to take an outline survey of some of the more important advances that have been made in that period. Such a survey, even though concise, must be very incomplete, because photography, like other branches of applied science and art, has made enormous advances in both knowledge and practice. The literature has become too voluminous, and the field too extensive for any one man to attempt to survey it all, even if there were the necessary time.

The year 1890 was remarkable in the history of photography from both the practical and scientific points of view. During the Chester Convention, on the evening of Tuesday, June 26, Mr. Friese Greene, who was then and for some years afterwards a member of the Convention, gave the first public description of the first really practicable camera and lantern for taking and projecting on a screen photographic representations of objects in motion. The apparatus previously employed by Muybridge and by Marey was complicated, difficult to use and limited in its capabilities and range. Muybridge's method of lantern projection by attaching the consecutive pictures of a moving object to a large disc which rotated in front of the lantern condenser gave very striking and interesting results, but it is obvious that such a method must suffer from severe limitations. We should not forget, however, that some interesting problems of animal motion were solved by both Muybridge and Marey.

The real solution of the problem of moving pictures, however, was to take the successive negatives on a continuous transparent band and to project the positive images by means of a similar band moving across the optical system of a lantern. It sounds very simple, but its realisation in practice presented many difficulties. The late Mr. Friese Greene, however, was an inventive genius, and he led the way in that wonderful development which has introduced a new and dominant element in the recreation of human beings in all parts of the world. The kinema, cinema, or "movies," which you will, has come to be regarded as an essential factor in social life, and with the aid of the still more recent motor-car it now finds its way into the remotest country districts. Whatever criticisms we may be inclined to make, we are obliged to admit that it has brought recreation and enlightenment, pleasure, and instruction into the lives of hundreds of thousands whose share of such things has never been excessive. Apart from its recreative side, it is now common knowledge that the cinematograph may render greater service in education, in scientific research, and as a recording agent. I need only remind you of such important matters as the Arctic and Antarctic expeditions, and the investigation of motion in

industrial manual processes with a view to eliminate unnecessary fatigue and increase efficiency.

The pathos of it is that here, as so often, the pioneer secured but little of the great pecuniary reward that has accrued to others from his labours. The inventive genius in his case was not allied to that commercial training and instinct which is essential to the exploitation of an invention. It is possible that he was far from realising how much would come out of his invention; even the title of the Convention paper, "A Magazine Camera and Lantern," conveys but little of the real importance of the topic. It is some satisfaction to know that in the end the great industry that has grown out of this beginning did to a certain extent recognise how much it owed to Mr. Friese Greene.

About the same time there was published a scientific paper which marks a distinct epoch in the history of photography. I refer, of course, to the famous paper on "Photo-chemical Investigations and a new Method of Determining the Sensitiveness of Photographic Plates," by Ferdinand J. Hurter and Vero C. Driffield. Later there were other papers by the same authors, but whilst of great value they had not the same distinction of novelty. The great merit of the first paper is that it laid down very clearly the principles and practice of the methods to be adopted in investigating, not only the sensitiveness, but all the other main characteristics of the photographic plate and incidentally, of the various developers, intensifiers, and reducers with which a plate may be treated. It is remarkable that although their methods have been improved in detail and accuracy, their general plan of work is still followed, and the ordinary man who wishes to make similar observations for his own information can still find nothing more suitable to his purpose than an apparatus similar to that which Hurter and Driffield devised.

I need not emphasise the point that nothing helps the advancement of human knowledge in a particular direction so much as the invention or discovery of a powerful new instrument of research like the microscope, spectroscope, or the X-rays, or the working out of the lines on which a whole series of investigations can be best conducted.

The names of Hurter and Driffield are familiar to many photographers, but it is safe to say that a knowledge of their methods and results is confined to comparatively few. For this there are several reasons: a large part of their work had much less significance for the general body of photographers than it had for makers of photographic materials or for those who use photography for strictly scientific purposes. At the same time, their results had a very important bearing on photographic practice more especially as regards development of the photographic image. Secondly, they employed certain terms in a sense different from that in which they were generally used by photographers; for instance, they used, quite rightly, one of their fundamental terms "density," with its recognised scientific meaning of the quantity of a substance contained in a particular volume or area. Photographers, unfortunately, had acquired the habit of using this same word "density" to mean the opacity or light-stopping power of different parts of the negative. This point alone led to much misunderstanding, not confined to one side of the controversy. Thirdly, their results were presented in a mathematical form, and their powers of popular exposition were not always as brilliant as their powers of investigation and mathematical analysis. It is to be regretted that for so long a time no one has attempted to make Hurter and Driffield's work and its practical significance intelligible to non-mathematical photographers, but it is a matter for congratulation that this attempt is now being made in the "British Journal" by so capable an exponent as Mr. G. E. Brown.

Perhaps the great point in Hurter and Driffield's results is that they clearly defined for the first time the terms "under exposure," "correct exposure," and "over exposure," and showed how to obtain the characteristic curve of a plate, which represents the latitude of exposure and the range through which the particular plate is capable of giving correct representation, the minimum exposure necessary to give correct representation and the factor (gamma) giving the time of development necessary for obtaining a given degree of contrast. They also showed that the densities of the silver deposit in the negative corresponding with the differences between the brightness of various parts of the object have a constant ratio, which is determined by the exposure, and, within the range of correct exposure is not altered by variations in the composition of the developer. For the reason stated above, this became the storm-centre of the subsequent controversies. Hurter and Driffield failed, until a much later paper, to emphasise sufficiently the fact that whilst the ratio of the *densities* remains constant, the ratio of the *opacities* varies greatly with the time of development. Subsequently, with more extended investigations, they modified some of their conclusions and recognised that with a sufficiently wide range of developers as regards both nature of the reducer and the composition of the solution, there may be differences between the ratios of the densities corresponding with the same exposures. One of their principal practical results, that photographers could not, as they had believed, alter the relative densities of different parts of the negative by altering the composition of the developer in the course of development was much challenged (old beliefs die hard!) but has not been upset. The effect of adding a soluble bromide to the developer was another point on which new conclusions were arrived at and old beliefs disturbed. From their work and that of later investigators, it can be said that the main effects of adding a soluble bromide to the developer before development begins are (1) to reduce fogging of the unexposed parts; (2) to retard development, and apparently to make the plate less sensitive; (3) to reduce the size of the silver grains; with prolonged development however these effects disappear.

The Hurter and Driffield paper and subsequent controversies stimulated interest in the questions dealt with and led to much further research, notably by the late Sir W. de W. Abney and by Mr. Chapman Jones in this country, and by Eder and Scheiner abroad. One outcome of the general activity was the time method of development invented by Mr. Alfred Watkins, a former President of this Convention. Even more important was the fact that a continually increasing number of scientifically trained workers turned their attention to the investigation of photographic phenomena and processes.

Some ten years after the appearance of the first Hurter and Driffield paper, their work was repeated with improved methods, and materially extended by Sheppard and Mees, but the main conclusions held good. At the present time quite a number of trained and competent investigators, whose names will readily occur to you, are at work, and are obtaining valuable results. I shall not, I hope, be supposed to under-value what they are doing if I venture to express some regret that more pains are not taken to make the results and their significance more intelligible to those who would profit by the work if only they understood it. I cannot help thinking that there is sometimes an unnecessary display of those wonderful combinations of the letters of the Greek alphabet which bring delight to the souls of real mathematicians and dismay to the souls of ordinary people. If scientific workers are to receive the general recognition that they claim and deserve, scientific results must be made plainer to those who can use them and to the general public. A prominent public man lately said that the only people with anything worth saying at the present time were the scientific people, but that they were also the only people who did not know how to say it. Casting my mind back to thirty and even forty years ago, I share the feeling that at the present time there is much room for the cultivation of the art of popular scientific exposition. In 1890 the number of scientifically trained men devoting themselves to research work in photography was probably not more than a score. To-day we have in all civilised countries a large number of energetic and competent men engaged in the same field. The establishment of well equipped laboratories under able control in connection with important photographic undertakings and the organisa-

tion of the British Photographic Research Association are all full of promise for more rapid progress in the future. It would be a misfortune if the results obtained were unintelligible or unappreciated outside the ranks of specialists.

Whilst the behaviour of plates has been under investigation attention has naturally been paid to the problem of the nature of the latent photographic image; but although new theories have been advanced this fundamental problem still waits for a conclusive solution. It is the "elusive Pimpernel" of photography—always with us but always escaping capture.

In many, indeed, one might say all, of the most important processes of photography we are dependent on that large class of substances known as *colloids*, that is, substances which are of the nature of gum or glue, and as far as we know are incapable of forming crystals and incapable when in solution of passing through certain membranes, whilst under suitable conditions they form jellies or coagulate. Familiar examples in addition to glue and gum are white of egg, starch, and that evil-smelling substance which is sold under a variety of names in a variety of tubes and has the property of sticking much closer than a brother, especially where it is not wanted to stick.

Gelatine, which is only the purest form of glue, is, as you well know, used as a supporting medium in all our most familiar negative and positive processes. Our sensitive material is an emulsion of a silver salt in gelatine, and it has been recognised for some time that to completely understand the processes we must know what the gelatine does as well as what the silver salt does. Now those who have worked with it know that gelatine is always a weird and otentimes a wicked substance (human bodies contain a considerable quantity of gelatine—but I am not suggesting that as an explanation of anything).

In these later years there has developed a new branch of scientific work which studies the properties of colloids and the colloidal state. Often it is called *colloid chemistry*, but this is unfortunate, because the methods of research and the phenomena are physical rather than chemical in the ordinary sense of the word. It is sixty years ago since the peculiarities of colloids were recognised by the English chemist, Thomas Graham, but the development of our real knowledge of them belongs to this recent period of thirty years with which I am dealing. It could not happen before because the methods of investigation had not been devised. The science of colloids is, in fact, an offshoot of the development of physical chemistry.

This new branch of science, having to deal with newly-discovered phenomena, has had to invent a new set of terms and talks of such things as sols and hydrosols, gels and hydrogels, emulsoids and suspensoids, adsorption, dispersion, heterogeneity and cataphoresis. Though the language may be repellent, the country investigated is of great interest and importance. It is part of the broad border-land between chemistry and physics, and apart from its special and comparatively minor interest to us as photographers its study is of the greatest importance in connection with animal and vegetable life.

In photography we are concerned not only with the true colloids which have not yet been known to crystallise like gelatine or starch, but also with the colloidal state of substances that can crystallise, but which under certain conditions can exist in a state similar to that of the true colloids. Amongst such substances are gold, silver, and the insoluble halide salts of silver. The colloidal state implies a very minute degree of subdivision of the particles of the substance, not so minute as in the case of a true solution, such as salt or sugar in water, but much more minute than the finest powder that we can prepare in the solid state. This minute degree of subdivision connotes a very large area of surface for a given mass of the substance, and since physical and chemical interactions take effect at the surfaces of the particles of the interacting bodies it is not surprising that when in the colloidal state certain substances have the power of entering into a kind of quasi-combination, not as intimate as true chemical combination, but very difficult to break down when once it has occurred. This quasi-combination is usually called adsorption, and we have instances of it in the difficulty of washing certain lead salts out of paper, or hypo out of P.O.P. prints.

It seems quite clear that silver bromide can exist in a colloidal state in an emulsion if only in small quantity, and further research may demonstrate the importance of this state in the production of practically grainless photographic images. It has also been suggested that the latent image may consist of colloidal silver adsorbed by the unaltered silver bromide.

Passing from latent images and development to the developers it is noteworthy that early in the nineties Andresen and Lumière independently established the general relation between the chemical constitution of certain compounds and their power of developing the photographic image. Speaking generally, this power is dependent on the presence of at least two hydroxyl (OH) groups or two amido (NH_2) groups, or at least one hydroxyl and one amido-group in the same benzene nucleus, with the further condition that they are in the ortho-position or the para-position in the molecule. Some work was also done on the effect on the developing power resulting from other substitutions in the molecule. To this work we owe such useful additions to our list of developers as amidol, diamidophenol metol and adurol. Probably further research in the same field would be still more fruitful.

In its early days the Convention did much to make known to photographers in general the principles and practice of orthochromatic photography. Since 1890 the advance has been mainly in two directions, (*a*) the perfection of factory methods for utilising the sensitising power of the dyes of the eosin group for yellow and yellow-green, and (*b*) the discovery of new dyes of the cyanine group with sensitising power for orange and red rays. Out of these have come panchromatic plates with all their advantages in the rendering of coloured objects. The reluctance of so-called practical people to take advantage of improvements is illustrated by the fact that a photographer in a large town in the West of England told me a short time ago that he was the only photographer in the place who used panchromatic plates even for difficult colour subjects.

It must be a source of gratification to us all that owing to the researches of Sir William Pope and his colleagues at Cambridge during the war, cyanine dyes have been produced which are far superior as orange and red sensitisers to any of the similar products for which we were formerly dependent on Germany. Why certain dyes, and certain dyes only, act as effective sensitisers is still one of the unsolved problems.

I feel, however, that to the great mass of photographers the really important thing that has taken place in the past thirty years is the marked improvement in, one may almost say the perfection of, the manufacture of photographic materials. I doubt whether there are any manufactured products of such a delicate character, turned out on a large scale, so free from chemical and mechanical defects and so uniform in character as the photographic plates, films and papers produced by the leading photographic manufacturers. As a consequence, the elementary practice of photography has become remarkably simple and certain. From one point of view, this is a great gain, but I think that for many there has been a loss of that interest which arises out of difficulties and uncertainties. In the old days surprising things might happen at any stage of the processes—not as an occasional treat, but as a regular thing—and the endeavour to discover the causes of these occurrences and the methods of preventing them constituted for the more enthusiastic amateurs one of the chief interests of their hobby. The defects met with were sometimes the faults of the makers, sometimes the fault of the users. Nowadays photographic manufacturers have, of course, no such sins—but even in the old days they never confessed to any.

The ease and simplicity of modern photography is not without its drawbacks to photographic societies. The centre of interest has shifted from the processes of photography to the

applications of photography. Many of the opportunities for discussion and exchange of experiences that used to arise out of the less perfected processes have disappeared, and I think the difficulty of keeping up interest and enthusiasm has undoubtedly become greater. After all, so much research is being done that new discoveries of importance must be made from time to time and influence even the most routine practice. Moreover, the applications of photography are so numerous, the art has become so intimately a part of our daily lives, that with reasonable organisation and systematisation with certain definite ends in view, there should not be many failures to keep societies in active existence.

It is, it seems to me, the principal function of this Convention to stimulate general interest in photography especially in the place of meeting, to make known in an accurate but popular manner the results of original researches, and to encourage through research and critical discussion that continued progress and development which is the only safeguard against stagnation and decay.

C. H. Bothamley, M.Sc., F.I.C., F.R.P.S.

THE H. AND D. DOCTRINE.

In the preceding chapter it was explained that the action of development upon a plate is to increase the densities proportionately.

At a given stage of development of a correctly exposed plate the densities thus reach a value at which the opacities corresponding with them are proportional to the corresponding light-intensities from the subject.

The contrast of a negative relatively to the subject can be expressed by the ratio of the ratio of two opacities to the ratio of the corresponding light-intensities $\left(\frac{O_2}{O_1} : \frac{E_2}{E_1}\right)$.

The resulting ratio measures the contrast of the negative relatively to the subject. But contrast is more conveniently expressed in terms of densities and corresponding log exposures when it is the so-called gamma.

A negative of gamma less than 1.0 is of less contrast than the subject; and one of gamma greater than 1 of greater contrast.

The gamma of the negative is measured by a simple graphic construction when plotting the characteristic curve of the plate for determination of speed.

Plates differ as regards the maximum gamma which they will yield; and this maximum gamma, γ_∞, or gamma infinity is a measure of the contrast quality of a plate.

Different printing papers require gammas in some cases less—in others greater—than the theoretically correct gamma of 1.0.

The calculation of the time of development required to produce a given value of gamma is therefore of importance. It is complicated in theory but simple in practice, and is considered in the present chapter.

The series concludes with some notes on the principle of the Hurter and Driffield measurement of the speed of plates.

IV.—TIME OF DEVELOPMENT, AND CONTRAST.

Thus there is a maximum gamma, which varies with different plates, but with a given plate cannot be exceeded. But any gamma less than the maximum is determined by the time during which a given developing solution is allowed to act. The final and important point in the making of a negative which shall have the gamma required for the best (most correct) results on a given printing paper is therefore the calculation of the time of development necessary to produce a given gamma. This is the most complicated part of the process which we have been considering in these chapters. A graphic method of calculating the time of development was merely indicated by Hurter and Driffield in their last paper, published after Dr. Hurter's death in 1898. A means of making this calculation was first worked out by Mees and Sheppard, and was published by them in three papers ("Phot. Journ.," 1903, pp. 48 and 199, and 1904, p. 297), which are almost wholly mathematics of a kind which it is not possible to translate into popular language. They are among the least comprehensible of the early papers by Mees and Sheppard; which is saying a good deal.

Without considering the physical conditions which prevail in the development of a negative due to the "structure" of the gelatine and the diffusion of the developing solution into it and out again, it will be sufficient to remind ourselves that development is a process which gets slower and slower as it proceeds. We know from practice that with any ordinary developer the contrast of a negative increases from nothing very quickly during the first moments of development, and although there is an ample quantity of developer, grows more slowly during the later stages of development. We also know that some plates increase in contrast, with the same developer, more rapidly than others. It is therefore plain:—

(1) That the rule or law governing the rate of development must be a rather complicated one, and

(2) That there must be some characteristic property which causes one make of plate to develop more rapidly than another.

An Illustration of Rate of Development.

An analogy will perhaps help to explain these two elements in development. Suppose we have a heap of bricks, and we set a man to lay them all end to end in a straight line over a mile length, taking one brick at a time from the heap. Suppose also that our man, as a convinced trade unionist, is able to work at an even rate. At first he will lay out, say, 6 ft. of the line of bricks in very little time, but as the length of the line increases he will spend more and more time in fetching each brick, and when the line is, say, half a mile long it will take him a very long time to add 6 ft. to its length. The analogy is not a perfect one, but it illustrates a characteristic of development, viz., that at any instant the more of it has been done the slower the rate at which the remainder is done. It also illustrates that though the speed of the process becomes less at an increasing rate, there is a constant factor, viz., the rate of work of our brick layer; and if he could be induced to carry out the job at twice that rate, the mile of bricks would be laid in half the time.

The Velocity Constant of a Plate.

In this analogy the mile line of bricks represents the utmost contrast of the plate (i.e., gamma γ_∞), and the rate at which the workman sets out the bricks represents a property of the plate (for a given developer), which Mees and Sheppard called the "velocity constant," and which is commonly denoted by k. As shown by them, the rate of development (increase of gamma) is constantly decreasing: at any instant it is the difference between the maximum gamma obtainable and the gamma produced at that instant multiplied by the velocity constant, k; or expressing this in symbols:—

after t seconds, rate of development $=(\gamma_\infty - \gamma_t)k$.

While the rate of development is changing at every instant, because the difference between the gamma obtained and the gamma obtainable is changing, the other factor k is a constant. With the same developing solution and temperature, a plate of a certain value of k develops to a given

gamma in half the time required by a plate having half that value of k (for the same developer), providing both plates have the same γ_∞. This constant k ranges with various plates from about .03 to .3 (for the ferrous oxalate developer), and is very easily affected by variations in manufacture, such as the rate at which the emulsion on the plates is dried.

TABLE A.

Table of corresponding values of $\frac{\gamma_2}{\gamma_1}$ and k for determination of k and γ_∞ (Mees and Sheppard, "Photographic Journal," November, 1904, page 297).

k.	$\frac{\gamma_2}{\gamma_1}$	Δ for Δ 0.001 in k.	k.	$\frac{\gamma_2}{\gamma_1}$	Δ for Δ 0.001 in k.	k.	$\frac{\gamma_2}{\gamma_1}$	Δ for Δ 0.001 in k.	k.	$\frac{\gamma_2}{\gamma_1}$	Δ for Δ 0.001 in k.
0.005	1.977	0.0050	0.105	1.596	0.0032	0.205	1.358	0.0018	0.305	1.216	0.0012
0.010	1.952	0.0048	0.110	1.580	0.0030	0 210	1.349	0.0016	0.310	1.210	0.0010
0.015	1.928	0.0050	0.115	1.565	0.0028	0.215	1.341	0.0018	0.315	1.205	0.0010
0.020	1.903	0.0046	0.120	1.551	0.0028	0.220	1.332	0.0016	0.320	1.200	0.0010
0.025	1.880	0.0044	0.125	1.537	0.0028	0.225	1.324	0.0016	0.325	1.195	0.0008
0.030	1.858	0.0042	0.130	1.523	0.0026	0.230	1.316	0.0016	0.330	1.191	0.0010
0.035	1.837	0.0040	0.135	1.510	0.0028	0.235	1.308	0.0014	0.335	1.186	0.0008
0.040	1.817	0.0040	0.140	1.496	0.0024	0.240	1.301	0.0014	0.340	1.182	0.0008
0.045	1.797	0.0038	0.145	1.484	0·0024	0.245	1.294	0.0016	0.345	1.178	0.0008
0.050	1.778	0.0038	0.150	1.472	0.0024	0.250	1.286	0.0016	0.350	1.174	0.0010
0.055	1.759	0.0036	0.155	1.460	0.0024	0.255	1.278	0.0014	0.355	1.169	0.0008
0.060	1.741	0.0034	0.160	1.448	0.0022	0.260	1.271	0.0014	0.360	1.165	0.0008
0.065	1.724	0.0034	0.165	1.437	0.0022	0.265	1.264	0.0014	0.365	1.161	0.0008
0.070	1.717	0.0032	0.170	1.426	0.0022	0.270	1.257	0.0012	0.370	1.157	0.0006
0.075	1.691	0.0032	0.175	1.415	0.0020	0.275	1.251	0.0012	0.375	1.154	0.0008
0.080	1.675	0.0030	0.180	1.405	0.0018	0.280	1.245	0.0012	0.380	1.150	0.0006
0.085	1.660	0.0032	0.185	1.396	0.0018	0.285	1.239	0.0012	0.385	1.147	0.0008
0.090	1.644	0.0032	0.190	1.387	0.0020	0.290	1.233	0.0012	0.390	1.143	0.0008
0.095	1.628	0.0032	0.195	1.377	0.0018	0.295	1.227	0.0012	0.395	1.139	0.0006
0.100	1.612	0.0032	0.200	1.368	0.0020	0.300	1.221	0.0010	0.400	1.136	—

TABLE B.

Table of corresponding values of kt and $1-e^{-kt}$ for determination of time of development for required gamma of plate of given k and γ_∞ (Mees and Sheppard, "Photographic Journal," November, 1904, page 297).

kt.	$1-e^{-kt}$	diff. for .01 kt.	kt.	$1-e^{-kt}$	diff. for .01 kt.	kt.	$1-e^{-kt}$	diff. for .01 kt.	kt.	$1-e^{-kt}$	diff. for .01 kt.
.000	.000		1.000	.6322		2.000	.8647		3.000	.9502	
.025	.02	.0095	1.025	.6485	.0034	2.025	.8680	.0013	3.025	.9513	.00047
.050	.046		1.050	.6547		2.050	.8712		3.050	.9525	
.075	.073		1.075	.6609		2.075	.8744		3.075	.9537	
.100	.0952		1.100	.6671		2.100	.8776		3.100	.9549	
.125	.1174	.0086	1.125	.6741	.0032	2.125	.8805	.0012	3.125	.9559	.00043
.150	.1387		1.150	.6830		2.150	.8834		3.150	.9570	
.175	.1600		1.175	.6909		2.175	.8863		3.175	.9581	
.200	.1813		1.200	.6988		2.200	.8892		3.200	.9592	
.225	.2082	.0077	1.225	.7059	.0029	2.225	.8919	.00105	3.225	.9601	.00039
.250	.2252		1.250	.7131		2.250	.8945		3.250	.9611	
.275	.2422		1.275	.7203		2.275	.8971		3.275	.9621	
.300	.2592		1.300	.7275		2.300	.8997		3.300	.9631	
.325	.2769	.0071	1.325	.7339	.0026	2.325	.9021	.00096	3.325	.9639	.00036
.350	.2945		1.350	.7403		2.350	.9045		3.350	.9648	
.375	.3121		1.375	.7469		2.375	.9069		3.375	.9657	
.400	.3297		1.400	.7534		2.400	.9093		3.400	.9666	
.425	3458	.0064	1.425	.7592	.0024	2.425	.9113	.00086	3.425	.9674	.00032
.450	.3617		1.450	.7651		2.450	.9135		3.450	.9682	
.475	.3776		1.475	.7710		2.475	.9157		3.475	.9690	
.500	.3935		1.500	.7769		2.500	.9179		3.500	.9698	
.525	.4085	.0057	1.525	.7822	.0022	2.525	.9197	.00078	3.525	.9706	00029
.550	.4234		1.550	.7875		2.550	.9217		3.550	.9713	
.575	.4373		1.575	.7928		2.575	.9237		3.575	.9720	
.600	.4512		1.600	.7981		2.600	.9257		3.600	.9727	
.625	.4641	.0052	1.625	.8029	0021	2.625	.9274	.00071	3.625	.9732	.00026
.650	.4772		1.650	.8077		2.650	.9292		3.650	.9739	
.675	.4903		1.675	.8125		2.675	.9310		3.675	.9746	
.700	.5034		1.700	.8173		2.700	.9328		3.700	.9753	
.725	.5138	.0047	1.725	.8215	.0017	2.725	.9344	.00064	3.725	.9758	.00023
.750	.5281		1.750	.8259		2.750	.9360		3.750	.9764	
.775	.5394		1.775	.8303		2.775	.9376		3.775	.9770	
.800	.5507		1.800	.8345		2.800	.9392		3.800	.9776	
.825	.5613	.0042	1.825	.8387	.0016	2.825	.9408	.00058	3.825	.9780	.00022
.850	.5714		1.850	.8426		2.850	.9412		3.850	.9786	
.875	.5827		1.875	.8465		2.875	.9426		3.875	.9792	
.900	.5934		1.900	.8504		2.900	.9450		3.900	.9798	
.925	.6031	.0038	1.925	.8539	.0014	2.925	.9463	.00052	3.950	.9807	.00019
.950	.6218		1.950	.8575		2.950	.9476		3.975	.9812	
.975	.6225		1.975	.8611		2.975	.9489		4.000	.9817	

The Law of Time of Development.

Evidently, then, there is a definite law for the time in which a certain value of gamma is reached for a plate of given values of gamma $_\infty$ and k. Unfortunately, in mathematical symbols it is a forbiddingly complicated formula, and I know of no method of making it simpler. I would not introduce it into these notes were it not for the fact that in order to use it there is no necessity to understand it from the mathematical standpoint. By means of the table B. worked out by Mees and Sheppard the use of the formula becomes a matter of ordinary arithmetic, and therefore the reader must not be frightened by the symbols, but is asked to make himself acquainted with the short cut to their use provided by the table. The formula is:—

$$\frac{\gamma_{t_1}}{\gamma_\infty} = \left(1 - e^{-kt_1}\right) \text{ and } \frac{\gamma_{t_2}}{\gamma_\infty} = \left(1 - e^{-kt_2}\right).$$

where γ_t is the gamma produced in t minutes and where $t_2 = 2t_1$. In other words we have first to find out by sensitometric tests gammas for, say 5 to 10 minutes development and from these data can find the gamma $_\infty$ and k of the plate for the developer employed. When they are known, the time of development required for any other gamma when using the same developing solution at the same temperature can be calculated from the table B of Mees and Sheppard given opposite. From the general form of the formula

$$\frac{\gamma_t}{\gamma_\infty} = \left(1 - e^{-kt}\right)$$

the required gamma is divided by the gamma $_\infty$ of the plate and the value nearest to the quotient is found in Col. 2. The corresponding number in Col. 1 is the value kt; that is, the time multiplied by the known k of the plate. Dividing by k, the time is obtained. Example:—What is the time of development for a gamma of 0.8 of a plate which (with the same developer at the same temperature) has a gamma $_\infty$ of 1.6 and a k of .15.

$$\frac{\text{gamma req'd}}{\text{gamma}_\infty} = \frac{0.8}{1.6} = .5 = 1 - e^{-kt}$$

From the table, the value of kt corresponding with $1 - e^{-kt}$ of .5 is .700. Dividing by k (=.15), we obtain 4.7 minutes. The method is valid only for developers of Watkins' factor less than 15.

But as a preliminary to this calculation the values of k and gamma $_\infty$ have to be found for the plate and a given developer. The sensitometric method of doing this is to make a series of exposures on two pieces of the plate, develop one twice as long as the other and measure the gamma of each. From the values of these gammas and the times of development the value of k can be found by the table A of Mees and Sheppard. For example, with a plate giving $\gamma_1 = 0.98$ at 3.55 minutes' development and $\gamma_2 = 1.40$ in 7.1 minutes:—

For k, using Table A:—

$$\frac{\gamma_2}{\gamma_1} = \frac{1.4}{0.98} = 1.428$$

Nearest value in table is 1.426, corresponding to a k for 5 minutes of 0.170.

To convert to a k for 3.55 minutes, multiply by 5 and divide by 3.55.

$$\frac{0.170 \times 5}{3.55} = \frac{.85}{3.55} = \underline{0.239 = k.}$$

Gamma $_\infty$ has also to be found, as for example, by the formula of Renwick ("Photographic Journal," April, 1911, p. 213), viz.:—

$$\gamma_\infty = \frac{(\gamma_1)^2}{2\gamma_1 - \gamma_2}$$

where γ_1 is the gamma produced by development for t_1 minutes and γ_2 the gamma produced by development for t_2 minutes, these two times being so chosen that γ_2 is considerably less than $2\gamma_1$ otherwise any error of measurement greatly affects the value obtained for γ_∞. It is possible here only to present in somewhat rough outline the methods adopted in calculations of time of development, but enough has perhaps been said to show the lines which are followed.

Summary.

At this point the foregoing chapters on the elements of the H. and D. doctrine might well end. While they have covered very little ground, the fullness with which the elementary conceptions have been considered will, it is hoped, do something to promote the study of sensitometric methods in the investigation of negative-making and printing processes by a greater number of photographers. Nevertheless, the chapters could hardly be published without one on the basis of the H. and D. speed numbers, the original purpose of Hurter and Driffield's experiments, though perhaps the least fruitful of them. Some explanatory notes on their rating of plate speed are therefore appended.

But the main theme of the present exposition ends here. After defining the theoretically perfect negative—perfect, that is, as a reproduction of the tones of the subject—in terms of opacity, or, alternatively, of density, we have seen the different shares taken in its making by exposure and development.

Exposure such that the difference between any two densities shall be in a constant proportion to the difference between the logarithms of light-intensities producing those densities.

Development such that this proportion shall be 1; that is, that the density-difference shall be equal to the log exposure difference.

We have also seen how this degree of development requires to be varied, and can be varied in a calculable way, according to the printing paper. But there still remain to be considered the rules regulating the effect of temperature and the properties of different developers in the making of negatives of a required specified degree of contrast. This further subject must be left for another occasion, when perhaps it may be possible for it to be dealt with by an authority to whom photographers are largely indebted for the scientific basis of time development.

G. E. B.

(To be concluded.)

FREE-LANCE PRESS PHOTOGRAPHY.—As we point out on another page, the series of articles by Mr. Vining, which begin their appearance in this issue, approach the subject of non-staff press photography from a fresh angle, namely, that of the art editor. The subject, however, is a wide one with many ramifications, and the photographer desirous of making the most of the more ample field which is now open to him is well-advised not to neglect any of the opportunities of obtaining guidance which are available. Undoubtedly the chief of these is the course of postal instruction in press photography which is offered by the Practical Correspondence College, of Thanet House, Strand, London, W.C. We can claim to have been fairly intimate with the value of this course for many years past, and have had opportunities of judging of the eminently practical and constructive scheme of the lessons, and also of the painstaking help rendered to students individually. A recent re-reading of the lessons as issued at the present time impresses us with the College's close appreciation of the conditions in illustrated journalism. It is quite in accordance with the many-sidedness of photography for the illustrated papers that the course of lessons offered by the P.C.C. should cover almost completely different ground from the series of chapters by Mr. Vining which our readers will be able to study during the next few weeks. Between the two the photographer who is ambitious to build up substantial independent earnings in the shape of reproduction fees from the newspapers may feel fairly well assured that there are few ideas or methods of procedure which are not brought to his notice in the most suitable way. An illustrated booklet issued by the Practical Correspondence College and sent free on application gives an excellent idea of the scope of the P.C.C. course and itself provides a certain measure of insight into the practice of press photography, from which so many at the present time are earning considerable sums.

EASTMAN KODAK COMPANY.

The directors' report for the financial year ended December 31 last (the eighteenth full year of business of the company) shows a surplus of $10,330,428 (£2,129,935), after setting off liberal amounts for depreciation and paying 40 per cent. on the common stock in addition to 6 per cent. on the preferred stock. The figure for the surplus in English currency is obtained on the basis of $4.85 to the £ as in previous reports. The above figure for surplus is equivalent to net profits of $18,656,210, equivalent to £3,828,084, the largest in the history of the company, and exceeding those of 1919, which hitherto have held the record, by more than £260,000.

The following table shows the net profits since the year 1903 :—

	£
Year ending December 31, 1903	606,740
,, ,, 1904	688,484
,, ,, 1905	827,610
,, ,, 1906	1,116,639
,, ,, 1907	1,446,479
,, ,, 1908	1,540,725
,, ,, 1909	1,619,087
,, ,, 1910	1,850,552
,, ,, 1911	2,401,910
,, ,, 1912	2,886,401
,, ,, 1913	2,920,090
,, ,, 1914	2,332,579
,, ,, 1915	3,245,600
,, ,, 1916	3,564,784
,, ,, 1917	2,998,467
,, ,, 1918	2,897,313
,, ,, 1919	3,778,595
,, ,, 1920	3,828,084

The report briefly intimates the death of one director, Mr. Alexander M. Lindsay, who had occupied a position on the Board for a number of years past.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, June 20 to 25 :—

Daylight Development.—No. 17,157. Daylight development of roll films. H. G. Chaney.

Enlarging Lanterns.—No. 17,060. Masking-device for lanterns for photographic enlargement. J. G. Kitchen and Thornton-Pickard Manufacturing Co., Ltd.

Shutters.—No. 17,101. Photographic shutter release and counter. F. Sullivan and A. S. Warne.

Finder.—No. 17,304. Focussing-attachment and distance-finder for film cameras. J. H. Whitehead.

Stereoscopy.—No. 17,325.—Stereoscopic lantern projection. P. Ashworth.

Electric Records.—No. 17,106. Photographic recording of electric signals, etc. J. Hettinger and C. A. Vandervell and Co., Ltd.

Stereoscopy.—No. 16,981. Apparatus for viewing stereoscopic cinematograph or lantern-slide projection. A. N. Wight.

Colour Cinematography.—No. 16,756. Optical exposure for three-colour exposure cinematograph. Firm of C. Zeiss.

Cinematograph-Phonograph.—No. 17,033. Means for synchronising cinematographs and automatic musical instruments. L. Köhler and Tonfilm Ges.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

Zona.—No. 413,311. Photographic papers. Thomas Illingworth and Co., Ltd., Cumberland Avenue, Park Royal, Willesden Junction, London, N.W.10, manufacturers of photographic papers.

New Materials.

Mounting Boards and Papers.—Messrs. Butcher, Camera House, Farringdon Avenue, London, E.C.4, send us a complete collection of the astonishingly numerous and varied styles of mounting boards and papers issued by them. These include three new introductions designated as the "Gambia," "Vancouver" and "Yukon." They have a certain family likeness, and are all three of them most distinctive styles, for the "Gambia" series is represented by mounting boards which are imitations of close-grained fabric, leather, or wood, and are produced in appropriate colours. The "Vancouver" and "Yukon" papers are perhaps best described by saying that they are imitations of the texture of arras cloth, familiar in the furnishing of studios and picture galleries, but the variety of texture and colour is greater than is obtainable in commercial arras cloth, particularly in the "Yukon" series, which includes two styles of figured gold surface, and in addition a mounting paper of quite smooth gold effect. There are certainly opportunities for making use of these most striking and realistic papers and boards which are a notable departure from the quiet and more subdued tints and textures which characterise the greater number of the specimens which Messrs. Butcher send to us. We cannot help thinking that for the most effective mounting of the great majority of photographs the papers or boards of less striking character are by far the best, but in the three new styles Messrs. Butcher have provided photographers with altogether distinctive goods, and we can well imagine that those who have the enterprise to consider their qualities will find ways of turning them to good account. Samples of any of the materials will be sent free on application to professional photographers.

Commercial & Legal Intelligence.

Legal Notices.—Notice is given of the dissolution, by mutual consent, of the partnership between Frank Spring and Herbert Arthur Bellamy, carrying on business as enlargers and photograph printers at 92 and 94, London Road, Sheffield, under the style of F. Spring and Company. All debts due to and owing by the late firm will be received and paid by Frank Spring, who will continue the business.

Notice is given of the dissolution, by mutual consent, of the partnership between Rose Kate Durrant and Harold Humphrey Brook Durrant, carrying on business as photographers at 37, Fleet Street, Torquay, under the style of R. K. Durrant and Son. All debts due to and owing by the late firm will be received and paid by Harold Humphrey Brook Durrant, who will continue to carry on the business under the same name.

Oswald M. Smith & Co.—Particulars of Oswald M. Smith & Co., Ltd., have been filed pursuant to Section 274 of the Companies (Consolidation) Act. This private company was incorporated in New Zealand on April 16, 1920, with registered office at Dunedin, to carry on business as indent and commission agents and manufacturers' agents, dealers in fancy goods, toys, photographic materials, and other goods. The nominal capital was £30,000, but has been increased to £50,000 in £1 shares. The directors are: E. R. Murphy, H. S. Williams, A. B. Williams, H. B. Williams, C. J. Bennett and O. M. Smith, all resident in New Zealand. The British address is at Copthall House, E.C. N. C. Sawers, of 69, Hervey Road, Blackheath, is authorised to accept service of process and notices on behalf of the company.

FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, JULY 12.

Manchester Amateur Phot. Soc. Council Meeting, 6.15 p.m.

THURSDAY, JULY 14.

Hammersmith (Hampshire House) P.S. "Bromoil." H. Procter.

SATURDAY, JULY 16.

Manchester Amateur Phot. Soc. Ramble to Marple District.

ROYAL PHOTOGRAPHIC SOCIETY.

PICTORIAL SECTION.

At the meeting held on Friday, July 1, Mr. Raymond E. Crowther opened a discussion on the rendering of sunlight by photography in the course of a short paper, in which he considered separately the influence of the subject of the photographic process and of the mounting and framing. In the case of open views light and shade played a comparatively small part, and such subjects were perhaps the most difficult from the point of view of imparting the sensation of sunlight to their photographic renderings. But those having a strong foreground provided differences between the high-lights and the shadows, which greatly accentuated the effects of sunlight. The rendering on the plate, in their case, approximated more closely to the psychological effect upon the observer than in the case of an open view.

The ideal photographic medium for the rendering of sunlight was a transparency, for the scale of gradation could be advantageously increased at both ends as the high-light brightness increased the shadows were better penetrated. But when making a positive print on paper the scale was comparatively limited, and one had to choose the best means for making the high-lights appear bright. That meant obtaining the longest scale possible in both the negative and positive, and, therefore, accurate exposure and full but not over-development. As regards the type of negative plate for the rendering of sunlight, it required to be borne in mind that the change in colour of natural objects consequent upon the introduction of sunlight was very marked: it could be readily observed in any of the parks, particularly on grass. Therefore it seemed desirable that the plate should give a record of the colour effect. But sunlight emphasised colours to the eye to which the ordinary plate is blind, and therefore a panchromatic plate, or, as a poor second, an orthochromatic plate, was recommended. But even with a panchromatic plate the sensitiveness of the eye and that of the emulsion do not coincide. To most people yellow, which is frequently encountered in the rendering of sunlight, is more assertive than white. Over-correction, therefore, provided the subjects were suitable, was frequently advisable, but some subjects, particularly skies, would stand it, and Mr. Crowther advised the use of a vision filter, by which the view could be seen as it would appear when employing a given plate and light-filter.

As regards the making of the print, it would immediately be found that a negative which faithfully rendered the luminosity of the subject called for sacrifice at one end or the other of the scale in the making of the print. If the high-lights were retained, the sky would exhibit the effect of sunshine, but the shadows would lack a naturalistic strength. On the other hand, if printing were done for the shadows, the blue of the sky would take a tone suggestive of an approaching storm. It therefore seemed inevitable that the subject should be selected so that when the sky was included it was not necessary to depend on strength of the shadows for effect; or, on the other hand, if the subject depended on shadow rendering it was advisable to avoid inclusion of the sky. Toning of the print through its introduction of luminosity into the shadows would help over some of these difficulties, and a cream base paper, by its suggestion of warmth, was another artifice of value. Mr. Crowther confessed that he saw no objection to local toning or tinting of a print if it contributed to a desired effect.

In briefly referring to mounting, etc., he pointed out a few of the factors which could contribute towards emphasising a sunlight effect.

CROYDON CAMERA CLUB.

The week before last, according to an account kindly furnished to an absent reporter, Mr. A. J. Lyddon, the Principal of the Polytechnic School of Photography, gave a lecture-demonstration on "Finishing Bromide Prints," illustrating his own method of finishing in oils, which is capable of producing a variety of effects simulating chalk, pastel or water-colour.

After a preliminary pun of the "justifiable homocide" class, the demonstrator obliterated the head of a fair damsel on a bromide print with sundry smears of brilliant oil colours, and immediately relieved the feelings of his wondering audience by rapidly reducing this exuberant jazz display to sober monochrome. By means of a mysterious fluid and various brushes and pads, high-lights were then picked out and edges softened in the most dexterous way till a masterpiece of "finish" was revealed.

Colouring came next, the initial proceedings being much the same as before, but apparent purposelessness soon gave way to settled design, and a second triumph of the same order resulted. Finally a bald-headed landscape was fitted with suitable clouds in manner incapable of detection, which furnished the text of a sermon on mud and bromoil by Mr. Harpur. Throughout the proceedings this member, who, so far as is known, has never embarked on finishing bromide prints in manner demonstrated, pointed out several improvements in procedures. The fact that most had been tried by the lecturer and found worthless in no way detracted from the kindly intentions of Mr. Harpur, who is the happy possesser of a battery of brains that cannot be put out of action by big guns, however heavy. A most hearty vote of thanks was accorded Mr. Lyddon for a highly interesting exposition of a somewhat unusual character.

At the start, just as the Secretary was reading the minutes for his own edification, Dr. Mees made a dramatic and quite unexpected appearance, and was heartily greeted by all. Last week he lectured on "Photographic Chemistry," a report of which is held over.

News and Notes.

THE CLUB PHOTOGRAPHER.—The July issue of our Liverpool contemporary is a Hackney number, the contributions, literary and pictorial, being by members of the Hackney Photographic Society.

DR. C. E. K. MEES has received from the University of Rochester, New York State, the honorary degree of Doctor of Science, in acknowledgment of his work in photographic research in the Eastman laboratory.

MR. H. WALTER BARNETT advises us that he is no longer associated with the firm of H. Walter Barnett & Co., Ltd., Knightsbridge, London, S.W., having entirely withdrawn from that firm in March 1920. Mr. Barnett has established himself at Villa Les Tourelles, Dieppe.

MORE COMPETITION.—The proprietors of the new "Sunday Illustrated" offer to supply copies of the pictures appearing in the pages of the paper; matt or glazed enlargements, 6 x 4 in. to 15 x 12 in., at prices ranging from 2s. 6d. to 12s. 6d.; postcards at 6s. per dozen, and lantern slides at 2s. 6d. each.

NEAREST TO NATURE.—Under this title the City Sale and Exchange, 61, Aldersgate, London, E.C.4, have issued an attractive 16 page booklet descriptive of the Richard Verascope camera and of accessories for the viewing of Verascope stereoscopic transparencies in monochrome and colour. The booklet is obtainable free on application.

RÖNTGEN SOCIETY.—At the recent annual meeting, Professor J. W. Nicholson was elected president, and Dr. G. H. Rodman, Sir Ernest Rutherford and Sir William Bragg, vice-presidents. Mr. Geoffrey Pearce, 33, Newton Street, London, W.C.2, was re-elected honorary treasurer, and Drs. E. A. Owen and J. Russell Reynolds, joint honorary secretaries.

CARBRO DEMONSTRATIONS.—The Autotype Company have secured the services of Mr. Dordon Pyke to demonstrate the new and improved carbro process during the autumn and winter. If secretaries of photographic societies wishing to take advantage of this will communicate with the Company details will be sent of the dates when Mr. Pyke will be in their districts.

A Novel Photographic "Finish."—We learn from one of the Birmingham newspapers that on a recent Saturday the East Birmingham Photographic Society had a very enjoyable gathering, first at Aston Hall, where some very good pictures were obtained in the afternoon, and then at the theatre in the evening. Surely a novel sort of finish up for a summer photographic outing.

The Lay Press and Photography.—If the lay papers will have columns of photographic notes, those in authority should see that the information given is fairly reliable. One of last Saturday's provincial papers told its readers that a mixture of "hy-posulphate of soda" and "metal-sulphate" made a good acid-fixer, and that an "amstigmet" lens working at "F 45" was a good one for focal-plane work.

Unreliable Finders.—Unreliable finders—especially finders on very cheap film cameras—are the cause of much spoilt film, and Mr. F. M. Sutcliffe, writing on the subject in the "Yorkshire Post," says that the finder and the film may have had both the same image when the camera left the workshop, but continual uplifting as the camera is opened out throws the finder out of plumb. The obvious remedy is to take as much care of a "moveable" finder as one does of a lens.

London's Water Views.—London is well provided with views in which water forms a part. An artist, writing in the "Daily Chronicle," says that for real prettiness the Regent's Park lake or the view towards Bayswater from the Serpentine bridge takes some beating. The Thames as seen from Greenwich Park looks grander than it does from the Terrace at Richmond, whilst Westminster Abbey and the Parliament buildings can only have justice done to them by those who have gazed on them in the evening from near Lambeth Bridge with the Thames in the foreground. These water views, however, are less "photographic" than some obtainable in St. James's Park—when there is water in the lakes. The view of the India Office across the lake is one of the best in London.

A Link with the Past.—With the death of Lady Brewster a decided link with the past has been snapped, for her husband, Sir David Brewster, was born in 1781. Lady Brewster, who was ninety-four years of age, died on June 22 at Allerly, Montrose, where she had lived since her marriage in 1857, and where Sir David died in 1868 at the age of eighty-seven years. In early Victorian days Brewster was as well known as any great scientist of our own times, and his writings were held in high repute. Among his many inventions were the kaleidoscope and the lenticular stereoscope, he making a special study of the latter. Sir David (writes a correspondent) was a close friend of Fox Talbot, with whom he stayed at Lacock Abbey in 1836, when the sixth meeting of the British Association was held at Bristol.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents*

EARLY STEREO AND MAGNESIUM WORK: AN ALMOST FORGOTTEN PIONEER.

To the Editors.

Gentlemen,—Your "Ex-Cathedra" reference to Prof. C. Piazzi Smyth's "Teneriffe" book, illustrated with original stereoscopic silver prints, is extremely interesting, for although the fact of its publication is fairly well known to those of us who are interested in astronomical matters, it most certainly is not generally known that stereoscopic pictures were included in it. It was in May, 1856, that Prof. Smyth went on his astro-photographic expedition, in the yacht "Titania." He returned in the following October, and published the volume in the spring of 1858.

Our photographic interest in Prof. Smyth, however, does not end here. Seven years later (in 1865) he photographed the interior of the Great Pyramid by the aid of magnesium ribbon, he being the first to do so, and we can but admire his enterprise, as he must have met with very great difficulties in those early days, and it would be interesting to know what became of the pictures. Twenty years ago it was my lot to photograph the very same pyramid's interior, and using the then latest forms of magnesium (powder and ribbon) and lamps, I found the task a most difficult one. I used a ribbon lamp fitted with a kind of parabolic reflector, which enabled me to focus the rays of burning ribbon into the corners of the inner chamber and to project them upon the darker parts of the stone, but Dr. Smyth could have none of these modern inventions, hence his very big difficulties.

Magnesium, I believe, was made known by Davy in 1808, but the first successful photographs were not taken with it until about March, 1864, when Mr. A. Brothers, of Manchester, obtained a stereoscopic negative of a Derbyshire mine. In May of the same year a portrait of Prof. Faraday was taken at the Royal Institution, so that Prof. Smyth may be considered one of the pioneers of magnesium work.

Although magnesium was used for photographic work in the sixties of last century, flashlight work with powders did not come along until twenty years later. It was, I believe, in May, 1887, that Drs. Gaedicke and Miethe first startled the photographic world with the possibilities of magnesium rapidly burnt in the form of powder. To do this they mixed magnesium powder with various oxidising bodies, such as potassium chlorate or nitrate, but this plan of working did not catch on very quickly, and many fatal accidents were reported. Dr. Piffard, of New York, then devised the system of placing the flashlight powder on guncotton, after which—but the exact date I am unable to trace, though I believe it was in 1889—Prof. Schirm, of Berlin, invented the plan of burning pure magnesium powder (not a mixture) by blowing it through a flame, a method largely used in this country about 1891. I do not, however, propose to write a history of flashlight work.

Prof. Smyth also made a careful study of cloud-forms by photography, he doing this in 1888, after his holding the post of Astronomer-Royal for Scotland, and while living in retirement at Clova, near Ripon, Yorks., where he died in 1900. These photographic cloud studies are specially mentioned in books of reference, though I feel sure they are not known in the photographic world.

Those acquainted with the life of Prof. Smyth know of the great interest he took in photography, particularly stereoscopic photography, and I think I do right in describing him as an almost-forgotten pioneer of photography as applied to science.—Yours faithfully,

P. R. S.

MICROPHOTOGRAPHY.

To the Editors.

Gentlemen,—I regret that at the moment I am unable to reply to Mr. J. Rheinberg's criticism and answer his query so fully as I would wish, but I will say at once that Mr. Pigg's micrographic slide was of an advertisement page. He, however, experimented with text pages as well and, I believe, produced promising results. I am now in communication with Mr. Pigg's relatives, who have promised to turn up the actual results if it be possible to do so, and should they, or particulars of them, reach me I shall be able to give names and dates of the actual pages with which experiments were carried out. As, however, ten years have elapsed since Mr. Pigg's death, you will realise that the task of tracing his experiments is not an easy one, but I well remember the results he showed me when visiting his workroom, on which occasion the method of making microphotographs was demonstrated.

Some may wonder why pages of the "B. J." were selected for experiment, and it may be pointed out that the late experimentalist worked in the office in which the "B. J." was then printed. His uncle was the printer and owner of the firm, Mr. Pigg having a laboratory and process business in the same building. When a page was wanted for experiment it was quite a simple matter for him to go into the composing room and take a "pull" of a page on the best plate or calendered paper, specially "inking-up" the type so as to get a clear and perfect page of letterpress for the camera. His results were, therefore, bound to be better than those obtained by anyone working from an ordinary copy of the "B. J.,"

[illegible] printed on the machine in the usual way. It was with [illegible] perfect pages that I saw him at work, and while I am certain [illegible] his success with advertisement pages, I cannot at the moment [illegible] anything definite about the matter pages, though I am of [illegible] that he did succeed in securing a satisfactory result.—
W. T. L.

[illegible] faithfully,

To the Editors.

Gentlemen,—I was very interested in the letter on the above sub- [illegible] by "W. T. L." in your issue of the 17th inst., as I have been [illegible] on the problem for some time.

I am familiar with the small pictures in penholders, etc., which [illegible] still sold in France, and until reading your correspondent's [illegible] I was always puzzled as to how these were made. I have [illegible] these under the microscope, and the grain is very fine [illegible] the detail very sharp, the picture being cemented under a [illegible] glass at the flat end of the lens. From an optical standpoint, [illegible] the lens is very crude, but it is a clever piece of work.

My method of making microphotographs is slightly different [illegible] that described by your correspondent, and may be of interest. [illegible] small precision box-camera is used, fitted with a 4-inch Cooke [illegible] lens in a focussing jacket. The camera is rigidly fastened, [illegible] behind it is a microscope for focussing. This latter is set by [illegible] on the grain of a similar plate to the one being used, [illegible] which the image is focussed on a piece of plain glass of the [illegible] thickness by the rack motion on the lens. The object in my [illegible] was drawn on Bristol board with Indian ink, and measured [illegible] inches across.

I have endeavoured to avoid the use of wet plates, and have [illegible] a good substitute in the Paget half-tone plate, and although [illegible] grain is hardly so fine, the process of making miniature pictures [illegible] simplified.

To get the necessary reduction, the camera is, of course, a con- [illegible] distance from the object, which is illuminated by a group [illegible] half-watt lamps. This process, of course, gives a negative from [illegible] positives may be made by contact printing, using the glue [illegible] process.

It is unfortunate for anyone working these processes that no [illegible] exists to guide one, and the above is the method [illegible] by myself, and others may have better methods which [illegible] should be glad to hear of.—Yours faithfully,

Glasgow, W. W. S. Robinson.

STEREOSCOPIC LENS SEPARATION FOR NEAR OBJECTS.

To the Editors.

Gentlemen,—In reply to the letter from Mr. T. J. Ward re my [illegible] on "Stereoscopic Lens Separation for Near Objects," as [illegible] stated in the article, I have endeavoured to deal with the [illegible] from the practical standpoint and am not prepared to argue [illegible] points of theory.

I suggest, however, that the reason an object 12 inches from the [illegible] of an observer does not appear exaggerated in relief is because [illegible] images transmitted to the retina are influenced to a great extent [illegible] judgment in the same way that although the images are received [illegible] the retina inverted, they do not appear so to the observer. My [illegible] is that if a separation of 2½ inches for an object 12 inches [illegible] gives exaggerated relief (as Mr. Ward admits it does), the [illegible] remedy is to use a smaller separation.

I am quite aware that stereoscopes vary a good deal, and, that being so, it is not possible to give a standard that will be correct for all, but I submit that if the lens separations which I give are used the best all-round results will be secured.—Yours faithfully,

11, St. John's Terrace, Lewes. E. J. Bamford.

July 4, 1898.

A NOTE TO DEALERS.

To the Editors.

Gentlemen,—May we call the attention of photographic dealers and their assistants to the great importance of handing to their customers with all photographic instruments they sell the printed booklet, card or leaflet of instructions which makers almost always supply with such instruments? We have had very frequent instances lately in which buyers have used instruments in quite a wrong way and spoilt their plates or films because the retailer of the instrument has sold it without the printed instructions. We have always regarded full and explicit instructions necessary, and have provided them with all instruments we send out. Buyers should not accept instruments without them, and thus check the carelessness we refer to.—Yours truly, Watkins Meter Co.,

Hereford. July 2. A. W.

A CONTRAST RATING FOR PRINTING PAPERS.

To the Editors.

Gentlemen,—The article by Mr. Rawkins on printing comes, in my humble opinion, at an opportune moment. The question of contrast quality in papers is one that is not at all well enough understood, and printers often wonder why they cannot get the results they want from papers which are made for other classes of negatives only. The fact that some makers' "soft" papers are similar to the "normals" and "vigs" of other makes adds to the confusion, while more than once in a broad experience of papers I have found truly vigorous papers in "soft" boxes.

At the moment I am in communication with a number of makers on the advisability of expressing the actual nature of a paper in numerals, something after the style of the H. & D. numbers on plates. This would be more informative than the terms "soft" and "vigorous," which often are misleading, and, when working with a variety of papers, mean nothing more than "fast" and "slow" would mean with plates. The art of choosing a printing paper for a negative is one deserving of more study by all concerned.

—Yours, J. R. Hall.

Liverpool.

TESTING DEVELOPMENT SPEEDS OF PLATES.

To the Editors.

Gentlemen,—We are all extremely indebted to Mr. Watkins for his very interesting and informative article in the "B.J." of July 1, and to Mr. W. B. Ferguson for having persuaded him to publish his laboratory methods. I hope, however, that Mr. Watkins will not consider that I am not appreciative of his article if I question his statement on page 383, column ii., under the heading "Standards," in which he writes that Messrs. Hurter and Driffield stated that the theoretical steepness of 1.0 gives the same contrast in the print as the original. My memory does not enable me to trace this statement in their papers, and a further search has not revealed it. In their paper on Photo-chemical Investigations, etc., "J.S.C.I.," May 31, 1890, they stated that "A negative is theoretically perfect when the amount of light transmitted through its various gradations is in inverse ratio to that which the corresponding parts of the original subject sent out." This condition is undoubtedly attained by an exposure within the range of correct exposure and subsequent development to a development factor (gamma, contrast, steepness) of 1.0. But Messrs. Hurter and Driffield were considering the *negative alone*, and made no reference whatever to the *print* that it would yield. And it seems obvious that they were well aware that the theoretically perfect negative of their own definition would by no means invariably yield a perfect print, for they wrote subsequently in their paper on the Latent Image and its Development, "Phot. Journal," 1898,* "As we have frequently pointed out, the real control which the photographer has it in his power to exercise lies in deciding what development factor he will reach. By this means he determines the range of gradation of his negative, and adapts the range of light-intensities in his subject to the range capacity of the material upon which he prints. He also modifies the range of his negative in order to adapt it to the printing method he means to employ." It is evident that, even if Messrs. Hurter and Driffield thought in 1890 that a negative contrast of 1.0 was necessary in order to yield a *print* which was a correct counterpart of the subject—and personally I don't think that they ever did so—they had certainly no misconceptions in 1898.

It seems to me that any system of development, whether it be aided by calculation or by judgment, must be able to produce a negative of any gamma at will. The gamma required is calculable from the relationship between the logarithm of the range of light-

* Also H. & D. Memorial Volume, p. 390.

intensities of the subject and the logarithm of the exposure range of the printing paper. If a fixed development factor (gamma) be chosen, such as Mr. Watkins' choice of 0.9, then it will only be occasionally that such a negative will co-relate the subject with the printing paper in a proper manner. We should be very much nearer perfection in development determined by calculation if we possessed and made use of the following information :—

(*a*) The range or scale of light-intensities in the subject.

(*b*) The exposure range or scale of the printing paper.

(*c*) The time of development for *any* gamma calculated from the logarithmic relationship between (*a*) and (*b*).

Hitherto (*a*) and (*b*) have been ignored in descriptions of methods of development, or merely alluded to in the vaguest terms. They are, however, the key to the production of a perfect *printing* negative.—Yours faithfully,

B. J. GLOVER.

Sunnymere,
Birkenhead Road Meols,
July 2, 1921.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

H. A.—The copyright is yours, and the reproductions are an infringement of it. Better write to the papers pointing this out, and asking what they propose to do.

H. W.—(1) We have found a solution of chrome alum to keep fairly well, certainly six weeks. (2) You would probably be able to procure the caustic soda flakes from Messrs. Hopkin & Williams, Ltd., 16, Cross Street, Hatton Garden, E.C.1.

S. C.—We think that you will find the N. & G. type of changing box quite satisfactory with films. We have used one carrying 24 sheaths, and have had no trouble with it. You would probably require a special focussing screen, as these boxes have a very deep register.

H. E.—(2) It is a good competitive picture, and would stand a good chance in a trade (paper or plate maker's) competition. Commercially it is of little use alone, publishing firms usually buying sets of six. (3) Artistically the plain one is the better, but the toned one would be the better seller.

J. B.—We cannot pass the markings on your prints as *stains*. They are clearly air bubbles caused in some way, probably by rocking the dish too severely, or by carelessly pouring on the developer. If you wet your prints before developing, and make sure that no bubbles exist on the film, we have an idea that your troubles will disappear.

J. B.—The formalities of converting a business into a company are somewhat out of our province, but you can obtain a book on the subject from Messrs. Jordan & Sons, Ltd., 117, Chancery Lane, London, W.C.2, who are publishers of books on company matters, and, we believe, also undertake the conversion of a business into a limited company.

P. W.—Zinc is a very unsuitable material for holding an alkaline developer in regular use, since the soda carbonate steadily attacks the zinc. It is possible that the markings on the negatives may arise from that cause. We advise you to use a tank either of hard wood or of earthenware, ; both Messrs. Kodak and Messrs. Houghtons supply tanks specially suitable for this work.

M. & J.—We regret that without knowing all the circumstances and the quality of the work supplied we cannot help you to fix the price. Such work is usually calculated on a commercial basis ; that is to say, materials, time, use of apparatus, proportion of running expenses, etc., are all totalled up, and a fair profit added to this. If you double the actual cost we do not think you will be far out.

A. H.—The mark something like the figure 8 at the end of the focussing scale is simply to indicate the infinity point—it is not really an 8. The other distances probably indicate metres—a metre is roughly 39 inches, unless, of course, the camera was made for the English market—as many of them are—in which case yards would be indicated. This point can only be decided by trial.

D. E.—Much appears to depend upon the verbal arrangement made, but your charges, we think, prove that you had no intention of delivering the negatives. We may point out that although the photographer has no right to use the negative, save by the customer's request, yet the customer cannot claim it as his property. This position has been upheld in the County Courts over and over again.

E. W.—The distance gauge, or telemeter, is an accessory which is, or was, on the market from several makers, for example, Messrs. Newman & Guardia, 17-18, Rathbone Place, London, W.1. It is simply an instrument for gauging the distance of an object quite apart from any camera. It has never been popular, probably because of the extra trouble involved ; and, of course, those who are regularly using a hand-camera become familiar with judging distances with sufficient accuracy.

H. B.—You cannot do better than use a reflex camera for the work. Any good reflex would serve, and we cannot recommend any special make, the principles of the instrument being the same. An anastigmat lens working at *f*/4.5 would be advisable : though it might not be necessary to always use this large aperture, you would be guided by the definition required, and that seen on the focussing screen of the reflex. Films or plates is a matter of opinion. The choice lies between a supply of dark-slides for plates and a fitting to take flat films in the form known as a "film pack."

A. M.—We would not care to use gas tar or naphtha as a coating for dishes in which prints are to be handled. It might answer for tank development of negatives where the plates are contained in a rack, and do not come in contact with the sides of the tank. For the handling of prints, particularly those to be toned, you cannot have anything better or more economical in the long run than the earthenware dishes. For view work, presumably in half-plate size, about the best all-round camera is a half-plate light model field camera with a good roller blind shutter and a couple of lenses, say, one of 9 in. and another of about 5 in., when it is necessary to work in rather confined quarters.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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Contents.

SUMMARY.

No one who looks forward to some pleasant respite from the strain of modern life can help being touched by the truly tragic death of Mr. S. H. Fry, ex-secretary of the Professional Photographers' Association. Mr. Fry died suddenly on the day succeeding his entering upon the tenancy of a country house, which he had at length taken, following his retirement from business a few months ago. (P. 419.)

The appreciation and sympathy of the P.P.A. are expressed in a letter from the secretary, Mr. Lang Sims. (P. 423.)

In his two further chapters on photography for the newspapers Mr. W. Lancelot Vining deals with advisable apparatus and with the plans to be followed in photographing a news event of public interest and transmitting the results to the newspapers. (P. 411.)

The Bristol meeting of the Photographic Convention wound up with a notable visit to Lacock Abbey, the home of Fox Talbot, where a representation was made to the Royal Photographic Society, represented by the president, Dr. G. H. Rodman, of a collection of relics, apparatus and prints, formerly belonging to Fox Talbot. (P. 413.)

Reproduction of a photograph of members of the convention at Lacock will be found on page 414.

The concluding chapter of the series setting forth the conceptions and methods of Hurter and Driffield, is in the nature of an appendix, and deals with the inertia, or inverse measure of speed, of a plate, devised by the two investigators. (P. 415.)

Dr. C. E. K. Mees, who has been making a stay in England during the last few weeks, delivered a lecture on photographic chemistry at the Croydon Camera Club. A partial report dealing particularly with some matters of practical interest, appears on page 416.

In his "Paris Notes," Mr. L. P. Clerc reports a new process of preparing plates specially sensitive to ultra-violet rays, and also describes some Autochrome methods of French workers. (Page 417.)

Considerations of cost, transport and facility of enlarging now tend to limit the size of camera for professional outdoor work to whole-plate. In an article on page 410 we refer to the employment of this size for larger or smaller prints.

Damage to a lens may be visible or invisible on ordinary inspection. The latter kind is more likely to impair the optical performance. Visible defects, such as chips or scratches, or even cracks, are of minor importance. (P. 410.)

The value of a hood for the hand camera lens is much less appreciated than it should be. Some kind of shade, e.g., a flap for box cameras, or a detachable hood for folding cameras, can make a great improvement in the negatives taken under many conditions of light. (P. 410.)

We are glad to see that there are evidences of organisation among painters to stem the tide of futurism, cubism, and the like, which for several years past has been running unchecked. (P. 409.)

EX CATHEDRA.

Carbon in Hot Weather. During the past few weeks the weather has been very trying to the occasional carbon printer, one of the principal troubles being the liability of the gelatine coating to liquefy in the sensitising bath, or even after hanging up to dry. When we consider that it is possible to develop a print in water at 80 degs. Fahr. it is obvious that the tissue must not be immersed in a bichromate bath anywhere near that temperature, nor should it be hung up to dry, except in a cool place. If it be possible to procure ice it is easy to bring the sensitising solution down to, say, 55 degs., and after squeegeeing off all excess upon a plate of glass the tissue may be hung up without much risk. If ice cannot be obtained, a useful dodge is to pour the bichromate solution into a jug or large measure, and to immerse in it a well-corked bottle of a strong solution of hypo which may be made by charging the bottle to one-third with hypo crystals and filling up with cold water. This should be shaken once or twice and put into the bichromate without waiting for the crystals to dissolve. An alternative is to use a spirit sensitiser and to immerse the tissue in this. Applying with a brush in hot weather has in our hands had a tendency to cause streaks, owing to the rapid evaporation of the spirit.

* * *

The Future of Futurism. A new Society of Artists has been formed to let the public have what it likes instead of having to put up with what art-adventurers like to give them. The first annual exhibition of this Society is now open at the Suffolk Street Galleries. As was to be expected, the journalists have not been too flattering about the show. It is, indeed, upon the level of pre-war ordinary work, with nothing superlatively fine in it. But another year may bring better results. The point to be noted is that at last artists have made some organised effort to stem the tide of ineptitude and absurdity which passes by the name of "futurism," "cubism," etc., and we hear rumours that still another Society, with the same objects, is being started. We welcome this effort of painters to rid themselves of the baneful influence of a revolutionary few, who rely upon the "boosting" of Press critics, having nothing else to rely upon. Things have certainly come to a ridiculous pass when, at the National Gallery of British Art, examples of Italian and French decadence are honoured with the cachet of worthiness by being placed on the walls beside the true works of art of our own countrymen. A visit to the Tate Gallery is, in this respect, a truly depressing ordeal, and shows the need of some sort of protest. But in matters of art the public are supreme in apathy, and the sensation-mongers supply exactly the right sort of pabulum for a sensational Press. It is thus that virulence thrives. The great weakness of the New Society is that the painters who comprise it are too

obscure. There are plenty of talented men whose names would have given strength and significance to this praiseworthy movement had they been properly canvassed to support it.

* * *

Damaged Lenses. Considering its reputed fragility it is rather remarkable that so few lenses bearing marks of hard usage are encountered. Such are, however, to be met with occasionally, and it is somewhat difficult for the average photographer to know whether they are worth purchasing at a low figure. Lenses are, as a rule, damaged either by a fall or by careless cleaning or packing. The damage caused by a fall may take the form of a chip or crack or separation of the cemented surfaces. Chips, if not large, do not interfere materially with the performance of a lens if they are covered with black varnish or even opaque colour. Cracks, if not large, may be blocked out in the same way, and even if one of the glasses is broken across it may be cemented together with black cement without showing any sign of the line upon the negative, provided that a very small aperture is not used. A fall may, however, seriously impair the working of a lens without being apparent to the eye. This is when the mount has been distorted and a strain put upon the glass. A general surface dullness, due to careless cleaning with gritty cloths, does not impair the definition, but causes a general fogginess upon the negative. Deep scratches, caused by allowing the lens to rattle about in the camera case, have the same effect, but an improvement may be effected if they are blocked out as if they were chips.

* * *

Fixing Bromides. An experience of one of our readers will probably be of interest to many others. Making a batch of two dozen prints from the same negative, he was much disappointed to find, on taking them into white light to wash, that they were much weaker than they should have been, judging from the appearance in the developer. Being convinced that reduction had taken place in the fixing bath, he made a further print, which he developed to the same depth and fixed for three minutes only. Upon inspection, this proved quite satisfactory, and it was returned to the fixer for a further period of fifteen minutes, at the end of which it was found to be in the same condition as the rest of the batch. The fixing bath contained hypo and meta-bisulphite only, a similar solution having previously worked quite satisfactorily. A fresh sample of hypo had, however, been used for the batch in question, and this probably contained some impurity, the nature of which we do not know. We mention this incident because it may account for uneven depth in a batch of prints, some of which have remained in the fixing bath much longer than others.

* * *

Hoods for Hand Cameras. It is quite an exception to find a hand camera fitted with an effective lens hood, yet it is obvious that if a hood is ever necessary, it is when working out of doors with a lens of large aperture. Although many subjects permit of the use of an unshaded lens, many others have to be passed over, because taking them would necessitate pointing the lens too directly towards the sun, this danger commencing as soon as the direct rays strike ever so little upon the front of the camera. A simple flap, preferably with side wings, can usually be fixed to box-form cameras, which will include the reflex and folding focal plane types, but others, such as folding Kodaks, need a circular or conical hood, which can be slipped on to the front cell of the lens. Whatever type of hood is adopted, the inside should be absolutely non-reflecting, and for a lining, black or very dark-brown velvet or flock paper is the most suitable. Those who desire to construct their own hoods will find much useful information in an article by Dr. Glover in the B.J. for July 30, 1920, while instructions for making a simple folding shade are given by Mr. Mackinnon on page 336 of the current B.J. Almanac. The shade and hood there described folds perfectly flat for the pocket or camera case.

OUTDOOR APPARATUS.

Before the war it was generally considered that the outdoor outfit of a professional photographer was not complete unless it comprised a 12 x 10 camera with its appropriate battery of lenses, a fairly heavy stand, and one or two rather solid carrying cases. In the course of events it has been found necessary to reconsider this choice, and to try to meet present-day conditions. There are now many factors which tend to make the production of large negatives inconvenient and costly, while the facilities for making enlargements indistinguishable from direct prints have been greatly increased. Among other things to be considered is the greatly-increased initial cost of the apparatus itself. Cameras and lenses are at least twice as dear as in pre-war times, and the high price of plates and the difficulty of obtaining the services of an assistant, or even a porter, to help in carrying the outfit, are now substantial factors.

Taking all these points into consideration it seems that the modern equipment should consist of a camera not larger than whole-plate size, which will suffice for direct negatives in many cases, and an enlarger which will take at least a half-plate negative. With such an outfit, not only is it almost as easy to obtain 12 x 10 or even 15 x 12 prints as by the use of large apparatus, but in many cases the finished result will be superior in quality, owing to the ease with which any necessary dodging can be performed. For some classes of work, such as machinery, motor-cars, and any subjects which require blocking-out, the large direct negative has the advantage, but for all ordinary subjects, such as groups, architecture, animals and landscapes, it is no longer necessary.

If possible, the camera should be of the parallel-bellows form, as this is much more convenient for use with a wide-angle lens, and at the same time is more rigid at its full extension than the conical model. Moreover, the risk of cutting off part of the sides of the subject when using the swing-back on a difficult bit of architecture is entirely avoided. A well-made parallel-bellows camera should have a maximum extension of nearly, if not quite, three times the longest dimension of the negative, while it will, on the other hand, permit the use of lenses of very short focus. The lens outfit should include several lenses, ranging from 4 inches to 20 inches in focal length. If cost is a prime consideration only the smaller ones need be anastigmats, rapid rectilinears being quite satisfactory for any focal length above 12 inches. If a separable lens of 8½ inches, the single components being 12½ and 17 inches, be chosen, this will make a good basis. In addition, a wide-angle lens of 5½ inches, which may be of the rectilinear form, and an anastigmat or good rectilinear of 10 inches focus will give a fairly complete set. The separable lens should have a maximum aperture of $f/6$, but for the others $f/8$ is as large as is necessary.

As absolute sharpness is a *sine qua non*, the tripod should be fairly solid. The ordinary self-locking style

with an 8-inch head is quite satisfactory, and a folding base which will strap up with the legs is a most useful accessory, especially for indoor work. An illustration of this accessory will be found in the "Practicus" handbook, "Commercial Photography," issued by our publishers.

Three double dark slides with carefully adjusted inner carriers for half-plates are requisite, and it is a good plan to have a half-plate Mackenzie-Wishart slide, with at least half a dozen envelopes adapted to fit in register with the regular focussing screen.

The reader will probably have gathered that the idea is that the negatives for all orders above whole-plate size should be taken upon half-plates from which the enlargements are to be made, and as the degree of enlargement is only two diameters for 12 x 10 prints, and two and a half for 15 x 12 prints, there need be no apprehension of want of sharpness, nor of granularity, if plates of moderate rapidity be used.

The enlarger, if fitted with a condenser, should have one of 8½-inch diameter, so that the plate is evenly illuminated to the corners, and it is advisable to interpose a piece of finely-ground glass between the light and the condenser. This equalises the illumination and prevents any small scratches or defects on the film or glass from being emphasised. A good front lens should be fitted so as to secure perfect marginal definition at full aperture. The 8½-inch anastigmat would answer perfectly, but there is a slight risk of the balsam being injured by continued heat. For this reason a lens of the Cooke type, which has no cemented surfaces, is to be preferred.

If the dark-room arrangements permit, a very effective enlarger may be made by enclosing a couple of half-watt lamps, of about 500 c.p., in a well-ventilated box, so that they illuminate a sheet of white card, which serves in lieu of a condenser. The ordinary lens may then be used without any risk, and the results obtained will, as a rule, be superior to those obtained with the aid of a condenser. It is an excellent plan, where practicable, to fix the negative in an opening cut in the wall of the dark room and to have the lamps and reflector outside.

It will be a great saving of time if the enlarging apparatus, of whatever form it may take, is carefully calibrated for the sizes mostly required, so that only a slight adjustment for sharpness is needed, that is to say, there should be clearly-defined positions for the negative lens and paper for, say, 15 x 12 or 12 x 10 prints. A great advantage of reflected light as the illuminant is that it is as easy to enlarge from a whole plate as from a smaller size.

To secure reasonably short exposures on enlarging it is necessary that the negatives should be free from any trace of yellow stain. This condition can be secured by using freshly-made pyro solution containing an adequate amount of sulphite, while the question does not arise when metol-hydroquinone, amidol or Azol are used for negative development. Care should be taken to avoid excessive density, as rather thin, bright negatives yield the best enlargements.

PHOTOGRAPHY FOR THE NEWSPAPERS.

[Below we continue the publication of a series of eight chapters on the supply of photographs to the newspapers written by Mr. W. Lancelot Vining, until recently art editor of the "Sunday Pictorial." So far as we know this is the first occasion on which the subject has been dealt with by a writer intimately acquainted with the production of an illustrated newspaper, and considering the matter from the angle of the art editor. Mr. Vining, who has spent his life in press photography, first as a free-lance and subsequently as a press photographer on the "Daily Graphic" and "Daily Mirror," deals in the current chapters with the choice of suitable equipment for press photography and with the handling of a news event of public interest. His articles will appear further in our issues of July 22 and 29.—Eds. "B.J."]

III.—APPARATUS.

I often receive letters from the readers of the "Sunday Pictorial" asking me to tell them the best kind of camera to buy for press-work, so I intend to give a chapter to this subject.

Any camera which will turn out a good photograph can be used for press-work, but certain types of cameras will naturally limit the field of work. I do not know of any camera which will do every kind of work that may be required. Police Court work requires a special camera. This must be very small and have a very fast lens, but as there is not a great deal of work of this description I do not think we need worry over these subjects.

The ideal camera is one using 5 by 4 plates, a very good lens working at *f* 4.5 and having a focal-plane shutter, a long focus lens which can be used instead of the *f* 4.5, and plenty of slides. We will suppose that we have just bought a new one having the above features. First of all, you must get to understand the working of the shutter, and the changing of the speeds. This can be done at home and without exposing any plates. It is quite useless to start taking photographs until you have thoroughly mastered the shutter, and here a word of warning all focal-plane shutters must be handled with care. Read the maker's instructions very carefully, and, if possible, get someone to demonstrate it to you. Having mastered the shutter, the next important thing to do is to make yourself perfect in judging distances. The ones you must be able to tell at a glance and not be more than a foot out are 3 yards, 5 yards, 7 yards, 10 yards, 15 yards, and 25 yards. You can practise this while out walking any time. Select an object ahead of you, guess the distance, and pace it out. You will soon find that you are quite good at it. This distance-judging is very important, because your lens is in a focussing mount with a scale in yards, and you must be able to set this scale and take your photograph without using your focussing screen. There is no time for this in the majority of events. Of course, there are others when you can use a tripod and focus in the ordinary way. I am not a lover of the reflex, except for certain special work, and then it cannot be beaten. It is not a good type of camera for work in the street. I found that once your head was in the hood you were very liable to miss something going on near at hand, and people often stepped in front of the camera as exposure was being made because I had not seen them coming. There is nothing very difficult about using the small wire frame view-finder, and by experimenting this can be fixed so as to give the exact view that will be given on the plate. The speeds of a focal-plane shutter usually range from one-tenth to one-thousandth, and it is very important to be able to hold the camera quite still when working at the lowest speed. A focal-plane shutter should run smoothly without the slightest jar, otherwise sharp results at one-tenth will be out of the question.

I have described a camera which can be used for nearly every type of subject, but quite 50 per cent. of the work could quite easily be done with an ordinary plate or film camera. Take any issue of an illustrated paper, and you will find that by far the greater number of the photographs it contains did not require a speed greater than one-hundredth. The focal-plane shutter is only a "must" when you are going in for high-speed work, but remember when buying a new camera that the focal-plane is more efficient than the ordinary shutter in lens mount, etc., and this applies at any speed.

I have made a point of the types of cameras because so many people are under the impression that the camera must be one which is made and sold especially for press-work, but this is not so. But, if any of my readers are thinking of taking up illustration work, and are about to buy a camera, they should certainly get the best one possible, so that they can tackle any subject that comes their way and not be restricted by unsuitable apparatus.

I have myself used all types and sizes of cameras, and these have ranged from the very smallest Block-note to one which was a specially-built half-plate reflex, and carried a 36-in. focus lens working at *f*/6. The extension was over 5 ft., and I used it mostly for cricket matches to secure play pictures. This camera always required two men to carry and work it, one to expose while the other kept the interested crowd back, and a car was required to move it from place to place.

Now, just one word with regard to exposure. A golden rule is to give the longest exposure possible that will give a result free from movement. (This speed can only be judged by experience.) By doing this you will very often find that you will be able to use a smaller stop, getting a great depth of focus and a result which will stand a great deal of enlarging, and that is often very useful in press-work.

Now, let us look at the vexed question of plates or films, and although my vote must be given to plates, I do not for one moment say that films are of no use for photographs required for publication. Plates are very much faster than films, and up to the present time film makers have failed to produce a film with the speed of the fastest plate. Also plates are very much easier to handle either wet or dry. An art editor would much rather hear that half a dozen plates were arriving from a correspondent in preference to a 6-exposure roll of film. Plates can be dealt with more quickly, and then enlarged while wet, with very little fear of damage or failure, and each plate can, if required, receive special treatment. Films can only receive special treatment if they are cut up, and then their curl is very awkward. Enlarging them whilst wet is a difficult process, and the risk of damage to the film surface is great. Yet with all this against films, some of the greatest "scoops" amongst modern photographs have been obtained on films, so never refrain from using them. I have heard of one or two cases where photographs of an event were not sent in because the photographers were under the impression that films were no good for "rush" work.

The type of negatives to be aimed at if you are developing the plates yourself is one full of detail. Contrast must depend on whether you are going to contact-print or enlarge. With regard to developers for both plates and papers, always use the formula recommended by their respective makers. They know what is in the emulsion, and you will always find that their developers give the best results.

When setting out to cover an event for a newspaper always carry a tripod, which may be quite a light one, but which you will find you require far more often than you anticipated. If you are wise you will use it on every possible occasion and get the sharpest possible result.

IV.—THE BIG NEWS STORY.

This chapter will, I expect, be considered the most important, so I will make it as complete as possible.

I am going to suppose that some big news event has suddenly happened quite close to you. It does not matter very much what we take as an example, because, whatever it is, it is the treatment of it that is going to count; but it is the type of event which is quickly known all over the country and appears in all papers as the big story. All art editors will be wanting photographs in the quickest time possible, and you were lucky enough to be on the spot, or you live near enough to get there very quickly. First of all, get hold of a "Bradshaw" or "A.B.C.," and work out the earliest train you can get plates on or think you can. Then send the art editor of the paper you are going to send your plates to the following wire:—

"Covering the accident at Blank. Hope to put plates on 4.30 train, due Euston 9.10. Wiring later."

This wire is important, because it tells the art editor four things. 1st, that the event is being covered; 2nd, he can, with luck, expect plates at a certain time; 3rd, they will be undeveloped, so he will arrange that when they arrive the night printer is in the dark room with developers and enlarging lantern ready, instead of perhaps the printer being out at supper, which would mean precious time being lost; 4th, he can be sure of another wire giving the exact train that plates are on.

If you are on the spot, or very near, you will not have any worry about reaching the scene quickly, but I just want to suppose you are twenty miles away. In this case you may have to decide between using a car or waiting two hours for the next train. Now these two hours are of the utmost importance, and may mean an earlier train for sending the plates to London. A paper is always willing to pay the reasonable expenses of a correspondent working for them on a big story. If you are ...g it off your own bat, and are fairly sure you will be first, ...ld risk the cost of the car, as it may mean a great deal ...o score over your rivals on a big story.

... now on the spot, and you may find that it is not at all easy to get pictures, or even get very near the scene. The police may have formed a guard around the spot; if your application to get a little nearer fails, don't get cross, it is fatal. Try the inspector in charge, and if that fails then you must try to outwit the guard, and you will want to use all the brains that you are blessed with. These situations do occur, and this is when the long focus lens often scores heavily. Expose your plates with great care, and write out a caption or title, and number this to agree with the number on the dark slide. Be sure you give plenty of details. This is most important, and be very careful how you spell names, and be sure that initials are correct. Don't spare any plates, and be sure to illustrate all sides of the story. A real big news story always wants well covering, and you never can tell how many pages are going to be filled with it. Having obtained your pictures, make for the station, remembering that on the way you must pack your slides, and, if possible, in a wood or tin box. If you are continually sending slides away, the best plan is to have a few of these boxes at home, and take one with you on the big story. Sometimes when the accident, or whatever it may be, takes place out in the country it is very difficult to get a suitable one, and your plates run a great risk of getting broken. The type of box favoured by press photographers can be obtained at most sweet shops. I think they are 7 lb. chocolate boxes, and when empty can be bought for 2d. I remember on one occasion having to purchase the contents as well as the box, as there were no empty ones available and I had to have one.

Not nearly enough attention is paid to packing glass plates, although every photographer must realise that all his work will be wasted if his plates reach the newspaper office broken, and this would not have happened (as it often does) if he had expended a little care while packing them. Use plenty of paper around the slides, and see that this packing is tight enough to prevent the slides moving about in the box. You never can tell what will happen to the box once it has entered into the gentle care of the railway company. Let us suppose that it is quite impossible to get a box of any description.

Obtain three or four newspapers—the ones containing plenty of paper in them, such as the *Times* or *Telegraph*, and pack the slides in these. I have had to do this several times, and my slides arrived at the office undamaged, but with this method they run a great risk. Address your box on the following lines:—

RUSH. GLASS WITH CARE.

To *THE SUNDAY PICTORIAL*.

EUSTON STATION.

By 2.10 train. TO BE CALLED FOR.

Try and reach the station at least ten minutes before the train is due to start, so that you will have ample time to get your parcel booked. Take your parcel to the outward goods office, and have this done. Pay the carriage at your end, as it will save valuable time upon arrival. Ask the clerk to let you take it down to the guard's van yourself. He will very likely let you do this if he knows you and what your work is, but if he refuses I advise you to hang around and keep your eye on the box and make sure that in the rush it is not left behind. They have a nasty habit of doing this in certain parcel offices I could mention. Make a point of finding out the guard and drawing his attention to your box, and give him a tip. This is very important when your box has to change trains at a large junction, but once you can get him interested, you can feel fairly sure that your plates will get through to time, or, at least, not miss a connection. Directly you have seen your plates starting on their journey, send a wire to the art editor of the paper as follows:—

"Undeveloped plates of accident at Blank arrive Euston 9.10, with rear guard; return slides at earliest."

Sign your name and address. If you know for certain that you were the only photographer there, state it in the wire by the word "exclusive," but do not put this unless you are quite sure of the fact. Once the wire has been sent the work passes out of your hands, and you are free to decide whether there is more in the story for you to illustrate. The local evening paper may be out by this time, with names and addresses of the killed and injured, and incidents will be given which can often be illustrated. If the story is a big one, it will always pay you to collect one or more portraits, as well as returning to the scene and getting some quite different pictures from those you have already sent off. The collection of portraits of people who have been killed is not at all pleasant work, but it is often very important and requires a great deal of tact, and the greatest care must always be taken to ensure the correct names being on the back of the photographs, otherwise serious trouble is sure to follow, which may end in the law courts, and result in heavy damages against the paper, and then you will become most unpopular. Another end of the story is to visit any of the injured that are well enough to be seen, either at their homes or in hospital. Photograph them, and take down any story they may have to tell. You will often get ideas for other pictures from them. Try and find out what caused the accident, and if any persons are connected with it try and photograph them or collect a studio portrait. In a recent rail accident there were three important portraits connected with the cause of the smash, but they did not reach London for some days. The length of time that interest will last in any big event depends on the public, but on a real big story you need never be afraid of sending too much stuff. Never waste valuable time developing your plates. Every picture paper runs a staff of experts, and what they cannot get out of your plates no one else can. If you are working for a local paper at the same time, duplicate your exposures as follows:—

Take two of the same view, on 1 and 3, 2 and 4, 5 and 7, 6 and 8, then you can keep slides 1-2, 5-6, giving you four pictures for the local paper, sending 3-4, 7 and 8 away, or if you have time before the train leaves, and can get to a dark room, take the plates you are sending away and put them in an empty plate box, film to film, fill up with paper, and carefully pack this box in the wood or tin one, just as you would have done your slides. When doing this be sure to number your plates in the corner to agree with your titles. A copying pencil is best for this, and be sure you don't forget to put the titles in the box. It is very easy when in a hurry to forget them, and I regret to say that this very often happens.

We will now suppose that the occasion will arise when you reach the station with your parcel within a minute or two of the departure of the train and you have no time to book. Find a passenger going to London, or to whatever town you are sending your plates, and ask him or her to take it and give it to a taxi-driver to deliver at the office. Ask them to tell the driver that his fare and tip for quick delivery will be paid upon receipt of parcel, but be sure if you do this you mention it in your wire. I have done this dozens of times, and have very rarely met with refusal, and this is the only way to get quick delivery from abroad. I can remember being let down only once when employing this method, and that was when I was over in Paris for the *Daily Graphic* at the time of the great floods some eight or nine years ago. After my first day's work I went to the station in the evening with other London photographers, and we each found a passenger to bring our slides. Mine was coming to the Hôtel Cecil, so I wired the office to call for them at 10 a.m. the following morning. When my man reached Calais he found a very bad storm raging, and it can be very bad in this quarter, so as he was a very bad sailor and in no hurry to reach London, he waited for two days until the storm had blown itself out, and my slides (packed away in his bag) waited with him, while the office sent around to every hotel in London, and then sent me a series of telegrams which I would not like to print here.

I have given you a very fair account of how a press photographer would carry out a really big story, and if you are ever lucky enough to work one, and proceed on these lines, you will not go far wrong.

W. LANCELOT VINING.

(To be continued.)

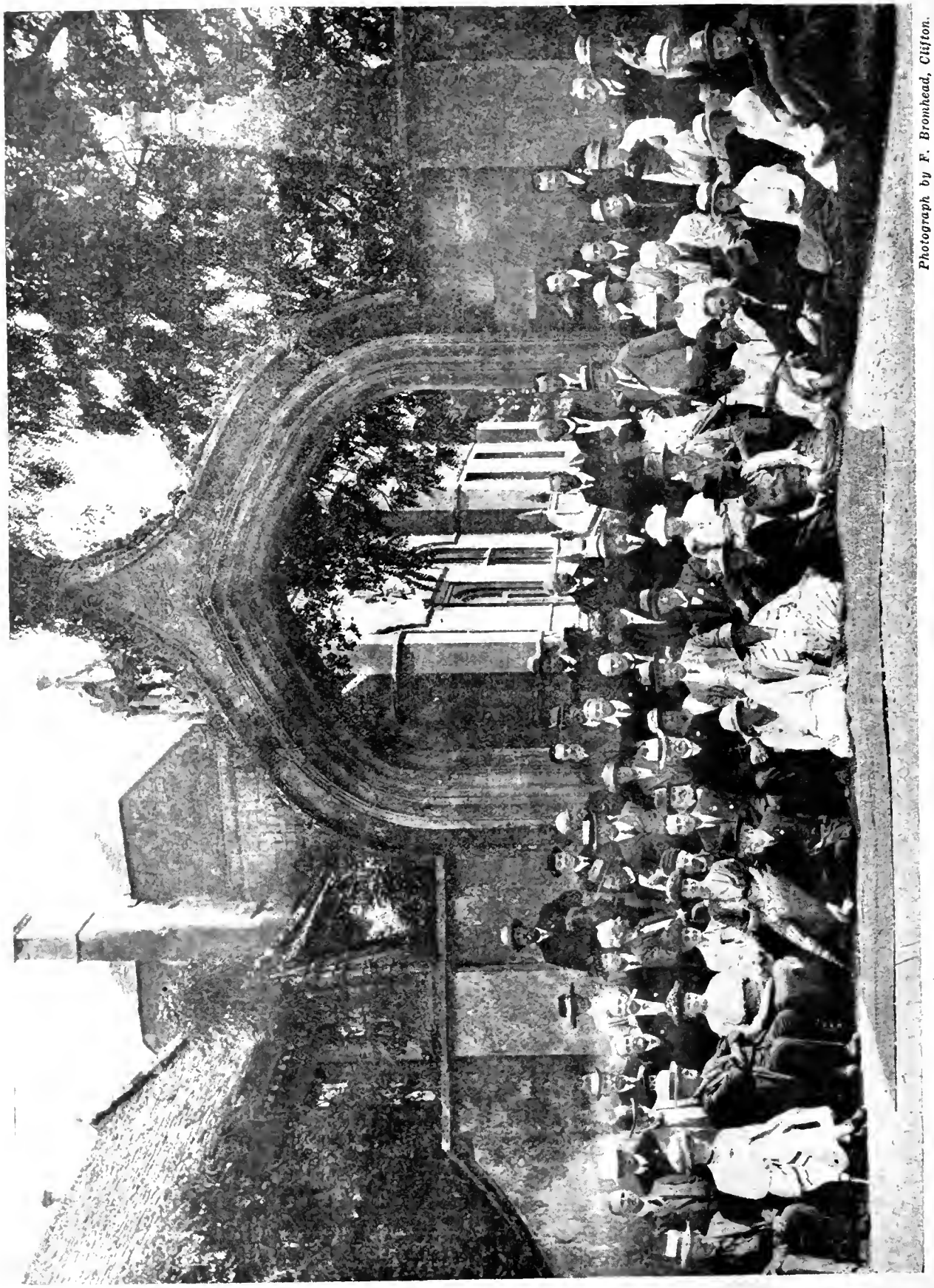
PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

Last Friday's proceedings of the Photographic Convention were, perhaps, the most notable of the week, for they included a visit to the village of Lacock and to Lacock Abbey, the home of William Henry Fox Talbot and the scene of his historical experiments in photographic processes.

Following a visit during the morning to Bath, the party proceeded after lunch by char-à-banc to Lacock, where they were received by Mr. Foley, agent for Miss Talbot, the granddaughter of the pioneer. Lacock is a picturesque abbey, founded in 1232 by Augustinian Canonesses, and the members of the party found many most interesting subjects in the cloisters and conventual apartments. In the nuns' day room the only fire in the abbey was kept burning, and the room still contains a huge brass cauldron, cast in 1500, which is supposed to have been used for cooking operations.

But the chief interest of the visit centred first in the exhibition of apparatus used by Fox Talbot and of examples of the results obtained by his processes of photography and photo-engraving. These had been arranged by Mr. Herbert Lambert, of Bath, to whom members interested in the historical side of photography could not be sufficiently grateful.

Afterwards, gathered in a corner of the grounds, a further interesting ceremony took place, namely, the handing over of the collection to the Royal Photographic Society for pre-



Photograph by F. Bromhead, Clifton.

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM, JULY 4 TO 9, 1921.

GROUP OF MEMBERS PHOTOGRAPHED AT LACOCK ABBEY, WILTSHIRE, THE HOME OF WILLIAM HENRY FOX TALBOT.

servation in the museum at Russell Square. Mr. Foley, who apologised for the unavoidable absence of Miss Talbot, formally asked the acceptance of the Royal Photographic Society of the collection, which he was glad to think would find a permanent home for the benefit of succeeding generations of photographers and as a form of memorial to the English inventor.

Dr. Rodman, president of the Society, said he was exceedingly proud to thank Miss Talbot, through Mr. Foley, for her gift. For many months he had taken a special interest in getting together apparatus relating to the history of photography as a permanent exhibition in their museum. When he heard, through Mr. Lambert, that there was a desire on the part of Miss Talbot for her grandfather's apparatus and prints to be made more accessible than could be the case at Lacock, he felt that the collection should be preserved at the house of the Royal Photographic Society, and he was very glad to witness the consummation of his hope. He cordially thanked Miss Talbot and also Mr. Herbert Lambert, who had devoted a great deal of time to arranging the exhibit, and had kindly consented to prepare it for transport to London.

After exploring the village of Lacock and taking tea there, the party returned by road to Bath and thence by rail to Bristol, where the final fixture of the Convention week was held in the shape of a lecture by Mr. C. P. Crowther on "The Making of Portraits."

The fine weather which prevailed throughout the Convention week, perhaps in excess when one has to experience the gradients of many of the thoroughfares in Bristol, conspired with other circumstances to promote a most successful and enjoyable gathering. Mr. Bothamley, it need hardly be said, proved an ideally genial president, and under the organisation of the honorary secretary, Mr. F. J. Mortimer, the machinery of the arrangements for the meetings and excursions functioned with extreme smoothness. As briefly announced last week, the choice for next year's meeting lies between York and Shrewsbury. The Convention held its meetings at Shrewsbury in 1895, but has not previously assembled at York. On this account the balance of preference naturally tends to swing in the direction of the Yorkshire city, and a further reason for favouring the latter venue is the well-organised ring of photographic societies existing within the Yorkshire Photographic Union, the collaboration of which body in the arrangement of a Yorkshire Convention would, no doubt, be heartily given.

On another page we reproduce a photograph of members of the Convention, taken in the grounds of Lacock Abbey immediately after the presentation of the Fox Talbot relics. The group was photographed by Mr. F. Bromhead, of Clifton

THE H. AND D. DOCTRINE.

The present series of chapters, aiming to set forth in simple language the conceptions and methods originated by Hurter and Driffield, might appropriately have been ended with Chapter IV., which appeared last week.

It was there shown that the time of development, and the gamma or contrast of a plate which has been exposed within the period of correct exposure, are related in a definite though mathematically complicated way with the time of development.

For a plate of given maximum gamma and for a given developing solution the time of development, for a given gamma, depends upon a particular property of the plate, namely, the "velocity constant" denoted by k.

The tables calculated by Mees and Sheppard for the simplification of the mathematical formula were given last week. At the wish of several experimenters, these tables have been reprinted on card, and a copy will be sent to any applicant enclosing stamps for their transmission by letter post

The present chapter, while not exactly forming a part of the scheme of the earlier ones, is added for the purpose of illustrating the basis upon which Hurter and Driffield founded their method of expressing the speed of a plate, by the so-called H. and D. No.

V.—INERTIA—THE H. AND D. INVERSE MEASURE OF SPEED.

Although the finding of a means of measuring the relative speeds of plates was the main object of Hurter and Driffield's researches, we have left this outcome of their work out of consideration up to this point in order not to introduce a side issue into the foregoing presentation of the theory of making a negative which correctly reproduces the light-intensities of the subject. We can now turn to see how the H. and D. measure of the speed of a plate is obtained.

If in the diagram (fig. 6) of the characteristic curve of a plate, the straight correct-exposure portion be produced to cut the log exposure scale at a certain point, the distance (representing so many candle-metre-seconds) of that point from the zero of the scale is termed the *inertia* of the plate. The inertia thus measured is an exposure—the exposure which marks the beginning of the period of correct exposure—and therefore it is inversely proportional to the speed of the plate In other words, the greater the inertia, the less the speed of the plate, and *vice versa*. In order to obtain numbers which are direct measures of speed, the value found for inertia is divided into a factor, which for the standard candle used by Hurter and Driffield in the exposure of their test plate was 34. Thus, for an inertia of .51, $\frac{34}{.54} = 63$ = the H. and D Speed No. of the plate. If a stronger light-source is used for the exposure of the test-plate a proportionately greater factor requires to be used instead of the 34.

The precise significance of the inertia value as a measure of the slowness of a plate (and therefore, inversely, of its speed) is somewhat difficult to define. It does not measure the smallest exposure which a plate can receive in order to yield some kind of a record of a series of light intensities which have acted on it. On the other hand, it does not measure the maximum exposure which a plate may receive in order that the resulting densities, first latent and subsequently developed, shall show differences proportional to the differences between

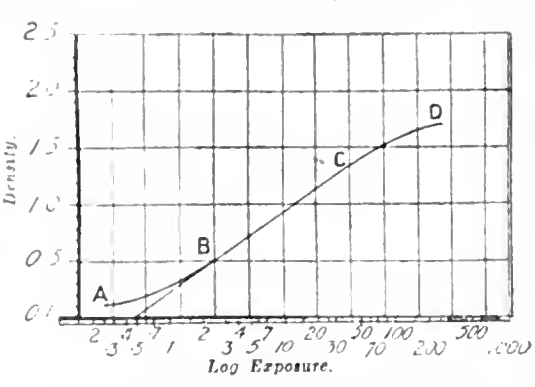


Fig. 6. The Characteristic Curve of the Plate.

Densities are plotted against the logarithms of the exposures which respectively produce them. The straight line portion B C is the period of correct exposure. The point at which, when produced, it meets the log E scale, marks the distance on the log E. scale, which measures the inertia or slowness of the plate.

the logarithms of corresponding light-intensities, that is to say, shall yield a straight-line curve. But it measures an exposure between these two, viz., the minimum exposure within the straight-line part of the curve, and was chosen by Hurter and Driffield on account of the definite and simple manner in which it is ascertained by impressing a series of exposures on a plate and plotting the resulting densities against the logs of the exposures.

In their mathematical investigation of the properties of an ideal plate, Hurter and Driffield evolved a formula for inertia depending only on the values of two densities and on the logarithms of the exposures producing them. That formula applies to a plate the curve of which is one straight line; and thus in the case of an actual plate applies only to the straight-line portion. The above construction (producing the straight-line part of the curve to the log exposure axis) is exactly an easy graphic method of working out the formula. At a stroke it shows the result of two multiplications, two subtractions, and one division. The inertia, and therefore the H. and D. No., thus neglects the under-exposure part of the curve, and hence may be looked upon as a measure of speed which rates the plate slower than suffices for passable results in practice, if one is prepared to forgo correct reproduction of the light-intensities from the subject. Still inertia, as defined by Hurter and Driffield, does not indicate a speed which is the best possible for correct representation. It is contrived to indicate the exposure at about which correct representation begins. A method of measuring speed on the basis of the exposure for the middle of the period of correct representation was considered by Hurter and Driffield, and has been put into practice by Mr. Watkins, who applies the name "central speed" to its findings.

While Hurter and Driffield recognised the somewhat arbitrary measure which their inertia represents, they held that, provided the developer does not contain bromide, the inertia is independent of the various variable factors, such as time of development, different developers, if their method of determination be strictly followed. In their last paper Hurter and Driffield admitted that different developers would, in some cases, give different speeds, and later experiment by others has shown that differences may arise, chiefly in consequence of the variation in inertia according to the gamma to which a plate is developed. In this respect different developers greatly affect inertia, so that 30 years after Hurter and Driffield's first publication of their method we are still without a rigid method of measuring the inertia or speed of a plate.

Fog.

With the object of simplifying such account of sensitometric methods as has hitherto been given, no reference has been made to the fact that the silver deposits, measured as opacities and expressed as densities, are not solely the result of the action of light, but include also deposit produced by the developer, and that (a very small quantity) resulting from the glass and the gelatine coating. It is customary in all such measurements to include on each test-plate a portion which receives no action of light, and to deduct the density obtained on this part from the other density values, on the assumption that this so-called "fog" is present in the same quantity in each density on the self-same plate. Characteristic curves and other results are then plotted from these net densities, *i.e.*, exclusive of fog.

But it may be objected: though we deduct fog from our density values, the fog exists in the negative which is used; the behaviour of the latter, *e.g.*, in printing, may not therefore be in correspondence with the indications of the characteristic curve or with data derived from it. If, however, this apprehension has arisen, a re-reading of what has already been said should disperse it. Providing that the fog *is* uniform—and methods (of obtaining the characteristic curve) which dodge fog deduction indicate that it is, at any rate, approximately uniform—the presence of a uniform deposit over the densities of the negative means that the transmissions of all the deposits are proportionately reduced. The transmitted light-intensities are feebler but relatively the same; in other words, the negative is slower in printing. The effect of the fog is that of putting a sheet of tissue paper in front of the negative in the printing frame. G. E. B.

PHOTOGRAPHIC CHEMISTRY.

[Abstract of portion of a lecture given on the 19th ult., by Dr. Mees, at the Croydon Camera Club, and discussion following it.]

As mentioned last week, Dr. Mees gave a lecture on "Photographic Chemistry," which covered wide ground, from a brief consideration of the chemistry of emulsions to the final washing of the negative. In the opinion of the most hoary-headed or effulgent-topped veterans the lecture was deemed to be the finest popular exposition of a scientific subject ever given in the club. Much of the interest aroused related to experiments conducted, and diagrammatic and other slides shown, without which only an inadequate idea can be gathered of the lecture as a whole. Despite the "off" session the room was crowded, with not a few of Kodak notabilities present from both sides of the Atlantic, including Messrs. Crowther, Luboshey, Pledge, Stinchfield, and Wratten.

A thorough knowledge of the subject; the ability in the fewest possible words to convey clearly that knowledge to non-technical minds; the judgment to know what to omit or refer to but briefly; and a keen "showman" instinct, are all factors which in combination make the ideal lecturer and are fully possessed by Dr. Mees.

He started by saying that the majority of photographers, professionals or amateurs, stand in need of a knowledge of photographic chemistry, and many present would be interested to hear something new—namely, facts.

If a solution of sodium bromide be taken, and a solution of silver nitrate is added to it, a curdy precipitate of silver bromide forms which sinks almost instantly. To obtain a permanent suspension of the silver bromide something else must be added, gelatine usually being employed. A so-called emulsion is made by adding a solution of silver nitrate to a solution of gelatine and bromide. It might interest his fellow members to hear that in the preparation of gelatine the finest product is used for photographic purposes, the lower grades being marketed for cooking purposes.

With its sponge-like texture gelatine has many unique properties. Chemicals have various solubilities, usually dissolving more freely in hot solutions, which if super-saturated will on cooling result in a proportion of the solids separating out. Gelatine is absolutely insoluble in cold water, and indefinitely soluble in warm, and on cooling nothing separates out, the combination setting to a jelly. By diagrammatic slides he illustrated the reason for this, and also the peculiar action of a cube of gelatine which, when immersed in water, swells but little sideways and very considerably upwards. When allowed to dry the edges harden first, resulting in a skeleton framework, and in consequence a curious distortion of the cube.

Similarly, when a drop of water falls on a dry negative the gelatine swells, and the outer boundaries setting first draw the silver grains away from the interior, rendering it the poorer. Hence the familiar transparent spot surrounded by a, more or less, opaque ring. In answer to a question, the lecturer said there is no known method of removing such a mark, but its formation may be prevented by immediately immersing the negative in water when a drop falls on it.

The various degrees of "swellibility" of gelatine in neutral, alkaline, and acid solutions, were next described, and a caution was uttered against plunging a negative straight from a strongly alkaline developer into an acid-fixing bath. This imposes a strain on the gelatine film, with a danger of its stripping from the glass.

Many theories, he said, have been advanced as to the constitution of the latent image (one theory being described by means of

diagrams). But of whatever nature the latent image may be, it undoubtedly consists of silver bromide which owing to light-action is developable. With developing papers and P.O.P. the energy required to produce the final picture is about the same. In the case of the former the energy derives but little from light-action, whilst with the latter light-action plays a predominant part.

Three great steps in the history of the world, he thought, contributed mainly to the advancement of mankind:—The domestication of wheat; the reduction of iron from its ore; and the production of movement by steam. The fourth, yet to come, will be the release and control of atomic energy.

Without reduction photography would be impossible, but a restrained and domesticated sort of reduction is required (which is fulfilled by developers ordinarily in use), since it is necessary that only the silver bromide which has been affected by light shall be reduced. The reduction of silver nitrate solution to a finely divided precipitate of metallic silver was prettily shown by the addition of a solution of ferrous sulphate.

A short reference to the "benzene ring" followed, with a brief consideration of standard formulas for developers, which are not necessarily the best for all classes of work. The number of formulas in existence, he said, is somewhat astonishing at first sight, but is not so great as it appears, for thanks to the British system of weights and measures, identical formulas per unit of developer may appear to differ by the adoption of varying bulks of solution.

Developers may be of high, or low, reduction potential. The lower the potential the greater the restraining influence of bromide, and *vice-versa*. In ordinary work a happy mean is desirable, which is fulfilled by pyro, or metol tamed with hydroquinone. The last used alone has a very low reduction potential. Amidol is an example of the opposite and the addition of bromide, even in considerable doses, has little or no effect on the developer.

A rough idea of high, and low reduction potential, he said, may be gathered by imagining two motor cars, one of high horse-power, the other of low. Under ordinary conditions, restrained by speed limit regulations, both may travel along a flat road at the comfortable speed of 20 miles per hour (this assumption, it may be remarked, is absolutely unwarranted), but given obstacles such as a steep hill or snow on the ground, and the high-power car asserts its reserve of speed.

Lucid explanations, illustrated by diagrams, of the principles underlying development came next, followed by some remarks on the fixation and washing of negatives. The rate at which hypo diffuses out of a gelatine film, he said, is practically independent of temperature within wide limits. Given a negative film of average thickness and *effective* washing, 50 per cent. of the hypo is washed out in five minutes, and at the end of thirty minutes only 1¼ per cent. of the original concentration remains, a proportion, he regarded, as quite harmless, provided it is not accompanied by any silver compound derived from an over-used fixing bath, when the contrary prevails, and staining may ultimately result, due to sulphurisation of the compound. His remarks on washing only applied to negatives, as with prints the paper support altered the conditions. For fixing negatives he strongly advised two hypo baths used in succession, discarding the first bath when its action slowed, and employing the second in its place.

In the discussion, Mr. Luboshez said that too many photographers in their dark-room were working in the dark (no joke intended), and to such, and indeed to all, the lecture they had heard was of great value. He inquired whether the amount of alkali present in a pyro developer influenced stain? When fixing he had often noticed a reduction in the intensity of prints, and, in lesser degree, of negatives. It was easy to ruin the quality of a silver print by removing it from the hypo bath, and examining it, dripping with hypo solution.

Dr. Mees agreed: hypo solution in conjunction with air had a comparatively strong reducing action. As to pyro stain, this depended on the concentration of the sulphite, and was nearly independent of the amount of alkali present. In reply to another question, he said it was possible to remove all the silver from a yellow pyro developed negative leaving an image composed purely of stain. It had been stated such image is structureless, but this is not altogether the case, as the oxidation products, the cause of the stain, are formed round the developed silver grains, and therefore in some degree partake of their structure.

Mr. Sellors unearthed several prehistoric formulas for developers, which failed to find appreciation. On the completion of his remarks he appeared to be unfavourably impressed on ascertaining that whilst on his legs his particular potation had been inadvertently consumed by the "office boy." Mr. Raymond Crowther raised some recondite questions (not caught by the reporter hopelessly in arrear with his notes), and pointed out if an appreciable quantity of developer is carried once into the fixing bath a perceptible reduction in depth of print occurs.

Mr. Harpur assuming the deportment of a super-professor, urged all to avoid the "pitfalls of bugbears," a statement, whether applying to science, art or ragtime, hardly admitting of controversy. Unhappily descending from the general to the particular, he added that he had often noticed the partial fixation of plates in a developer containing sulphite. "I envy your powers of perception, for, to all intents and purposes, nothing of the sort occurs," said Dr. Mees. "Where argument is concerned there is a bit of the fox-terrier about me," warned the prior speaker. "I am not arguing, but merely *telling* you," placidly rejoined Dr. Mees. Mr. Harpur, with all the dignity possible under the circumstances, then resumed his seat.

Dr. Knott inquired as to the feasibility of combined development and fixing. Dr. Mees replied that this procedure involved some difficulties, for the development and fixation had different temperature coefficients. If temperatures relatively increased the speed of fixing, and the hypo got the best of things; at low temperatures development pushed ahead.

In reply to a vote of thanks proposed by the president, Mr. John Keane, in gracious and grateful terms, Dr. Mees expressed his genuine pleasure at revisiting his "spiritual home." It had trained him in the use of offensive and defensive weapons found useful on many occasions.

PARIS NOTES.

MM. J. Ducraux and P. Jeantet of the Pasteur Institute have recently published two very ingenious processes of employing ordinary commercial dry-plates for photography by extreme ultra-violet rays. A few months ago these experimenters described the construction of a simplified spectrograph for this branch of work in which they employed single quartz glasses (lenses) selected from those commonly sold for spectacles in conjunction with a water prism mounted in a metal frame having openings in it fitted with plane-parallel sheets of quartz. As regards the sensitive material it has hitherto been necessary to prepare plates specially according to the Schumann method (a description of which was published in the "B J" for 1901) in order to eliminate absorption of the ultra-violet rays by the gelatine of the emulsion. Instead of making the somewhat complicated Schumann emulsion the authors have adopted the plan of removing the bulk of the gelatine from ordinary commercial dry-plates by treatment for about four hours in a solution of 1 volume of strong sulphuric acid of 66 deg. B. in 10 parts of water at a temperature slowly falling from 85 to 70 deg. F. After removal from the acid the plates are washed in a dish in a very slow current of water, taking every precaution to avoid agitation of the liquid. After half an hour they are put to dry which they do very rapidly, owing to the very small proportion of gelatine. The exposed plates are coated with a film of collodion and when this has set, but before it has dried, the plate is immersed in water for the purpose of preserving its permeability. The authors have found that when using transparency plates treated in this manner the sensitiveness is ten times greater than plates by the Schumann process for rays of 1840 Angstrom, which is the limit of the spectrum obtainable with their water prism.

As is well known the ultra-violet may be photographed by applying a film of a fluorescent substance to the emulsion surface. MM. Ducloux and Jeantet, in seeking to find a fluorescent substance dissolving in a liquid which does not

cause swelling of the gelatine have obtained excellent results with æsculin dissolved in a machine oil and applied to the emulsion surface with cotton wool, or flowed over the latter in the form of a mixture obtained by dilution of the oil with petroleum spirit. All grease is removed from the plate before development with ether and alcohol. Plates treated in this latter way have been found to be twice the sensitiveness of those prepared by extraction of the gelatine and suffer only from the drawback that there is a slight thickening of the lines (about 1-500th of an inch) owing to irradiation in the fluorescent film. This process is applicable to panchromatic plates, in the case of which it permits of records being made throughout the entire spectrum.

Desensitising Autochrome Plates.

A good many experiments have been made, with full success, on the desensitising of Autochrome plates both with Lüppo-Cramer's phenosafranine, or the commercial varieties of it such as Ilford Desensitol or Calmel's Desensibilisateur, or with aurantia as recommended by MM. Lumière and now placed on the market, as Lumière Desensibilisateur, as a strong solution of aurantia in acetone, which is simply diluted with water to give the desensitising bath ready for use. When using aurantia one cannot employ such a measure of illumination as with safranine and the greatest care is necessary in preserving the plate from exposure to the dark room light. But, on the other hand, aurantia is better adapted to a time or factorial method of development, since the speed of the developer, both as regards the time of first appearance and the total duration of development, are not affected by this dye.

M. Ch. Adrien has recently made tests for the purpose of satisfying himself if, when treating Autochrome plates with safranine immediately after exposure, the fog and alteration of the image which generally takes place if development of these plates has been postponed, is avoided. His tests showed that there is scarcely any difference between a plate kept in the usual way and one which has been kept after desensitising. But it seems obvious that there can be no advantage in desensitising a plate shortly after exposure, when on tour for instance, if a dark-room is not available or if one does not intend to complete the development, etc., of the plate at night in an extemporised dark-room. The most advisable course is surely to desensitise at night, as can conveniently be done, and to carry out development, reversal, etc., the next morning in any room darkened simply by closing the shutters or drawing down the blinds.

One of the most accomplished workers of the Autochrome process, M. E. Ventujol, has recently modified his practice in photographing articles of artistic manufacture, many Autochrome reproductions of which by him were recently shown at a public exhibition. Almost all the negatives were made by lighting the subject with incandescent electric lamps of about 12,000 c.p. total strength. M. Ventujol used the special screen sold by MM. Lumière for Autochrome work with their "Perchlora" flash powder, and the negatives were developed with pyro in accordance with the original Autochrome instructions. In France many Autochrome workers still adhere to this developer as yielding, in their experience, the best results.

Photography of Projectiles.

At the meeting of the French Physical Society held on June 17th, M. L. Dunoyer, professor in the Institute of Theoretical and Applied Optics, made an interesting communication on the processes employed by him during the war (when he was attached to a bombing squadron) for determining, by night and by photogrammetric methods, the complete trajectory of luminous projectiles employed for the 1½ inch guns mounted on air-craft. His object was also to study irregularities of projection due to construction defects, weather conditions, and other causes. The complete trajectory was recorded simultaneously by two phototheodolites (extemporised from available materials) placed at opposite ends of a measured base and arranged with their optical axes converging in the direction of fire. A third camera was advantageously placed behind the gun, the optical axis and the line of fire being in the same vertical plane so as to record directly any error of direction. Three fixed fires were provided at known points situated in the same horizontal plane as the optical centre and were lighted on a signal being given before the firing of the gun. They provided the exact determination on each of the negatives of the principal point (foot of the perpendicular let fall from the nodal point of emergence on to the plate) and the principal distance (distance of the node of emergence from the principal point). In order to co-relate the image of each trajectory with the time factor, there was turned in front of each lens a wheel of four radii, the speed of which was regulated so that at each closing of the lens there was a gap on the recorded line corresponding to the limit of resolving power. Each of these wheels was turned at a uniform and known speed by a gravity motor, the speeds of two wheels not being necessarily the same. A simple graphic construction allowed of determining the interruptions of any one of the images relatively to the interruptions of the other and thus provided all the elements required for the graphical construction or calculation of the tragectory.

Some Novelties.

For use in conjunction with the process of combined development and fixing, recently introduced by MM. Lumière, chemicals for which have been placed on the market in carton form, there has also appeared on the market a special tank of nickelled metal, fitted with a loose rack, under the name of "Cuve Lumière et Seyewetz."

M. R. Kaufmann, an inventor whose ingenuity might well be applied to subjects of greater importance, has designed a mechanical exposure calculator. This "Posegraphe," as it is called, has certainly called for much detail work. Logarithmic scales corresponding with the chief exposure factors are arranged around a plate of about 4 x 3 inches size. On each scale is a pointer connected with the pointer moving on the scale which indicates the time of exposure. Having set each pointer in accordance with the number applying to the particular circumstances of the exposure, the pointer on the time scale automatically comes to the graduation indicating the length of exposure requiring to be given.

The growing approval with which negative paper has been received has led a maker of sensitive materials to introduce a stripping paper. MM. Bauchet and Co. have now introduced a new material known as "Isofilm B.P.A.," almost on the same lines as the Radiofilm Guilleminot previously described in these notes, consisting of a negative sensitive film temporarily attached to a card support which, in small sizes, provides a rigid surface without special precautions.

Cinematography and Taxation.

The heavy taxation levied on cinematography by the French Government (in some cases the taxes amount to 50 per cent. of the gross receipts of a cinema theatre) has had a most injurious effect upon the cinematograph industry. As an attempt to remedy this state of things while there is yet time, the Confederation des Travailleurs Intellectuels, (Association of Intellectual Workers) recently arranged a meeting in Paris to which were invited all the members of the French Chamber, many of whom were present. After some addresses, in particular by M. R. de Flers, the new member of the French Academy, and by M. L. Forest, a journalist of mordant wit who has shown a great interest in the educational and artistic aspects of the cinematograph and in its capacity to combat German propaganda, interesting demonstrations were given of the Gaumont colour cinematography and of the system of talking films emanating from the same firm. Admirable use was made of synchronised phonograph and cinematograph for the special purpose of bringing before the meeting the support of well-known political personages of the aims which prompted the holding of the meeting.

L. P. Clerc.

DEATH OF MR. S. H. FRY.

We very much regret to announce the very sudden death, on Friday last, July 8, at the age of 61, of Mr. S. H. Fry, for many years well known as the founder and proprietor of the firm of enlargers which bears his name, and until a few months ago secretary of the Professional Photographers' Association.

It was only in the early part of the present year that Mr Fry withdrew from taking an active share in his business, leaving the management of this undertaking to his son, and at the same time resigned his position as secretary of the P.P.A. He had taken up his residence at Ripley, in Surrey, in the reasonable expectation of enjoying some years of retirement and leisure. Fate has decreed otherwise, and his death, indeed, took place under particularly pathetic circumstances. Mr. Fry and his wife only the day before had entered upon the tenancy of a house in the village of Dunsfold, near Godalming. In the small hours of the next morning some cows strayed into the garden. Mr. Fry dressed himself and went down to drive them off. A few minutes later Mrs. Fry found that he had been taken seriously ill, and he died before a doctor could be brought. At an inquest held on Saturday last, it was stated that death was due to heart failure, and a verdict of death from natural causes was returned. Mr. Fry was buried at Dunsfold on Monday.

Portrait by Reginald Haines.

THE LATE MR. S. H. FRY,
Ex-Secretary, Professional Photographers' Association.

Owing to the suddenness of his decease very few of his friends had the opportunity of being present, his son and Mr. R. Child Bayley, a close friend, being the only mourners. A wreath was sent by the Council of the Professional Photographers' Association, and at the council meeting of the Royal Photographic Society on Monday last a message of condolence with Mrs. Fry was ordered to be sent on behalf of the Society, of which Mr. Fry was a life member.

Mr. Fry was the son of Samuel Fry, formerly a photographer of Kingston-on-Thames, who in the early days of the gelatine emulsion process commenced the manufacture of dry-plates which were of a greater rapidity than those then on the market, due to the method of preparing the emulsion worked out by Charles Bennett, a well-known amateur experimenter. These plates were placed upon the market as the "Kingston," and for some years occupied a leading place among similar products, as did also other manufactures of the firm, such as bromide paper. It thus came about that Mr Fry, in his early days, acquired a practical knowledge of emulsion making and subsequently of the making of enlargements whilst employed in his father's business. Following engagements with one or two firms of photographic manufacturers, he established the business of trade enlarging, which has steadily grown in importance. He was one of the first to embark in the business of developing and printing amateurs' film exposures, at a time when few commercial firms perceived the large amount of profit to be won from this branch of work.

Continuously with these business occupations, Mr. Fry was a prominent participant in photographic society meetings. Until a few years ago he took a considerable interest in the Royal Photographic Society, but was perhaps most regularly present at the meetings of the London and Provincial Photographic Association and the now extinct Photographic Club. But his connection with photographic society life was closest in the case of the Professional Photographers' Association, of which he was an original member and upon the Council of which he had served for many years, and in which body's affairs, first as honorary and subsequently as paid secretary, he had taken a prominent share of management.

Possessed of a mordant and somewhat cynical wit, Mr. Fry's outward personality perhaps belied the seriousness with which he applied himself to any matter in which he had assumed responsibility. Whilst applying a naturally shrewd judgment to any subject under discussion, it was impossible for him to deny himself opportunities for wit or satire. Perhaps on this account he was sometimes misunderstood by those of less lively habit of mind, but he lightened many a technical or business conference, where, however, he was loth to speak except from first-hand knowledge.

Sympathy will be extended to his widow and to his son, Mr. A. B. Fry, who for some considerable time past has been in sole control of the business of S. H. Fry, and will continue to be responsible for its direction.

Patent News.

Process patents—applications and specifications—are treated in "Photo Mechanical Notes."

Applications June 27 to July 2:—

CAMERAS.—No. 17,947. Photographic cameras. F. Bradley.

STORING PHOTOGRAPHS.—No. 18,036. Devices for storing and displaying photographs. F. J. Phillips.

FILM DEVICE.—No. 17,915. Roll film turning device. K. Sayo.

DAYLIGHT DEVELOPMENT.—No. 17,432. Apparatus for daylight developing photographic roll films. J. Welch.

APPARATUS.—No. 17,932. Photographic apparatus. W. Fenerzeng.

PRESS ILLUSTRATIONS.—No. 17,706. Transmission and reproduction of press illustrations. M. L. D. McFarlane.

CINEMATOGRAPHY.—No. 17,674. Means of daylight projection of animated pictures. T. F. Newman and A. F. Scott.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in each case is that of application in this country; or abroad, in the case of patents granted under the International Convention.

OPTICAL PROJECTION.—No. 160,492 (November 19, 1919). In order to produce a uniform illumination from a filament lamp or like banded source of light, the condenser is so formed that the field of illumination produced by the converging rays projected thereby from each point of the source gradually increases in intensity towards the centre, as by giving the condenser negative spherical aberration, the fields so formed overlapping to produce a uniform field. As shown in Fig. 1, the condenser C may be of the Fresnel type having a central "bulls-eye" c^1 and outer ridged zones c^2, c^3, c^4, c^5; the foci of the several parts of the condenser are located beyond the film or slide D to be projected, and the outer zones focus the rays at greater distances beyond the picture plane than the inner zones, but at less distances than the "bulls-eye." In a modification, the condenser consists of a lens having a non-spherical convex surface. The negative Fresnel lens may be combined with an ordinary positive lens, such as a plano-convex lens M, Fig. 2. One of the lenses may be provided with a series of diffusing-flutes c^6 parallel to the bands of the light source. A method of determining the proper position of the light source is

described, in which an image of the filaments is focussed on a special screen, which may consist of the shutter of the projector. In this operation, the fluted lens C', Fig. 2, is turned through a

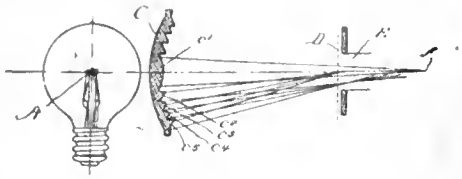


Fig. 1.

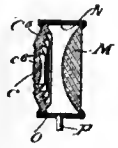
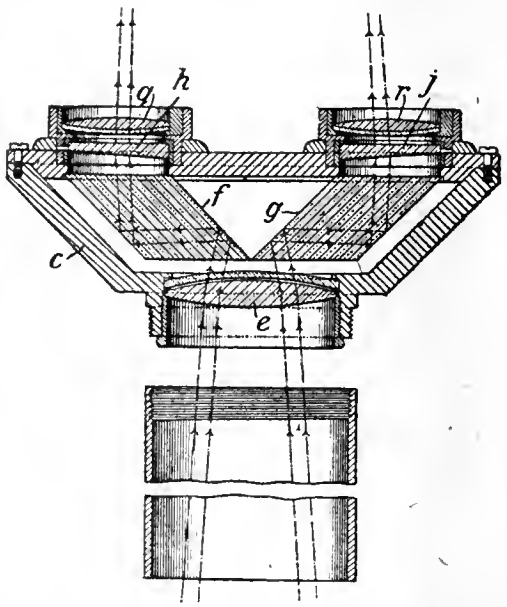


Fig. 2.

right-angle. Optical data for the various forms are given by means of diagrams.—A. J. H. Haddan, 31, Bedford Street, Strand, Westminster, for Corning Glass Works, Walnut Street, Corning, New York, U.S.A.

Stereo-Cinematography.—No. 160,512 (December 16, 1919). The invention comprises a prismatic optical system for use as a projector for the pictures of a cinematograph apparatus, in which two images of a single picture are simultaneously thrown on to the screen and superimposed. In place of the usual projecting-lens a system is used consisting of the back component *e* of an ordinary lens, in front of which is mounted two rhomboidal



prisms *f*, *g*, each reflecting half the rays through lenses *q*, *r*. To ensure correct superimposition on the screen, wedge-prisms *h*, *j* are fitted, and are capable of rotation. The lenses *q*, *r* are mounted in eccentric cells to facilitate adjustment. The whole system is mounted in a casing, *c*, so that it may replace any ordinary projection lens.—Charles Henry Frampton, 209, Balham High Road, London, S.W.17.

FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary, J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

New Apparatus.

Razor Blade Print Trimmer.—Messrs. Butcher & Sons, Camera House, Farringdon Avenue, London, E.C.4, have given practical shape to the suggestion often made that one should use old safety razor blades as print trimmers. They now supply a stout metal handle which allows of a used Gillette razor blade being

quickly and most firmly inserted. We have found that the device is an excellent knife for trimming prints and undoubtedly will find favour with those who have a supply of the Gillette blades. The price is 3s. 6d., and the appliance is already in stock with most photographic dealers.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Sunday, July 17.

Hammersmith (Hampshire House) P.S. Outing to Wisley.

Monday, July 18.

South London P.S. "Platinotype." W. H. Howard.

Wednesday, July 20.

Bradford Phot Soc. Evening Excursion to Cottingley and Beckfoot.

Thursday, July 21.

Hammersmith (Hampshire House) P.S. "Cameras." Miss Chatterton.

Saturday, July 23.

City of London and Cripplegate P.S. Outing to the Zoo.

Manchester Amateur Phot. Soc. Ramble from Wilmslow to Prestbury.

Commercial & Legal Intelligence.

Legal Notices.—Notice is given of the dissolution, by mutual consent, of the partnership between Lucy Arnold and Henry Alfred Sutch, carrying on business as fine art restorers, at 47, Beauchamp Place, Brompton Road, S.W., under the style of Arnold and Sutch.

NEW COMPANIES.

Sanders, Austin and Co., Ltd.—This private company was registered on July 2 with a capital of £1,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in apparatus and appliances for making, presenting, or reproducing photographic or other pictures, and any electrical, optical or other apparatus, etc. The permanent directors are: T. Sanders, 27, Fields Park Road, Cardiff; I. T. Austin, 134, King's Road, Cardiff. Qualification (except first directors), £100. Secretary: I. T. Austin. Registered office: 50, Charles Street, Cardiff.

Imprensa, Ltd.—This private company was registered on June 29 with a capital of £5,000 in £1 shares. Objects: To carry on the business of lithographers, engravers, colour-process and half-tone engravers, stereotypers, photographers, etc. The permanent directors are: A. H. Burton, 22, Aubrey House, Maida Hill, West, W.2, physician; E. R. Holden Quinta de Almaraz, Almada, Portugal, cork merchant. Qualification of permanent directors, 2,000 shares of ordinary; of ordinary directors, 500 shares. Solicitor: G. A. Morgan, 1, Woodbury Lane, Clifton, Bristol.

Jonathan Fallowfield, Ltd.—This private company was registered on July 1 with a capital of £20,000 in £1 shares (12,000 8 per cent. preference). Objects: To take over the business of a wholesale and retail photographic dealer carried on by J. Fallowfield,

of 146, Charing Cross Road, W.C. The first directors are: F. W. Hindley, Tonlegee, Bushey, Herts.; F. D. Hindley, High Prestwick, Haselmere, Surrey; H. J. Traise, 40, Cedar Road, Cricklewood, N.W. The two first-named are permanent. Qualification, £200. Remuneration as fixed by the company. Registered office: 146, Charing Cross Road, W.C.

Colour Cinematography Syndicate, Ltd., has been registered, with a nominal capital of £40,000 in 35,000 preferred ordinary shares of £1 each and 100,000 ordinary shares of 1s. each, to acquire the patents and inventions of Professor S. M. de Procoudine Gorsky relating to a process for taking and developing still photographs, transparent slides, and cinematograph films in natural colours, etc.

The first directors are: Prof. S. M. de P. Gorsky, The Dell, Croft Road, Sutton; D. N. Dunlop, A.I.E.E., 36 and 38, Kingsway; G. Smith Orr, J.P., Glasgow; R. G. Booth, 9, Landrock Road, Crouch End; J. MacAlister, Glasgow; J. M. Preston, Glencraig, Fife; G. C. Möller, Drammen, Norway.

Minimum cash subscription, £7 Director's qualification, 100 shares. Remuneration, £250 each per annum, free of income tax.

Wiggins, Teape and Co. (Export), Ltd.—This private company was registered on June 29 with a capital of £1,000 in £1 shares. Objects: To carry on the business of wholesale, export, and manufacturing manufactnrers of photographic, artistic, or other articles, etc. The first directors are: P. W. Wood, Queen Anne's Mansions, S.W.1; A. E. Parke, Edgehill, Wadhurst, Sussex; F. L. T. Barlow, Eythorne House, Eythorne, near Dover; K. Barlow, 3, Vicarage Gate, Campden Hill, W.8; T. L. Parke, Withnall Fold, near Chorley, Lancs.; L. W. Farrow, 10, Brookview Road, Streatham, S.W.10; W. G. Hay, 19, Marine Parade, Brighton; J. Horsburgh, "Strathculm," Hele, near Cullompton, Devon; J. P. Hepburn, The Red House, Hele, near Cullompton, Devon; all directors of Wiggins, Teape and Company (1919), Ltd. Solicitors: Pleese and Sons, 15, Old Jewry Chambers, E.C.2.

News and Notes.

Mr. G. I. Higson, M.Sc., of the British Photographic Research Association, hitherto A.I.C., has been elected a Fellow of the Institute of Chemistry.

Glut of Photographers.—A Sunday newspaper states that hawkers and itinerant photographers are so numerous at Cheddar Gorge that the authorities have had to appeal to the police.

The Holiday Friend.—Messrs. W. Butcher & Sons, Camera House, Farringdon Avenue, London, E.C.4, have just issued for the holiday season an attractive folder leaflet, entitled "Who is your best holiday friend?" This is for the use of dealers, to whom copies can be supplied, with a dealer's own imprint, at 20s. per thousand.

A Flashlight Hint.—A correspondent, who is of opinion that there is nothing to beat fusees for firing flashlight compounds, states that these useful accessories are again on the market, and are being sold in London streets by hawkers, if not in the shops. Once upon a time there was a fusee magnesium lamp on the market, but fusees disappeared some years before the war.

Ex-Enemy Debts.—The Board of Trade announce that by an agreement made with the German Clearing Office now awaiting the approval of the Reichstag, the time for lodging claims with the British and German Clearing Offices by their respective nationals under Article 296, Section III. Part X. of the Treaty of Versailles has been extended to September 30, 1921. No further claims under the above Article will be accepted after that date by the Clearing Offices concerned.

Camouflaged Photographers.—One of the most conservative institutions in the world, Lloyd's, was photographed more or less secretly last week. To get a truthful representation of the scene in the underwriting room, it was decided by those in authority that the intention to photograph the scene should be kept secret, and one day last week members in transacting business took little notice of some painters who with ladders and other things seemed busy high up on the walls. The "painters," the daily papers tell us, were really camera men in disguise.

The Annual Outing provided by Messrs. Wellington and Ward for their employees took place on Saturday last, when a party numbering over 300 visited Brighton by motor chars-à-bancs. After spending the greater part of the day in Brighton and thoroughly enjoying the bathing and numerous other items of interest which that popular resort has to offer, the return journey, also by road, was made to Elstree, with the usual one or two stoppages for light refreshments en route. Absolutely perfect weather conditions prevailed, and the trip throughout was most enjoyable. The firm provided a private car fully equipped with Red Cross and first-aid appliances, but fortunately they were not required, as, in spite of the great heat, no casualties were reported—a fitting tribute to the "keeping qualities" of the firm's employees!

Miniatures and Woodcuts.—A little exhibition of ivory miniatures, held by Madame Yevonde at her studio, 92, Victoria Street, London, S.W.1, contained some very beautiful examples, the majority on a photographic basis. Among them was a striking portrait of Lord Reading, from the negative made by Madame Yevonde shortly before the Viceroy's departure for India. But most were of women, who form the greater part of Madame Yevonde's sitters, and who provide the miniature painter with the most suitable subjects. A collection of portrait woodcuts by Miss Dorothy Mullock, shown at the same time, provided some interesting examples of the broad effects to be obtained in this method of engraving. Miss Mullock's impressions from the blocks were pulled in monochrome and very effectively coloured in water colour. Their novelty, as a form of portrait, suggested the possibility of providing the requisite drawing on the wood block by photographic means and applying the art of the photographic colourist to the treatment of the impressions. Wood engravers, no doubt, would exclaim against such a programme, but for certain subjects and styles of lighting there would seem to be possibilities in it.

Ross Advertising.—Messrs. Ross, Ltd., Clapham Common, London, S.W., send us a complete selection of the advertising literature, etc., prepared by them for the use of dealers. In addition to the full price list of Ross lenses and cameras, there is a smaller, but very fully illustrated, list of lenses. This 24-page publication contains many reproductions of work done with Ross lenses and also a set of drawings illustrating the optical and mechanical processes in lens making. As regards show cards and window bills, Messrs. Ross have brought together an imposing series in which actual photographic prints of sporting subjects, landscapes, portraits, etc., are used for the joint purpose of offering an attractive picture and at the same time of displaying the photographic excellence of a Ross lens. These showcards are supplemented by two reproductions in colours of artists' drawings, which further emphasise the close connection between photography of sporting events and the use of a Ross lens. Messrs. Ross have evidently given so much consideration to the production of striking sales making showcards that dealers certainly cannot do less than apply for examples and give them a prominent display in their windows.

Dr. Mees at the Polytechnic.—On Wednesday, July 6, Dr. C. K. Mees addressed the students of the Photographic School at the Regent Street Polytechnic, his subject being photographic chemistry. After a brief reference to the early use of chloride of silver, which he took as a type of light-sensitive salt, he demonstrated the making of a bromide emulsion. A particularly interesting section of the lecture was devoted to the properties and behaviour of gelatine, the phenomena of shrinkage, reticulation, and the structure of the emulsion film being shown upon the screen. The various types of developer, such as pyro hydrokinone, metol and amidol, were described, and their specific qualities demonstrated by lantern slides of graduated exposures. The necessity for thorough fixing and washing was emphasised by the lecturer.

In proposing a vote of thanks to the lecturer, Major Warwick, Assistant Director of Education, Polytechnic, congratulated the students on their good fortune in obtaining such an instructive lecture from Dr. Mees during the few days which he was spending in England. Dr. Frederick Rose, M.A., of the Education Committee, L.C.C., who was visiting the school, remained during the whole lecture, and at its conclusion said that such knowledge as

Dr. Mees had imparted was of the greatest value to the nation. It was formerly an article of faith with the British nation that "trade followed the flag," but it was no longer safe to trust to this idea, as it was becoming more and more evident that the world's trade would be captured by those nations who applied the most scientific methods to the production of their goods. He urged the students to devote their energies to mastering the theories underlying their practical work, and where possible to endeavour to add to existing knowledge by original research. In acknowledging the vote of thanks, Dr. Mees said that the backbone of our great industries was composed of men of great technical ability with sufficient scientific training to form an effective link between the research worker and the workshop or factory. Another great factor in commercial success was to be found in the personality of the man at the head of affairs. He gave an instance in which all the most valued experts of a firm deserted it to found a rival concern, but without doing it any material damage, while the new business soon came to grief for lack of the necessary directing energy and acumen.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents*

STEREOSCOPIC PHOTOGRAPHY OF SMALL OBJECTS.

To the Editors.

Gentlemen,—I think Mr. Bedford will find that the all-important essential in this question is the suitable focus of stereoscope used for viewing the slide. I have a stereoscope, for instance, of 3¾ in. focus, which makes absolute nonsense of his three examples; that is, it minimises the relief and exaggerates the size of the cube, throwing it all out of drawing. The three examples of different camera lens separation each calls for its own particular focus of stereoscope, and with the ⅝ in. separation slide, if a long focus stereoscope be used to get the proper amount of relief, the apparent natural size of object is sacrificed and vice versa.

My stereoscopic creed is that for natural effect the camera lens separation should be the normal eye separation, 65 m.m. (2.56 in.), and that the stereoscope lenses must be of such focus as to give the same apparent or angular size as given by the actual object in Nature. With 3½-in. camera focus lenses I find that 3¾-in. to 4-in. focus lenses in the stereoscope give the desired result, for *ordinary* views. Oliver Wendell Holmes, in "The Poet at the Breakfast Table," gives an easy method of making this test. After saying that the object in the stereoscope is the same size as the object in Nature, he offers to bet on it, and makes the doubter look with the right eye at the stereo. transparency slide in the stereoscope; whilst at the same time looking with his left eye at the actual view, and either by sliding one view over the other, or by ranging the two views alongside each other, convince himself that image and object are the same apparent size. The test must, of course, be made from the same standpoint as the camera.

In coming to objects at very close quarters, the eyes are slightly converged, and the 2½-in. camera lens separation theoretically calls for a corresponding reduction. But I have taken small objects, half-size at 10½ in. away from lens with the 2½ in. separation without the effect of exaggerated relief. But the 3½-in. focus is no longer suitable for such slides. At 10½ in. away from the object the lens is racked out to 5¼ in. instead of 3½ in. from the plate, and a corresponding longer focus stereoscope must be used.

I should be very glad if Mr. T. J. Ward would give us the methods he refers to for determining the proper focus of lenses to use in the stereoscope, giving the focus of camera lenses and the other conditions such as occur in the photography of small objects at close range. The point is one of some scientific interest. For instance, in the photography of small natural history specimens to half, or full size, the use of the correct lenses in the stereoscope is essential if the effect of both natural size and natural relief is to be obtained.—Yours truly,

R. W. Blakeley,

4, Seedley Park Road,
Near Manchester,
July 7.

THE BETTER SIDE OF THE FACE.

To the Editors.

Gentlemen,—The issue of the "B.J." dated April 29 has only just reached me here, and I have read with the greatest interest Madame Yevonde's lecture, in which she states that "in 99 cases out of a 100 the left side (of the face) is the more beautiful, owing to the fact that careful mothers, when we are babies, put us to sleep on the right side, and the bones of the face being soft and unformed, suffer accordingly."

It is interesting to know what you on your side believe to be the cause of one side of the face not being so well formed as the other side, but I would like to point out that we Americans believe something else to be the cause.

The matter attracted the attention of some of our leading men in the winter of 1889, when Sarony, of New York, attributed the cause to the habit of sucking the thumb. His dictum, and the one generally agreed upon, was that when baby's chubby little thumb is in his (or her) mouth, the forefinger presses the cartilages of the nose on one side, and by degrees completely out of shape. Sarony gave some interesting experiences in support of his statement, but I need not trouble you with them. All I need say in conclusion is that those mothers who stop thumb-sucking during childhood are likely to have the best-looking children.—Yours faithfully.

W. G. Taylor.

Washington, U.S.A.

HYPO IN THE DEVELOPER: SOME NOTES ON COMBINED DEVELOPING AND FIXING.

To the Editors.

Gentlemen,—Many of us have no doubt at one time or another tried one or more of the many methods of combined developing and fixing, with more or less—usually less—success, believing there to be something in the process. Formulæ have been many, and advocates, as well as compounders of the same, have done their best to make such solutions popular, but, so far, their efforts have been in vain. To-day, however, the method is nearer to perfection than it has ever been, and well worth the further attention of experimentalists.

Pyrocatechin was, I believe, first used for the work (in 1898), and the late Mr. J. McIntosh—an indefatigable user and advocate of the method—decided in favour of Kachin, which, later on, was found to be pyrocatechin, or as near like it as made no difference. I was witness to some of Mr. McIntosh's experiments, and some of the excellent negatives produced, though I failed most miserably with Kachin, my best results being obtained (in 1912) with the amidol-hypo formula advocated by M. Cremier. I also tried edinol, metol-hydroquinone, and ortol with hypo, but with little success, and I came to the conclusion that amidol and pyrocatechin—particularly Dr. Elion's formula for the latter—were the most suitable agents if a really reliable method of mixing hypo with them could be found.

The chief drawback to the process of combined developing and fixing has been the absolutely necessary correct adjustment of the developing agent and the hypo, for, obviously, if the hypo is in excess the plate becomes fixed before development can be completed, whereas if the developing agent predominates the negative becomes over-developed before it is fixed, making in the latter case—if one has an eye on proper density—a separate fixing bath necessary if the negative is to be rescued, thus doing away with the great advantage and main object of the process, namely, developing and fixing in one solution.

A properly constituted solution is one in which the developing and fixing agents must work in greater harmony than, say, a

Government, and together must run unitedly in double ... and so finish in what may be described as a dead heat ... a consummation devoutly to be wish'd." Chemicals of ... and even quality, particularly hypo, and the most accurate ... compounding of the same are therefore as important ... good formula. Indeed, I believe that all the formulæ I have ... are good, and that perfect results are possible under favourable ... conditions, non-success with them being due to improper ... or using, if not impure, chemicals. Thus when using hypo ... developer it is advisable to ... and rub dry the crystals ... weighing them, washed ... washed crystals giving in ... hands quite different results ... do the pure crystals and ... orthodox variety, the latter ... about half the price of the ... ner. Much depends upon ... and compounders of ... who should be most explicit ... using it, that is, using hypo ... hypo.

The above remarks are suggested ... our Paris ... (p. ... 389), in which it is stated ... another ... useful attempt has been ... Continental ... for ... fully satisfactory method of ... developing ... I am sorry your Parisian ... correspondent does not ... us of it, particularly some information concerning ... structure, two very important factors about which M. Cle... ...gely reticent. We who care to experiment with the ... advocated can, of course, solve these problems for ourselves, ... it would have been better and to our great advantage had ... been explained.

There are many submerged rocks in this branch of work, ... ry and practice do not appear to work in agreement. It might ... thought, for instance, that developers having a high factor ... would be the most suitable agents to work first with hypo, ... such is not the case. One's first idea, naturally, is to secure ... image, no matter how weak, at the earliest possible moment, ... may do with a high factor developer, and then to strengthen ... ere the hypo has a chance to overbalance and perhaps destroy ... of the latent part of it, but this plan does not appear to ... the manner expected of it. Experience teaches us that developing ... ving medium (factor, number, pyrocatechin, Kachin, amidol, ... etol-hydroquinone, potassium ... and the most satisfactory ... ming between the pouring on of the developer and the ... ce of the image allowing the hypo to start its work. This ... other form of chemical handicapping appears to be ... M. Bunel seems to have discovered it in acetone. ... Another curious and seeming contradictory point is that with ... ment of combined developing ... doing a very fully ... ...n is necessary, because of ... something like two ... ...ishing the exposure. ... impossible to get ... ...ish unless one gives ... ...ish beyond the ... ...d yet a generation ... ... we were advised to add ... ...ypo to a developer ... under-exposure, in order ... ...get the most from ... ... But more of this ... ...ding we process, in which I ... particularly interested. ... M. Bunel has, I believe, ... secret of success in ... ...ns as a constituent of ... developer and fixer. ... ...long been considered a ... addition to certain developers, ... I have never before heard ... being combined with ... developing agent and hypo. ... ...ecise action of acetone ... developer under these ... ...y be unable to say, but I ... ...dabbler in chemistry, know ... ...hen mixed with ... ...forms acetone sulphite, and ... ...of the sulphite combines ... the developing agent to form ... ...compounds, so that it may ... ...d to play of sulphite when ... ...is present, hence the ... ...pyro-acetone developer. Pyro, 60 grs.; acetone sulphite, 560 grs.; acetone, 12 minims; water to 10 ozs. ... M. Bunel's formula acetone appears to have a balancing ... ...ping action, causing the developing and fixing agents ... with greater harmony than they hitherto have done, and ... in some mysterious way, the too rapid advance of ... ...amidol) or the hypo should one have a ... ...its work before the other. This check, which may ... to be automatic, has long been wanted, and it appears to ... found in acetone.

... with the developer-fixer advocated in your ... ...more promising than those carried out some ... ...formula, but I have for the moment suspended ... further operations, ... learn from ... experimen... ...by ... ...olution ... ...closely related ... ...normal develope... ...It's use in ... ...ing that plate ... ...or an ... ...Thomas Woods.

... ...ulty. ... ...Council ... There ... P.P. ... ...photo... ...yself to ...

We offer our united sympathy to his widow and son. May they reap some comfort from the knowledge that their dear one will be mourned and affectionately remembered (not only by his fellow Councillors, but by the members generally) as a devoted pioneer of the P.P.A. right to the end.

"Requiescat in pace."

Yours faithfully,

LANG SIMS,
Secretary, P.P.A.

TO SAVE A PLATE.

To the Editors.

Gentlemen,—The following "wrinkle," though probably familiar to most of your readers, may be new and useful to some. If a plate when placed in developing dish proves to have been unexposed, at once rinse in clean water, drain for a few seconds, reinsert in dark-slide and promptly expose on any available subject. Image will already be visible on removal, and re-immersion in developer will produce a negative indistinguishable from those by ordinary treatment.—Yours faithfully, EUSTACE J. EASTMAN.

The Avon Studio,
West Moors, Dorset.
July 11, 1921.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

O. M. T.—There can be little doubt that the stains are due to imperfect fixation. As a rule, film development and fixing are rather "rushed," and traces of silver left in the film become evident on intensification.

H. D.—It is a little difficult to advise without seeing specimens. You appear to be over-developing, the pyro-soda increasing the defect. The defect seems to be still further increased by using S.C.P. paper. In other words the pyro-soda developer and the paper tend to increase contrasts. The plate used is a very good one, and we would suggest a trial being made with a softer developer—"Azol" for example, or, of course, less development with the pyro-soda. We presume you are exposing correctly; if you are not doing so it is probable that under-exposure is the cause of all your trouble.

H. E.—Technically your two prints are very good, the colour of the toned one is a trifle too warm for our liking, but many like it, and it is looked upon as being a good saleable colour. Pictorially we should say there are too many blossoms; they give a speckled effect to the picture, which detracts from the model. More of the lady's left arm, also the hand, should have been shown—or none at all. As it is now it appears disjointed and incomplete because of the mass of foliage. The use of an even larger stop would have separated the model and the near foliage (that in the same plane as the head) from the distance, and would have given a better effect. On the whole, however, the results are good and above the average of outdoor figure work.

H. T.—It is perfectly well established as a custom of the photographic trade that the negative is the property of the photographer, to be used by him in accordance with the customer's order, but, in the absence of special contract in the first instance or subsequent contract, not the property of the customer. This custom has been confirmed in the Courts on several occasions, and particularly in the case of the Rotary Photographic Co. *v.* Taber Bas Relief Co. in the High Court in 1903. In this case the negatives were specially charged for, yet it was held that they were the property of the photographic firm. In the little volume, "Photographic Copyright," which we issue, you will find a chapter on this question of the ownership of negatives in which an abstract is given of this decisive judgment.

A. W.—(1) The one-solution mixture will require a little potassium bromide if used for gaslight prints. We strongly advise you, however, to use the M.Q. developer recommended by the maker of the gaslight paper you use, as by so doing your prints would be of a better colour, it being a difficult matter to find a developer that will give the best results on all papers. (2) As a rough guess we should say a 6-inch focus lens was used with a rather small stop—certainly not larger than *f*/16. It is, however, very difficult to say. (3) Shutting the lens down more will not increase the area of illumination. If the picture is cut off with open aperture, it will remain cut off, no matter how small the stop used. (4) Special washers are made by Kodak, Houghtons and others, and you cannot do better than write to one or the other for particulars.

T. B. S.—We have met with no difficulties with the toner you are using for toning bromide prints to a Bartolozzi red, but as an alternative method you might try that advocated by Mr. C. W. Somerville, in his book, "Toning Bromides":—Make a saturated solution of ammonium carbonate by adding 3 ozs. of the crushed salt to 10 ozs. of cold water, allowing it to stand two or three days, shaking as often as possible. Make up the following solution in order given:—

Ammonium carbonate (sat. sol.)	1 oz.
Copper sulphate	10 grs.
Potassium ferricyanide	25 ,,

Any precipitate which forms when the copper is added to the ammonium carbonate will be re-dissolved. The solution should be perfectly clear, but should be used immediately, as a precipitation is likely to occur after long standing, especially if the solution has been used. If much work is going to be done with this toner it is advisable to keep a fairly large stock of ammonium carbonate by putting an excess of the salt in a bottle and keeping it covered with water and well stoppered. Toning should be continued until the deepest shadow is converted and allowed a minute longer. The print may then be washed for 10 minutes. Preferably it should be immersed in the acid hypo bath to remove any unconverted silver salt and again washed. Should there be a pink stain in the whites of the print it may be easily removed by treating with a 1 per cent. solution of ammonia. If the ammonia be too strong it will destroy the colour.

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HENRY GREENWOOD & CO., LTD., Proprietors and Publishers, 24, Wellington Street, London, W.C.2.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3194. Vol. LXVIII. FRIDAY, JULY 22, 1921. Price Fourpence.

Contents.

SUMMARY.

In the current chapters of his articles on photography for the newspapers, Mr. W. Lancelot Vining deals with the advantages of flashlight as an auxiliary in press photography, and has some hints to give on the making of portraits for reproduction in newspapers (P. 427.)

In a contributed article, Mr. Arthur G. Willis deals with some of the advantages of the Carbro process (of making carbon prints from bromides), particularly from the standpoint of the professional portraitist. (P. 434.)

Some notes on the use of panchromatic plates, by Mr. H. N. Holland, deal with a number of practical points, and refer to the advantages of these plates in outdoor work. (P. 429.)

A recent paper by M. G. Cromer, before the French Photographic Society, has described methods for the use of large-aperture lenses in portraiture in order to simulate the effect of binocular vision (P. 430.)

In a leading article we refer to the advantages of orthochromatic plates for portraiture by both daylight and artificial light. Although their merits may not be capable of such striking display as in the case of more highly coloured subjects, they are nevertheless positive enough to justify the adoption of the orthochromatic plate in regular work. (P. 426.)

The Revd. H. C. Browne, M.A., in a paper on lens separation in the stereoscopic photography of near objects examines the question as regards the viewing of the positives, as well as regards the taking of the negatives. (P. 432.)

On the proposition of Dr. Rodman, president of the Royal Photographic Society, donations are invited for a permanent memorial to William Henry Fox Talbot (1800-1877), from whose researches present-day photographic and photo-mechanical processes originated. (P. 439.)

We regret to record the death of the eminent French physicist, M. Lippmann, whose "interference" process of colour photography raised great hopes thirty years ago. (P. 435.)

A recently patented invention in aerial photography consists of a supplementary camera in which the compass bearings at the moment of exposure are photographed. (P. 436.)

The working of ordinary P.O.P. removal of ink stains from negatives and prints, and extemporising of a focussing screen are the subject of "Assistants' Notes." (P. 435.)

In making reproduced negatives on glass plates, want of contact between the two plates may easily give rise to imperfect definition if the ordinary pattern of printing frame is employed (P. 426.)

Considerably longer life of the inexpensive unmounted gelatine light-filters is obtained by a simple form of mounting between a pair of rings of thin card, cut to size for insertion in the lens tube. (P. 426.)

EX CATHEDRA.

A Fox Talbot Memorial. As will be seen from the letter in another column from Dr. G. H. Rodman, the Royal Photographic is moving to create a memorial to William Henry Fox Talbot, to whose investigations the methods both of photography and photo-mechanical reproduction, as we know them to-day, chiefly owe their origination. It is a laudable object, and one which has been too long delayed. In France the scientific inventor, even if he does not fare better than elsewhere during his life-time, is assured of an adequate posthumous tribute. At Chalon and Bry, respectively the homes of Niepce and Daguerre, the work of these pioneers is commemorated. Only a few months ago, in Paris, on the site of Daguerre's Diorama premises being identified, permission was obtained to perpetuate the fact by the erection of a mural tablet. Fox Talbot, to say the least, is deserving of an equivalent measure of public testimony to the value of his labours on the part of the present generation, and it is to be hoped that the appeal of the Royal Photographic Society will meet with a wide response. It is proposed that the memorial should be established at the village of Lacock, the home of Fox Talbot and his forebears for a great number of years, and the place which is intimately linked with the genesis of photographic processes.

* * * *

Mounting Gelatine Filters. Many photographers using colour filters for ortho or panchromatic plates for reasons of economy use the gelatine film slipped between the components of the lens. This plan is in every way satisfactory, the only argument against it being that the gelatine surface of such filters is very delicate and easily spoilt through over much handling. It is a good plan when purchasing these filters to mount them for use between two circular-shaped rings of thin cardboard of exactly the diameter of the lens. This will enable the filter to be handled without the fingers actually coming into contact with the gelatine film, and will further assist in removing the filter from the lens. Care must be taken that the inner circles of the mounts are no smaller than the largest stop fitted to the lens, or exposure calculations will be seriously upset. If there is a difficulty in slipping the mounted filter out of the lens a couple of tiny tabs of black velvet may be attached to the edge of the cardboard mount. These will allow more easy handling if the lens mount is too deep or narrow to allow the insertion of the fingers, and if the filter mount is a tight fit (which it should be in order to keep it central and avoid interference with the stop) a pair of small tweezers may be employed to grip the tabs and lift the filter out. The above plan is of real value in keeping the gelatine filter in good condi-

tion, and the trouble is well worth while in saving the cost of the constant renewal of spoilt filters, due to the accidental touching of the gelatine surface.

* * *

Unmounted Prints. A problem which often faces the photographer is to find a means for preventing unmounted prints upon emulsion-coated papers, either gelatine or collodion, from curling. In the early days of bromide papers it was a common practice to immerse the fixed and washed prints in a weak bath of glycerine and water. This, of course, prevented them from becoming "bone dry," but experience proved that it was conducive to rapid fading, and it is now seldom done. A better plan, based upon the experience of cardboard manufacturers, is to keep the prints flat while drying, applying moderate pressure until all moisture has departed. Prints so treated will remain flat, unless they are allowed to become very damp and dry again in the open. In the case of collodion emulsion papers, the prints may be taken directly out of the water, the surface moisture blotted off, and then transferred at once to a dry blotting book. Gelatine papers are best treated with a weak formaline bath, hung up to become surface-dry, and transferred to the blotting book as soon as the surface is hard enough. It is desirable that the special "fluffless" paper sold for the purpose is used. A slab of plate glass on top of the blotting board will provide sufficient pressure.

* * *

Temperature and Development. In spite of all that has been written and said upon the subject, many photographers have lately been getting negatives which are much too thick for their liking. The brilliant light we are experiencing has ensured full exposure, and the high temperature has hastened development. To secure satisfactory negatives in these conditions, one of two things may be done. The developer may be cooled by the use of ice, or it may be diluted so as to bring its working time back to the normal. It should be remembered that different developers are differently affected by temperature, pyro-soda perhaps the least, and hydroquinone the most. Some may think to meet the case by using bromide of potassium as a restrainer, but this affects the scale of the negative, and, while it prevents a thick, clogged-up appearance, it is likely to produce hardness. It is, of course, desirable to keep the dark room as cool as possible, and if it can be arranged to avoid developing during the hottest period of the day, so much the better.

* * *

Reproduced Negatives. An often unsuspected cause of inferior definition in negatives which have been reproduced by contact from a transparency is to be found in the want of uniform contact between the original negative and the transparency plate, and subsequently between the transparency and the plate which is to yield the final negative. This was impressed upon us recently when making a number of transparencies from a very fine line negative. Under a magnifier the lines in these were distinctly unsharp, and it was only when a process printing frame with powerful screws was used that satisfactory results were obtained. The reason for this is simple. Sheet glass as used for modern plates is more or less curved, and the emulsion is coated upon the concave side, so that, with a weak spring pressure in the printing frame, the centres never come into contact. Failing such a printing frame as we have mentioned, it is better to make both transparency and negative in the camera, when with careful focussing and a moderately small diaphragm the difficulty will not arise. Another way to secure sharpness is to make the exposure at a considerable distance from a small source of light, and to keep the frame perfectly still the whole time.

ORTHOCHROMATIC PLATES IN PORTRAITURE.

Although practically every intelligent photographer uses authochromatic—or, as they are indifferently called, isochromatic—plates for certain classes of work, we believe that comparatively few appreciate to the full the advantage of employing them for the ordinary run of studio portraiture. Possibly this is due, in some measure, to the methods which have been adopted by writers and demonstrators to prove their particular qualities. For example, a bunch of marigolds and cornflowers makes an excellent test-object, the ordinary plate rendering the yellow flowers as if dark in colour, and the deep blue ones as if nearly white, while upon the ortho' plate these tones are reversed, giving very nearly the actual visual effect. When a similar comparative test is applied to an ordinary sitter, the two negatives do not show this striking difference, especially if no colour filter, or what is popularly known as an iso-screen, has been used, and consequently the advantage of using them has been questioned, and the "ordinary" plate has held the field.

In case there may be any misapprehension in the matter, it may be well to state that for any normal subject there is not the slightest disadvantage in using ortho' plates to the entire exclusion of ordinary ones, and, as the cost of the two kinds is the same, no economy results from choosing the latter. The only point which has to be observed is that the dark-room light is a pure red, and free from any trace of green or yellow. In most cases this requirement is already met, and, if not, it is a simple matter to fit a properly tested "safe-light" to the existing lamp.

Although the full advantage of the ortho' plate cannot be obtained unless a yellow, or greenish-yellow, colour-filter be used, a considerable improvement in the quality of the negative can be obtained without it. In the case of very florid, sunburnt, or brunette complexions, a very long exposure is necessary with an ordinary plate to avoid a dusky appearance, but with the ortho' plate a slight increase beyond the normal will be all that is necessary. With badly-freckled skins, especially when these occur in conjunction with deep yellow or reddish hair, as is very frequently the case, it is very desirable to use a light yellow screen, which will necessitate doubling the exposure, but, when using a plate of 500 H. & D., this should prove no deterrent. With such sitters the improvement by so doing is most conspicuous. If a test for this be desired a group of two persons—one with a healthy tan and the other with a delicate pink and white skin—will convince the most incredulous. A great improvement is also obtained with white or very light draperies, although with these the best results are only to be obtained by using backed plates or films

There are now many self-screened isochromatic plates upon the market, and these have been found to

yield excellent results in the studio, being certainly better than the unscreened ortho' plate. From the nature of their manufacture a full exposure is needed to bring out their true capabilities, and few portrait negatives receive this. For this reason we recommend the use of a colour filter, whether the ortho' plate be a screened one or not. The cost of a colour filter of good optical quality of sufficient size to be used with a large portrait lens is rather a serious item, and one of poor quality will impair the definition of the best lens. This has perhaps deterred many photographers from giving orthochromatic work a fair trial. Fortunately, there is a cheap and easy way of overcoming this obstacle. Most of the leading makers issue thin sheets of gelatine, dyed to the proper tint, at a cost of a few pence per square inch, and a piece of this cut to the requisite size may be fitted either inside the lens tube or mounted upon a cardboard cut-out immediately behind the lens. The former position is preferable, as the gelatine is protected from both atmospheric influences and finger marks or scratches.

It is when using artificial light that the full advantage of the colour-sensitive plate is adequately displayed. The half-watt lamp is rapidly ousting other forms of illuminant, and has no disadvantages except the somewhat yellow tinge of the rays. This is entirely removed by the use of the ortho' plate, which is sensitive to such rays, and which in this case does not (for the ordinary sitters) require a colour screen. It has been claimed that an iso plate bearing the same H. & D. number as an ordinary plate requires only half the exposure of the latter when used with half-watt lamps, and upon trial we have found the claim to be approximately correct. Those who have had much experience with arc lamps, particularly of the enclosed type, are aware of their unkind treatment of the freckled or red-haired sitter. Here, again, the ortho' plate scores if used with a pale yellow screen, which practically brings the light on a level with that emitted by the half watt.

All the advantages of the ortho' plate are, of course, possessed in even a higher degree by the panchromatic, and for very highly coloured draperies, scarlet uniforms, and the like, these should always be used; but it is hard to persuade the average photographer to load and develop in absolute darkness, and therefore he is likely to use the ortho' plate for all subjects within its scope.

PHOTOGRAPHY FOR THE NEWSPAPERS.

[Below we continue the publication of a series of eight chapters on the supply of photographs to the newspapers written by Mr. W. Lancelot Vining, until recently art editor of the "Sunday Pictorial." So far as we know this is the first occasion on which the subject has been dealt with by a writer intimately acquainted with the production of an illustrated newspaper, and considering the matter from the angle of the art editor. Mr. Vining, who has spent his life in press photography, first as a free-lance and subsequently as a press photographer on the "Daily Graphic" and "Daily Mirror," deals in the current chapters with flashlight work and with portraits and figures. His two last chapters will appear in our issue of July 29.—Eds. "B.J."]

V.—FLASHLIGHT.

Every photographer having press-work in his mind should be able to get a good photograph by means of artificial light made by flash-light powder. The lamp required is of no great size, and can be carried in the pocket. There are several makes on the market, and if handled according to the makers' instructions, will give very little trouble. When you set out to cover any event, you can never be sure that you will not be called upon to take a photograph in some dark place, or a portrait in a very bad light, and many a cheque has been lost to a photographer because he had no flash-lamp with him. Interiors, and even portraits indoors, are greatly improved by giving a small flash at the end of a daylight exposure. The exact amount of powder to be used is very important. The majority of photographers use far too much. A little home practice will soon put you right over this, and give you the amount of powder to be used to get a good result, without overtaxing the patience of your sitter, whom you will often find can sit quite still for three seconds, but not for six, and this is where the little flash at the end of the day-light exposure scores. The negative will also be found to be bright and crisp, and the print a good one for reproduction.

Now, I want to give all my readers a warning. Never handle flash-powder except with the greatest care. You may use it every day, as I have done, during the winter months, and although I have always entertained a holy horror for the stuff, and handled it as I would gunpowder, I have paid three visits to Charing Cross Hospital to have my hands dressed. There is no need to get "wind up," but never hurry, or allow yourself to be rushed, and keep as far away as you can from other people.

Very often when flashing at a public meeting you will be told to hurry up, etc., etc. Well, this is just the time to go slow; don't lose your head or get flustered. If possible, have your camera in position and everything at hand before the chairman announces that a photograph will now be taken for the "Sunday Pictorial." All you will then have to do is to draw your slide, put out your powder, ask for the attention of the group and expose. There are several methods of exposing at these times, but I think the best and safest is by a cap on the lens in preference to working the shutter by ball and tube. The latter has been known to fail, and when using a cap you will never be worried at the last minute wondering whether you remembered to set the shutter; but when using a cap, you must make quite sure that your shutter has remained open since you focussed the group.

Never fire the powder where there is a downward draught, and this often occurs in halls. Look out for open skylights and windows in the roof or high up in the walls. Hold even the smallest flash high above your head and always wear a leather glove on the hand holding the tray.

You may have some trouble in obtaining permission to flash some important gathering, and then only receive it on the promise that there will be no smoke. In this case I advise you to find a quick way out of the hall beforehand so that you can get well clear of the hall before the smoke, which you are bound to make with a big flash, has had time to hit the roof and descend in the form of a miniature fog upon the audience. Their remarks would not interest you, although they would very much like you to hear them. I remember on one occasion when in the Midlands at election time I was brought back into the hall after letting off a big flash to hear a few special remarks from the chairman on "Truth in rela-

tion to photographers." I could just see the speaker through what was certainly a rather thick mist, while the coughing drowned his voice, but I had obtained my picture.

Always measure your powder by spoon-fulls and keep one spoon specially for this purpose. "Borrow" one from the silver drawer at home, but be sure that it never gets back again among the others, because, I believe, the powder is poisonous; it certainly kills fish. I made six very small flashes in a friend's drawing-room, and accidently let some of the ash fall into his bowl of goldfish. Next morning they were found to have "gone West." Always keep your flash-lamp very clean; a stiff nail brush is all that is required.

I do not advise flashing in the open unless the air is very dry, and in any case do not put the powder out until the very last minute, otherwise you risk an explosion if the powder becomes at all caked, as it certainly will if the air is at all damp.

A very good brand of plate to use when using artificial light is a rapid orthochromatic and a developer which has not the tendency to give strong contrasts. With care, any developer can be made to give a good result; but as there is always a risk of under-exposure which would give harsh contrasts, no bromide should be used, and the developer should be diluted with water. My favourite developer for this work is hydroquinone-eikonogen, made up as follows:—

A.	Hydrequinone	½ oz.
	Eikonogen	½ oz.
	Sodium sulphite	2½ oz.
	Hot water to	45 oz.
B	Sodium carbonate	2½ oz.
	Hot water	15 oz.

A. 3 oz. B. 1 oz. Water 3 oz.

A good negative for enlarging should be obtained in about eight minutes.

Success in group and portrait work by flashlight depends a great deal upon the arrangement of the light and the sitter. The chief mistake made is to have the light at too low a level. Reflectors play a very important part in obtaining good results, but the correct manipulation of these can only be proved by experiment, but it is quite worth while spending some time doing this. When possible get a fair amount of contrast between the dress and your background. Always aim at a result which will reproduce well, even if reproduced small size.

VI.—PORTRAITS AND FIGURES.

Portraits play a very big part in press-work, and every correspondent should be able to obtain a good result or set to work to practise until he has more or less mastered the art of lighting his subject in a manner to suit his or her features.

A photograph of any person should always include the complete face and top of the head, the feet we do not worry about so much. I make this remark because the "Sunday Pictorial" is constantly receiving plates or prints which have part of the features missing, the edge of the plate cutting right through the face. Retouchers do not like having to guess at the missing half of the face of a person they have never seen, and the subject in question usually has some very pertinent remarks to make about the result. A photograph of this description would, of course, not be used unless very important. Another fault which is very common with amateur photographers is the small size of the figure on the negative. I recently received a quarter-plate print of a man who had made a very important arrest, and which I was very anxious to use. The size of the figure was ¾ inch, and the legs had been cut off, while the angle was 45 degrees and the whole was out of focus. By the time I had enlarged the figure to half-plate and had it worked up I very much doubt whether even his friends knew him. Both these faults can be cured by getting on "speaking terms" with your view finder. Of course there is no excuse at all if your camera is a reflex. Make a few experiments and you will soon find out the correct distance to stand from your subject to obtain a full-length figure. When using a 5 x 4 upright, the image should never be less than 3 in. This will give clear details and ought to be obtained when using a 6-in. lens on a 5 x 4 plate at about 5 yards. It is very important that the view in your finder agrees with your focussing screen. When out to take a portrait for publication get a full-length, as well as head and shoulders, as you never can tell what an art editor will want to do with the story, or the shape of the space he is keeping. You might think the story was worth a picture the size of a postage stamp, while it was wanted to go the full length of the front page. Having made sure of your portrait, ask your subject to let you have a "lifey" snap—working in the garden; walking in the street. Get them interested, and try and give the result a natural touch. Introduce a pretty child or an animal (two very safe cards to play). Always try and get a bright result, however dull your subject may be. An art editor is always trying to produce a bright paper, and is always on the look-out for a bull's-eye for every page, and there is no reason why your photograph should not be the one selected and reproduced at a size which will bring a double fee.

"What dress shall I wear?" This question will always be put to you when your sitter is a female. Dress and its colour plays a very important part in photography, and more often than not does not receive the attention that it should. Always use a fast isochromatic plate when possible, and when the light is very good a 1½-times screen. This will save a great deal of retouching. Don't forget that pink and yellow come out grey; scarlet, a dark grey. Dark red, brown and dark green print up black. Silver ornaments give a better result than gold, while diamonds and all stones with great sparkle should be smeared with soap to deaden the reflection.

When taking photographs for publication, there are a great many things which must be taken into consideration, and I think that backgrounds can easily be put at the head of the list. Why do so many photographers choose a red-brick wall, and having made this bad start, make things very much worse by standing their subject as close to it as possible? Very few portraits go through the process of reproduction without having a certain amount of work put on the face by an artist retoucher. This we expect, but we do not want to lose valuable time painting out unsuitable backgrounds, when a little thought at the time of exposing would save all this extra work, which by the way has to be paid for. When possible, choose a plain back in contrast to the dress and colour of the subject, as the result to be aimed at every time is a good printing negative. This may not be artistic, but that is not everything in press-work. A sheet, tablecloth, or even a newspaper is better than a brick wall, but if a wall has to be used, get your subject as far away from it as possible, and it will be then out of focus. Trees and hedges also make very bad backgrounds if the subjects are stood close up against them.

Collecting Portraits.

When collecting a portrait a promise can always be made that the original will be quickly returned, undamaged and clean. Write the name and initials of the person on the back clearly, and be quite sure it is the right person, and also the address to which it is to be returned. When it reaches the office it will be copied and returned at once. It is also just as well to find out who owns the copyright, and to put that on the back as well. We may have to pay the photographer as well as the collector.

The News Photograph.

What shall I photograph? This is a question that I am often being asked, and is one that is not at all easy to answer; so much depends on the person behind the camera. I know many photographers who can take a subject of no topical interest, and by the method in which they handle it produce a photograph which is quickly published, and I also know

many photographers who would pass this same subject by as quite useless. News photographs can be placed in two classes—dated and undated. The former must be handled quickly, even if you are the only photographer at the event. Never stop to develop and print, but proceed as instructed in Chapter 4. Don't overdo the number of plates you expose. More than three pictures of one story are very rarely published these days, except the big news event. Find out the principal items of the event you are covering, and work on these. The "undated" events or subjects give you more time, and provided you have no one in competition, there is no reason why you should not develop your plates and make enlargements from them if you wish, but if you have no enlarger, send the negatives for the office to enlarge. Most interesting subjects require a little story to explain them. Write enough to fully explain the photograph, and the caption-writer will condense it into the required number of lines.

Arranging "Stunts."

When a local event is fixed, and you think it will interest a paper, write to the art editor giving full particulars and offer to cover it for him. Mention any expenses that may occur. He will then do one of three things—refuse your offer, give you a definite order, or tell you to send prints on approval. If you have secured the exclusive photographic rights, state this in your letter. In this event a paper is often quite willing to pay a fee, so that their photographer can attend, and this will save the correspondent a great deal of trouble.

Make your arrangements for a good position beforehand, and there ought to be no difficulty over this. In fact, a local man is always better treated in this respect than a stranger. Be on the spot early. Never rush up at the last minute and then be surprised and cross if you cannot reach your position, and fail to get good pictures. When arranging your position, do not forget to allow for the position the sun will be in at the time you will be exposing. Sometimes it will be necessary to get a posed group. In this case always see the chairman as early as possible, and before he gets busy tell him exactly what you want to do, and the time you will want to take your photograph. You may have an idea for a "stunt" which would produce five or six good and interesting pictures. You can obtain these and send around on approval, or write to a paper and put it up to them. Give full particulars and what it would cost, also the fee you would require; but always remember one thing when dealing with stunts, it is never a very wise thing to give away ideas for pictures.

W. Lancelot Vining.

(To be continued.)

NOTES ON THE USE OF PANCHROMATIC PLATES.

An amateur with progressive ideas and powers of observation soon tires of producing bald-headed snapshots with dead white skies such as are obtained with ordinary ortho plates and films.

Relief is sought by the use of ortho filters (three to five times) to get the desired cloud effects, but one is hampered by the reduced light and lengthened exposure frequently making it impossible to use a hand camera with an *f*/8 lens.

Even the five times ortho screen, which is the maximum for efficient correction, does not give the best results, and many turn to the anti-screen or non-filter plate, which is alleged to give full correction without any filter except that incorporated in the film.

Better rendering is certainly obtained, but still those clouds elude us, and a three times filter has to be used to get them registered on the negative effectively.

At this stage we are a little better off than with an ortho plate and five times filter in the matter of exposure, assuming both plates to be Wynne 90, a fair average speed for this class of plate; but still we are not happy, for now our negative is over-corrected, and the results are unreal. At last we turn to the panchromatic plate (about which many amateurs are unnecessarily timid), and find that we are better off in the matter of exposure, whilst the other troubles of development, etc., are more apparent than real.

We can get at least two varieties of panchro. plates with a speed of Wynne 110, which will give all the correction required by means of a one and a-half, two or three times filter, and for outdoor work we shall not require more than two times as a rule.

With a hand camera of lens aperture *f*/4.5 I can take good outdoor exposures at *f*/8 or *f* 5.6 and a two or three times screen at 1/25 sec., and have to be careful to avoid over-exposure during this present month of April between 9 a.m. and 5 p.m., and the negatives show perfect colour correction and beautiful cloud renderings.

Too much of a bogey is made of the loading and development, as I will endeavour to show.

Loading can be done without difficulty in absolutely dark conditions if one remembers that plates are packed in pairs film to film. If plates are backed (and, personally, I use no other) the rough backing can be felt with the tip of the finger, and I never make a mistake in loading a double back holder.

Development is equally simple if properly carried out. If no dark-room is available, plates can be loaded in the dark in a developing tank by touch, as in loading plate holders. There are many tank developers to be bought and many formulæ available if one prefers to make up developer at home.

Any degree of contrast can be obtained by varying the time of development, and a few experiments will soon make any one *au fait* with a particular developer.

If quick development is to be done in a dark-room time and temperature methods can be employed as before, covering the dish effectively and switching on the light to observe the time, switching off again when ready to rinse and fix the negative. As above contrast can be regulated by time of development.

Factorial development can be done equally easily with a Wratten Green safe light. Many state that they cannot see to develop by this light, but at least one can see the image flash up and note the time by a stop watch, afterwards covering the dish and switching on the light to time development, switching off again to rinse and fix the plate by the aid of the Green safe light.

Contrast can be regulated by varying the factor. A new method is available to us now in the use of the Ilford preparation called Desensitol, a concentrated red dye, which is diluted for use to 1 in 50; a plate bathed in this can be developed in a bright yellow light after one minute. Like all new methods, it has drawbacks, which will doubtless be overcome in time.

The dye stains the film pink, and does not always remove by prolonged washing.

If the staining is even tinted it is not serious, but sometimes it is uneven and patchy, and, further, an apparently stainless plate will sometimes show purple patches when dry.

The use of dilute hydrochloric is recommended in such cases, but even with the alum bath there is a tendency to frill.

Another drawback, but not a serious one, is the alteration of the time factor in factorial development, but as factorial development is not necessary in a bright yellow light this does not matter very much.

Mr. Raymond Crowther, who is writing on this subject in

the "British Journal" from time to time, will doubtless discover for us in time a stainless desensitiser, and then this method will be perfect.

For the present I prefer either tank development or factorial development with a green safe light.

It may be mentioned at this point that although the Ilford Co. warn panchromatic plate users that their plates are unsafe in a green safe light, I have developed several of their plates by this means, using pyro soda and factorial development without a trace of fog on any plate.

Possibly this is due to the fact that the black backing dissolves and stains the developer black, making it safe against the green light.

On the superior colour rendering and cloud effects that are obtained with a panchro. plate and one and a-half to three times filter I need not dilate here.

Let any reader choose a suitable outdoor subject, and try for himself a set of negatives—ortho, with and without filter; self-screen, with and without filter; and, finally, panchromatic, with filter—and compare results.

The panchro. plate and filter holds the field against all others for speed, combined with a given degree of colour correction, and no one who gets experienced in their use and management should want to go back to other plates for outdoor subjects or daylight portraiture.

HENRY N. HOLLAND.

DEFINITION IN PORTRAITURE.

[In his Paris Notes some weeks ago M. L. P. Clerc referred to a recent paper and demonstration before the French Photographic Society by M. G. Cromer on the employment of a lens of large aperture for portraiture for the sake of its "looking round" effect, and mentioned the effective use which had been made of an objective having a diaphragm of 5 inches diameter. M. Cromer's full paper having now been published by the French Photographic Society, we take the opportunity of printing a translation of it, in making which we have to acknowledge the kindness of M. Cromer in elucidating one or two items which appeared insufficiently explicit in the French text.—EDS. "B.J."]

PERHAPS the most insurmountable obstacle which is encountered by those endeavouring to produce by photography works having the quality of art is that which relates to definition. The difficulty appears the greater from the fact that, as a result of optical conditions, the definition of a photographic portrait is localised in the parts of the subject which are in exact focus, whilst other parts are rendered more or less "woolly" in appearance; part of the outlines is obtained quite sharp against the background, whilst the rest suffers from diffusion or fuzziness.

Most of those who have studied this question of definition in relation to portraiture have taken the view that it is due only to the greater defining powers of the lens, as compared with that of our eyes, and have, therefore, sought to break up this sharpness in order to obtain a more exact reproduction of nature. Claudet, in 1866, suggested altering the focal length of a lens during the time of exposure by separating the front and rear components. He aimed at reducing the excessive sharpness of some parts, and the too great fuzziness of others by bringing them all into the plane of sharp focus. In the same year Dallmeyer introduced his famous soft-focus lens, a modification of the Petzval objective, in which he obtained an analogous result more easily than Claudet by slightly unscreening the rear lens before exposure. Much later, in 1904, MM. Puyo and de la Pulligny introduced their artistic lenses, yielding diffusion by residues of chromatic aberration, and soon afterwards there appeared the Eidoscope of Hermagis, in which diffusion resulted from spherical aberration; the Dallmeyer-Bergheim, etc. [M. Cromer is in error respecting the date of introduction of the last named, which was about 1895.—EDS., "B.J."]. In the hands of many skilful portrait photographers these lenses have produced remarkable results; but, in my opinion, they serve only to hide, by their diffusion, the definition which is the ideal of the artistic photographer.

Shortly before 1900 M. Boissonnas, of Geneva, following suggestions of the painter Darier, made a start on what, I think, is the correct path, by studying what he termed binocular photography. We do not know what was Darier's idea; but it is easy to imagine it by recalling Wheatstone's demonstration of double vision. Since the draughtsman looks at his model with both eyes, he sees a little more of the left side of his model with his right eye, and a little more of the right side with his left eye. His drawing is thus the synthesis of these two aspects seen simultaneously. The lens, however, scans over a single angle, and views Nature as a one-eyed man would do. In order to imitate the unconscious process of the draughtsman by photography, Boissonnas employed on his camera two lenses, paired as for stereoscopic photography. By slightly inclining the lenses, he caused the two images to be superimposed on the ground glass. In this way he produced the curious portraits exhibited by him in Paris in 1900. But the process had two defects. In the first place, the superimposition of the two images was a delicate operation, and in taking a portrait it is necessary to work quickly to avoid fatiguing the sitter.

Moreover, it is well known that the exact registration of two images of the same subject taken with two lenses under different angles cannot be done. In the process of Boissonnas, the two lenses were mounted horizontally, and, therefore, the images could be registered as regards their height, but not as regards their width. Thus the outlines approximating to the vertical were sharply doubled, enlarging the image obtained, and though nearly horizontal lines were almost sharp, those running nearly vertical were never so.

I have endeavoured to find a solution of this problem which has occupied experimenters since Claudet; and I first noticed that the works of artists, draughtsmen and engravers, as well as painters, of every period of school, with rare exceptions, never employ diffused definition in the rendering of Nature. Their work may be done in masses or broad effects obtained by reducing or omitting disturbing details, but the drawing and the essential outlines are always firmly defined. In short, whatever the kind of representation, artists reproduce what they see within limits comparable to those of normal human vision in the examination of a scene.

On the other hand, the fertile idea of Darier, supplemented by the experiments of Boissonnas, gives the key to this habit among artists to those photographers who are seeking to infuse art into the works produced with a lens. The latter does not record as do our two eyes; but, as a one-eyed person. I venture to think that in this lies the true explanation of the definition produced in photographs.

The direction in which to experiment was thus plainly indicated. *We require a lens able, first, to see binocularly; and, second, to define the image within the limits of precision of a normal eye.*

An observation of Brewster's pointed me quickly to the solution of the problem so far as binocular vision is concerned. The English physicist noticed that lenses of too large diameter introduce into the photograph parts of the subject which, with our two eyes, we see only by alternately turning the head to

the left and the right. It, therefore, seemed probable that lenses of suitable diameter would see the sitter as we do.

Practice showed the correctness of this assumption, and that the best rendering in this respect is obtained with lens of 5 inches or about 13.5 cm. diameter. Those of 4 inches diameter are large enough for this purpose, but those of 6 inches are too large, and, moreover, are of inconveniently great focal length. My experiments were made with a lens of 5 inches diameter of aperture.

As a control of the first results, I made an experiment for the purpose of proving that a lens of this size views the subject from different angles, as do the two lenses of a stereoscopic camera. Choosing an immobile subject, a plaster bust, I took a negative after having placed behind the front lens a piece of black card having a circular aperture of 3.25 cm. diameter, which was disposed tangentially at the right-hand edge of the lens. Focussing was done on the eyes, before placing this mask in position, with the lens at full aperture. This first negative was made on the left-hand half of the plate by means of the customary repeating back.

I next made a second negative under the same conditions, except that the mask was turned to bring the aperture tangentially at the left-hand edge of the lens, and the exposure made on the right-hand half of the same plate by sliding over the repeating back. A pair of negatives was thus obtained on the one plate representing the two views of the subject. If, now, the lens sees binocularly, we should have, on making positive prints and mounting them at a separation of 6.5 cm. between corresponding points, a stereoscopic print, exhibiting the customary relief. The result conclusively showed this to be the case; and it can, therefore, be admitted that a lens of 5 inches diameter of aperture renders modelling as seen by the eyes.

But, as regards sharpness of definition, the problem still remains to be solved. With this lens the definition of parts of the image in sharp focus was too good, but of others, insufficient. As regards this question, I had noticed that with portrait lenses, particularly those of old construction, the margin is far from being equivalent in effect to the central part, and the sharpness of the image comes chiefly from the midway region of the lens. By masking this portion more or less completely by a disc of black card placed at the centre of the front lens, we ought to obtain less perfect images, and therefore more nearly in correspondence with those seen by the eyes. This was the first means tried for the production of the desired normal rendering.

It should be noted that the use of a disc in this way does not involve appreciable increase of the time of exposure. If an objective of old type is used, such a disc covers scarcely a quarter of the surface which can be utilised at full aperture; and if it is borne in mind that, without the disc, it is necessary to stop down for the sake of depth of focus, it will be understood that the use of the disc does not reduce the useful speed of the lens. The disc used against the front lens can be replaced by one of suitable diameter central in the position of the diaphragm.

An alternative means for remedying the excess of sharpness can be used, and has the advantages of leaving the speed of the lens unaffected, and of not requiring a lens of old type. Moreover, it can be very readily modified according to the degree of diffusion desired or admitted. This second method consists in interposing in the path of the image-forming rays a transparent screen, so as to alter the course of the rays slightly. The clear gelatine sheets used by photo-engravers answer excellently, if of the utmost purity. I employ them from 15/100 to 30/100 thickness equivalent to .006 to .012 of an inch. The thinner the screen, of course, the less the diffusion.

Some experiment has been devoted to finding the best position for such a screen. I have tried using it in the plane of the diaphragm between the two glasses of the back combination, and lastly behind the whole lens at distances ranging from .1 to 20 cm. from the back combination. Of these various positions, the worst seems to be that in the plane of the diaphragm for the screen then tends to grey the image. The position behind the lens appears to be the best. In this position the screen produces the minimum of greying, and gives less diffusion as it is moved away from the lens in the direction of the plate, the latitude in this respect being an important advantage.

For the mounting of the screen, a collar may be secured round the rear part of the lens tube, and serves to support a horizontal rod parallel to the optical axis, placed below this axis and extending in the direction of the plate. The screen is mounted on a light cardboard frame, to which is fixed midway at the top perpendicularly to its surface a tube which slides stiffly on the rod. Thus we have only to remove the ground glass from the camera in order to fix the screen on the rod and can move it along the latter as required. Also the screen can be readily exchanged for a thinner or thicker one. I would add that the gelatine screen can be used with any lens, and will be found a novel and practical means of securing diffusion without the aid of special fitments. All that is necessary is to fit the screen to the camera in the same manner as a light-filter, preferably behind the lens. In place of the gelatine screen one of extra thin glass, such as a microscopic cover glass, can be used. The perfect transparence of glass avoids all trace of greying effect on the negatives.

The use of this somewhat thicker screen serves to show the way in which the process improves the even character of the image. This image appears on the ground glass as formed of several images, which do not coincide, or only very approximately, in the parts which are in sharp focus. The excessively sharp focus of these parts is thus modified. In the parts which are not in focus these various images are slightly separated, and the outlines, instead of being unpleasantly woolly as usual, are formed by a certain number of fairly sharp and adjacent lines, which impart a much firmer character to the definition, in the manner of the pencil strokes of the draughtsman. It can be said that a positive increase of depth of focus is produced in this way.

I will now refer to a third means which I have studied for overcoming the excessive sharpness given by portrait lenses. It is, however, applicable only to lenses of the old types of relatively small aperture.

Proceeding from the observation that these lenses can be opened out whilst still giving sufficient depth of field for portraiture, I enlarged the fixed diaphragm and obtained images of much more even definition.

In reference to the use of large lenses, it is often stated that if of greater diameter (of diaphragm) than 10 cm., they produce deformation of the image by recording parts of the subject, which the two eyes cannot see simultaneously. (M. Cromer here projected a portrait in illustration of the incorrectness of this statement.) The result I now show you was made with a lens of 5 inches diameter (= 13.3 cm.), the same one used in making the stereoscopic pair of negatives previously mentioned. Now, just as it has been shown in the stereoscope that the relief obtained by the use of this lens was not exaggerated, but was, if anything, less than the regular stereoscopic relief, so in the single portrait we notice how small is the difference of view point in the two images. In this experiment the camera was 13 ft. (4 m.) from the subject. If we take up a position at the same distance from any sitter, and close first one eye and then the other, we shall not perceive less of the right side of the model with our left eye and of the left side with our right eye than is recorded by our 5-in. (diameter) lens when employing the right-hand and left-hand portions of its front glass. Therefore I repeat that lenses of 4 inches, and particularly 5 inches, diameter are solely capable of seeing binocularly without deformation, and that it is not until lenses of 6 inches diameter are used that there is occasion to fear the defective drawing which is commonly attributed to lens of diameter greater than 10 cm. In illustration of this I show some examples made with a lens of 5 inches diameter, in which the sharp definition has been reduced by one of the means described above. (M. Cromer also showed two examples made in the same manner by M. Benjamin, the well-known Parisian photographer.)

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To conclude, when it is wished to obtain the most realistic and striking portraits, we must have recourse to lenses of sufficiently large diameter, as was done by Adam Salomon, Nadar, Carjat, Bertall, whose most beautiful work challenges comparison with much of recent date. Such lenses should be free from chromatic aberration, and employed in conjunction with one or other of the screens described. In this way the extreme sharpness of definition will be broken up and the quality of binocular vision will be utilised.

G. CROMER

STEREOSCOPIC LENS SEPARATION FOR NEAR OBJECTS.

THE important article on the above subject which appeared in the "B. J." of June 24th is very welcome, and its author, Mr. E. J. Bedford, deserves the thanks of all who are interested in the improvement of stereoscopic practice. He has carried out a systematic and graduated series of experiments, and has given some informative samples of the results, together with the technical details which enable us to examine them, and, if necessary, to criticise them intelligently. In commenting on an article of this kind, which embodies the fruits of much painstaking labour and puts them at our disposal, criticism must be postponed until expression has been given to that appreciation which in this case it is both easy and pleasant to accord. It may be said at once that the three examples of stereo prints shown seem fully to bear out Mr. Bedford's remarks concerning them. The subject he has chosen to illustrate in all three cases consists of a simple grouping of a 1.5 in. cube, a small sharply pointed volute shell, and a large match. The print numbered 1, taken with $\frac{5}{8}$ in. lens separation, gives an agreeable and sufficient perspective relief, and the size and distance of the image do not strike the observer as incorrect. No. 3, on the other hand, which is given as an example of how not to do it, taken with $2\frac{3}{4}$ in. lens separation, cannot be viewed without a sense of discomfort and unreality, and is accurately noted as presenting exaggerated perspective. No. 2 is intermediate, and for present purposes may be neglected. Mr. Bedford's introductory observations on the subject of stereoscopic relief in general are of a most admirable common-sense kind. The aim of stereoscopy should be to attain the natural effect and to eliminate everything that is artificial and untrue.

The first remark that has to be made in the nature of criticism concerns a very amiably expressed *obiter dictum* of Mr. Bedford to the effect that practice, as exemplified by his results, sometimes differs from theory. Photographic optics consists of a very simple form of "straight through" geometry, its only difficulty being that it must be treated as a geometry of three dimensions, not, as is sometimes done, of two, or even of one. It is accepted and acted on as accurate not only in text books, but in the laboratory, where work of the utmost precision has to be executed. Theory solved the abstruse problem of correct mapping from obliquely taken aeroplane negatives, when no account of rule-of-thumb experiment would have succeeded. If theory predicts results which differ from those obtained in practice, then either the theory or the practice must be in fault. This second contingent must be borne in mind. It may be that in practice some of the rules laid down in theory have been neglected.

The present writer is an old stereoscopic practitioner of some twenty five years' standing. Of late he has for various reasons turned theorist, and does his photography by the aid of *fs.* and *xs.* and right lines and angles. As such he has had the privilege from time to time of contributing some practical suggestions to the readers of the "B. J." for the solution of various photographic difficulties and the removal of certain misconceptions. He can safely say that he learnt more about the principles and practice of stereoscopic photography in half an hour, with the aid of a pipe, a pencil and a piece of paper, than in five years' enthusiastic camera making and picture taking. While practice, in the person of Mr. Bedford, was straining its eyes and staining its fingers in experimental work, theory, in the person of the present writer, was injuring its brain cortex in the pursuit of this extremely elusive will-of-the-wisp of the stereoscopic photography of small objects, discovering at every step new practical difficulties which had to be overcome if the investigations were to be of any use. The result took the form of two very dry and unattractive articles which appeared in these columns in April and May of last year (1920). Information on this subject had been asked for by practical workers; and when the validity of the rules given seems to be not only called in question, but even refuted, by the specimen stereo prints sent in by Mr. Bedford and the details accompanying them, it becomes necessary for the theorist either to stand to his guns and point out the principles which have been lost sight of by the photographer, or to acknowledge himself in error and retire as gracefully as he can.

In ordinary single lens photography there is only one problem to be considered—namely, how and from what point to view the prints in order to secure the natural perspective. In the strictly technical sense no mistake can be made in the taking or in the mounting of single photographs. But in stereo photography the problem is three-fold, and its three elements are inseperably interwoven. The taking, the mounting and the viewing of the photographs possess equal importance in determining the accuracy or otherwise of the resultant image. A technical mistake made at any of these three stages introduces an error which cannot be entirely rectified. In both branches of photography grave *artistic* errors made be made in the choice of subject and view point; and it by no means follows that because we see what is true to nature the result will be pleasant to the eyes or free from violent and disagreeable perspective. This self evident fact must not be lost sight of.

Mr. Bedford, very strangely, has devoted himself altogether to the problem of the taking of the stereoscopic negatives. To the proper mounting of the prints he pays no attention whatever, beyond stating that the print centres should not be more than $2\frac{1}{2}$ or $2\frac{3}{4}$ in. apart. The extraordinary result of this last rule will appear when we come to consider his print No. 3. As regards the viewing of the prints he contents himself with the statement, "This will suit any kind of stereoscope in general use."

In the taking of the photographs he appears to have adopted, if not a theory, at least a working hypothesis or principle of his own. Throughout his article he seems to assume that the photographs must be the same size as the required image: if the image is to be natural size the photographs must be so too; if twice natural size the photographs must be on a scale twice that of nature. This when it can be done, certainly makes it very easy for the eyes to receive the impression of size; but it would be most unfortunate if we had to accept it as a binding condition. What will happen if we try to photograph an object 4 in. wide, and present it natural size? Since the stereo prints cannot at most exceed three inches in width according to his own rule, this, on his hypothesis, will be impossible. And if we wish to photograph a cathedral, must we be content with a visual image on a scale of 1.400 or less? Does the rule hold good for large distant objects as well as for small and near ones? If not, at what point does it begin to change? Is there a gradual alteration in the necessary

equality of photograph to image as the latter recedes, or is there a *per saltem* change at some critical distance, like the sudden mutations which biologists are beginning to recognise in the processes of evolution? In fine, is stereoscopy, like every other branch of photography, an exact art, with clear-cut unalterable rules which extend over the whole field from the nearest point of distinct vision to infinity, or must it for ever be practised through the rough medium of rule-of-thumb approximations—any view to any stereoscope—in which we blunder on by experiment and error, and do our best to produce eventually a mental illusion good enough to pass muster as somewhat akin to reality? If the latter, then we can understand why so many technical and artistic workers of the highest class look on the keen stereo-photographer much as we regard a child who is lost in admiration of a rag doll.

But the more emphatically the theorist thus laments the defective practice of his day, the ruder must be the jolt he receives when he examines Mr. Bedford's results, which seem to show that theory, like the law, "is a hass." Theory decrees that if the stereo prints are the same size as the required image the two prints must be super-imposed, in order that the eyes may converge as in nature; and common-sense informs us that this must be so. Yet Mr. Bedford, in his No. 1, mounts his prints side by side, with wide separation between corresponding points, and secures an admirable effect. Theory decrees that if a natural size image is to be produced the taking lenses must be eye distance apart. Yet No. 1 is taken with only ⅛ in. in separation, while No. 3, which approximates to theory (2¼ in. instead of 2½ in.), is by comparison a complete failure.

However, a careful examination enables theory to advance a few considerations in its own defence. In fact, having languished for a time under what seemed a knock-out blow, it now holds up its head again with all the robust self-confidence of a sturdy convalescent.

Mr. Bedford's thesis throughout his article is that it is desirable to reproduce a natural effect: "the whole process of stereo photography is to present objects as seen in nature." He wishes us to see the group of objects he has photographed exactly as he saw them himself, and at the same distance of 12 in. from the eyes. But No. 1 does not do this at all. If the left eye, viewing the original objects, were placed so as to see the view shown in the left-hand prints, the right eye could not possibly see the right-hand view: it would much more nearly see the view given by the right print in No. 3. As already pointed out, the fact that No. 3 is disagreeable and difficult to view does not by itself prove that it is untrue to nature. The group quite legitimately chosen for the photographs is of considerable depth, and, as arranged, has many projecting points and rapidly changing contours. When examining actual objects of this sort we can either turn them about in our hand or we can change our position. In the stereoscope no change of view point is possible; and if the perspective difference between right and left eye entails large occulations of important areas of the subject the imagination of the observer cannot be expected to fill the gaps, and a painful sense of confusion results. In No. 3, a key portion of the whole composition—the far end of the shell—is hidden in the right-hand print by the projecting end of the match, while only about two-thirds of the back edge of the cube is common to both eyes. That this sense of confusion depends upon the nature of the objects photographed can easily be proved by arranging a small group of articles criss-cross and viewing them from a near point without movement of the head. We are led to the conclusion that this particular subject chosen by Mr. Bedford for illustration is not one suited for stereoscopic reproduction at 12 in. distance. This in no way discounts its value, or the propriety of its use for test purposes, but it emphasises once again the necessity of avoiding what is bound to produce an unpleasing result. If the object chosen had been a butterfly, mounted in the usual way, and only some ¼ in. or so in depth, it is very questionable whether No. 1 would have emerged at all so triumphantly: it is much more likely that No. 3 would possess a pronounced superiority, at least in the clearness and distinctness of its stereoscopic relief.

No. 1 view shows us, in fact, a radical departure by Mr. Bedford from his thesis, for it presents his group of objects with a perspective considerably *less* that that of nature at 12 in., and the result is effective and pleasing. Let us apply theory to discover why this is so.

In No. 1 the lens separation used (⅛ in.) is only ¼ that of the eyes. The image, therefore, when properly viewed, would be projected to a distance of nearly 4 ft., and magnified four diameters. Corresponding points in the two prints—say, the upper ends of the match—should be mounted in this case 1.8 in. apart instead of the 2.8 in. shown in the prints; so that there is an error of 1 in. If the popular sphero-prism stereoscope is used to view the print this error is more than corrected by the resultant inward shift of both images, which thereby become smaller and coalesce at a point nearer than 4 ft. As the slide is probably brought much nearer to the eyes than the proper distance of 12 in., the image is again brought nearer, but not further reduced. The cumulative result which comes out of all this is that there is no very extreme departure from theory in essential respects, and the eyes, without effort or strain of any kind, can see a very satisfactory and convincing stereoscopic group. As regards the apparent size, the presence of the match is a very compelling feature. Even if the utmost accuracy were secured it is almost certain that the mind would refuse to accept the reality of an 8 in. match, and this fact coerces the judgment into fixing the size and distance of the whole group. If a non-prismatic stereoscope is used, it can only be said that the eyes perform their usual miracle of combining images under conditions very far removed from those of nature, and yet producing a natural effect.

The critical examination of No. 3 leads to very different results. It is taken with lens separation of 2¼ in., which is ¼ in. more than the correct average separation of 2½ in. of the eyes when looking at a point 12 in. distant. The first effect of this is to increase the already violent natural perspective of the group, so that the mind is called upon to fit together a three-dimensional jig-saw puzzle with some of the pieces missing. The second result is that the image, properly viewed, is brought to a distance of only about 9½ in. from the eyes, or nearer than the distance at which the slide should be held. Corresponding points of the two prints should in this case not only coincide, but they should overlap in the other direction: the top end of the match in the right print should be ¼ in. *to the left* of the same point in the left print. The error in mounting here is therefore 2.9+.5 in., or a total of 3.4 in.! This outrageous departure from accuracy is such that not even the most complacent of cross-eyed stereoscopes can make any attempt to conceal it. Instead of the eyes converging upon points only some 9 in. distant, they are almost, or if a plain lens stereoscope is used, they are absolutely diverging. The whole delicate measuring apparatus of the eyes is thus thrown out of gear, and ceases to function. To ask the mind to pass judgment on what it sees under these conditions is like setting a man to tune a piano after we have filled his ears with wax.

The real obstacles to stereoscopic progress are the terrible facility with which the mind receives an impression of perspective relief, and the consequent inability to pass judgment on what is presented to it. For definite information as to size and distance it clutches at straws, or matches; and if it can resolve the components into a pleasing whole, it is content. Unless the stereoscopic observer can be taught to exercise his judgment with the same confidence as that with which he looks about him every day, the stereoscope must remain a useless and possibly a harmful toy. The precision and certainty of exact method in taking, mounting, and viewing must be substituted for the tedium and futility of haphazard, partial experiment. And the true method, when once adopted, will be found infinitely easier and less laborious by those who put it into practice.

H. C. Browne.

THE NO-DAYLIGHT CARBRO PROCESS.

The technical side of the "Carbro" process has already been described in this Journal, and full formulæ and working directions are obtainable from the Autotype Company. But it may be of interest to put forward the results of some recent tests, and to discuss the utility of the process to the professional.

There is one point which must be driven home at the outset, and that is, that a Carbro print is actually a carbon print: not a "semi-carbon" or a "carbon-effect," but the real thing, which means that it allows of far greater range of colour, base, and general effect than any other process or combination of processes.

The one and only essential difference in the making of a Carbro and of a regular carbon is the method of impressing the latent image. In the newer process daylight is dispensed with, and exactly the same effect is produced by squeegeeing the carbon tissue into contact with a bromide print in the presence of certain chemical solutions. From the point at which the tissue is stripped from the bromide print the two processes are the same, with the exception that, when using Carbro, there is no reversal, right for left, when using the single transfer process, and that the more roundabout double transfer is therefore unnecessary.

This method of "printing," if one may use the expression, has an important advantage, over and above that of the elimination of daylight. As any carbon printer knows, the one stumbling-block in the old process was uneven printing. Unless, indeed, nothing else was done, it was most difficult to make a set of, say, a dozen carbon prints of exactly the same printing depth. There were at least three possible sources of error:—the Actinometer paper might vary, the tissue might be "stale," and there was always continued action after removal from the frame.

Now with Carbro these troubles do not exist. The strength and duration of immersion in the sensitising baths can be controlled, also the depth of the bromide print and the time of contact therewith, which are the factors affecting the printing. As a matter of routine, development will almost always take place at practically the same time after "stripping," so that continued action is unlikely to cause unevenness; as a matter of fact, my own experiments point to the fact that, if continued action is not entirely absent, it is, at any rate, greatly reduced.

Let us now examine the process from the point of view of the man who, seeing its advantages, wonders if it is a practicable workshop printing method.

Those to whom speed is the great requisite are not likely to desert bromides, but the man who feels that he wants something better, and yet must be able to rely on sending his prints out within a reasonable time, has every reason to give Carbro a fair trial. That it will more than fulfil his expectations I do not doubt.

The elimination of daylight printing means that the process becomes independent of weather conditions. In other words, you can absolutely rely on your output being regular. It does not mean that Carbro is a speed process—it cannot compare with bromide for this—but the average studio of the better class will not mind a comparatively slow output, providing it is a regular one. As a general rule, I suppose one bromide print will be used for each order of, say, half a dozen "Carbros," but in cases of emergency it would be easy enough to make half a dozen bromides and take all the Carbros through at one time. If a single bromide is to be used, it will be found that some two hours will be necessary between stripping one Carbro from it and squeegeeing the next.

I have not made more than six Carbros from any one bromide, and have not been troubled with blisters or any other mechanical defect in the original print. It does not seem very advisable to harden the print to any great extent, as this has, in some cases at least, a detrimental effect. But the drying of the bromide print, before use, will harden it quite sufficiently and at the same time have no ill effects. Should this be done, it can hardly be necessary to point out how very essential a thorough soaking of the print is before any attempt is made to squeegee it.

There does not seem to be any "best" paper, but "platino matt" certainly works with greater ease than any other surface. This is due, in part, to the ease with which it may be squeegeed, and possibly also to the fact that, having no "surface," it is more easily permeated by the solutions. It is most advisable that the same paper should be used in all Carbro work, because, as one would expect, different papers work at different speeds, and the fewer variable qualities the better, especially when a test is being carried out.

The type of print may vary within pretty wide limits, but for the ideal result the bromide should be a shade lighter than for normal use. Carbro reproduces to a remarkable degree the slight—almost invisible—tones in the high-lights, and anything like an over-printed bromide is liable to lead to "bunged up" lights in the Carbro. The scale of the negative used and of the bromide print may be met by variations in the working, which makes the process of unusual value in the case of uneven negatives.

For fancy vignetting, double printing, and faking in general, Carbro seems perfectly well adapted; it should be of great use in those often troublesome cases where, perhaps, five or six negatives have to be vignetted on to one sheet of paper. Also, if landscape work is done, the insertion of clouds is much more easily done with "Carbro" than with any other type of print whatever.

There is a use, one might suggest, for "Carbro" which may add considerably to its value—that is, in the reproduction of prints, instead of copying. Naturally, this would only be done with your clients' approval, as it involves bleaching and re-developing the print. But the results should be far and away better than any copy, and the risk of damage to the print really very slight.

One thing is certain in the future of "Carbro"—that it will become the normal means of obtaining high-class enlargements. The cost of enlarged negatives has driven many to bromide enlargement who fully realised their faults. Now it is simply a matter of making an ordinary bromide enlargement and taking any number of Carbros from that. The quality of the process is shown even better in large work, and the difference between the best of bromides and a Carbro is greater than most people think. Also, your finishing staff will bless you when you take to Carbro; there is no easier paper than this to work on. To sum up. My tests have led me to the conclusion that the professional who wants the very best results, and yet cannot undertake daylight printing, will find in Carbro the solution of his difficulties.

ARTHUR G. WILLIS.

PHOTOGRAPHS OF LLOYD'S.—Messrs. J. H. Dallmeyer, Ltd., of Carlton House, 11d, Regent Street, Piccadilly Circus, S.W.1, advise us that the film recently taken at Lloyd's by "Around the Town Film Co., Ltd.," showing the underwriters' room, was taken with one of their new *f*/2.9 1½-in. Pentac anastigmat lenses, the enormous speed of this lens enabling a well-exposed film to be obtained without the use of artificial light.

A X-RAY HOWLER.—Among the latest schoolboy howlers, published in an educational monthly, is the following: "X-ray photographs are those taken when the sun's rays cross each other."

DEATH OF PROFESSOR GABRIEL LIPPMANN.

The death was announced last week of the famous French physicist, Professor Lippmann, during his return from America, on board the steamer, "France," at the age of 76

In photography M. Lippmann was known chiefly in connection with the process of colour photography, which bears his name, although this latter is a small part of his many contributions to experimental physics, in particular, electricity. He was born in Luxemburg in 1845, of French parents, and after a distinguished career in classics, philosophy, mathematics, and physics at the Ecole Normale, became a student in Heidelberg University, under Kühne and Kirchhoff. Germany at that time offered opportunities of study to an investigating mind which were not available in France, where education in science still followed the strict channels laid down by Napoleon. Returning to France, Lippmann, who had now chosen electricity as his subject, continued his researches at the Sorbonne, under Jamin, and a few years later was appointed director of research in physics at the Sorbonne. The rest of his life was spent in scientific research, of which he was one of the pioneers in France, and witnessed the carrying out of numerous investigations in heat, electricity, and other branches of physics.

His process of colour photography was, so to speak, the offspring of his theory and practical experiment. In 1886, whilst teaching optics at the Sorbonne, he conceived the idea of demonstrating the formation of "stationary" or "standing" waves of light, that is, waves which have "interfered" by reflection back on to the original path, by making records of colours. Some years passed before he succeeded in preparing the grainless transparent emulsion required for this process, but in 1891 M. Lippmann made known his discovery, which aroused an extraordinary degree of interest. Scientific men admired it as a most exquisite physical demonstration; photographers, somewhat precipitately, saw in it the basis of an ideally simple process of colour photography. Time has shown that the view of the former was the more correct, for, despite the labours of many photographic investigators, the making of a Lippmann colour photograph remains more an optical experiment than a working process of colour photography. The special emulsion required for it was improved by M. M. Lumière and others, including Mr. Edgar Senior in this country, and, so far as the photographic technique is concerned Mr. Senior's methods, published in the manual of colour photography by Bolas, Tallent, and Senior, have done all that is possible to bring the process within the capacity of photographers. The characteristic qualities of the results have, however, prevented it from becoming popular.

FORTHCOMING EXHIBITIONS.

August 27 to September 10.—Toronto Camera Club. Latest date for entries July 30. Particulars from the Hon. Secretary. J. R. Lawson, 2, Gould Street, Toronto, Canada.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 35, Russell Square, London, W.C.1,

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary. W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

LUXURY EVIDENCE.—The smoking of Turkish cigarettes, the creasing of trouser legs, and the carrying of a camera were items given as evidence of means in a London County Court last week.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

A Dark Slide Hint.

OLD dark slides which are inclined to come open at inopportune moments may be cured by drilling a small hole through the top of each side-clip and inserting a cheese-headed screw in the woodwork underneath the hole. This forms a very efficient catch.—A. W. W.

Fine Focussing Screens.

METHODS of fitting up temporary or make-shift focussing screens are as plentiful as labour troubles, and all kinds of dodges are to be found in most reference books. I have, however, never seen the following plan advocated. It was given to me by an American tripper, who discovered me trying to focus on a damped handkerchief stretched on the frame from which the ground glass had disappeared. Take about 120 grs. (¼ oz.) of common glue or gelatine, soak it for an hour or two in 1 oz. of water, then dissolve by heat, and add to it ½ oz. of boiled milk. This when coated upon plain glass gives a screen of extraordinary fineness, which is an ideal medium on which to focus, particularly dark interiors. The opacity of the screen—or rather its translucency—may be regulated by adding more or less milk; the quantity given, however, produces what I believe to be the best screen. I have tried mixing milk with the gelatine mountant used in some workrooms, but the milk does not seem to mix so well with the mountant as with a plain solution of glue, or gelatine, perhaps because of the inclusion of methylated spirit in the mountant.—L. T. W.

Removing Ink Stains from Negatives and Prints.

IT is not often that a negative or print is damaged by ink, but accidents will happen, and when they do it is very useful to know a good remedy for the mischief. Photographs are liable to this kind of accident when handled at the desk where ink is in constant use, while violet ink, as used for typing and copying, may get about on fingers and papers in a most annoying way. Post cards are very often deliberately inked with autographs, and in copying it is often desirable to remove the writing. A quick solvent is sulphuric acid. It should not be used stronger than one part in four of water, and if diluted from a concentrated fluid great care should be taken to pour the acid into the water and not *vice-versa*. At the strength of one in five, the acid is safe to fingers and photographs and will remove ink without injury to gelatine or silver. There is no need to prepare a dishful, a spot or two applied with a small brush should be sufficient. A short wash afterwards is necessary.—THERMIT.

Toning Ordinary P.O.P.

SELF-TONING papers have their advantages, it is true, and makers of such issue instructions by which a greater range of tones is obtainable, but in my opinion the charm of the process of self-toning goes if the supplementary baths called for are used. In spite of the great popularity of self-toning there are many assistants who, like myself, have a liking for ordinary P.O.P., but who meet with difficulties when toning it, and these unfortunate workers cannot do better than try a simplified method of toning once advocated by Mr. G. Watmough Webster. I have used this system with the greatest success during the past eight years, and can recommend it. The process consists merely in adding ordinary kitchen salt—not the refined table variety—to the ordinary gold and sulphocyanide toning solution in the proportion of about 60 grains of salt to the pint of toning solution. When the salt is thoroughly dissolved the P.O.P. prints are placed without any washing at all into the solution. No milkiness will be seen, and toning proceeds in the ordinary way. When the proper tone is reached the prints, again without any washing, are placed direct into the hypo bath. When finished the prints are—if all goes well—in every way equal to those dealt with in the accustomed way, and if any difference is noticeable at all it is in favour of the non-washing method. The exact amount of table salt added is not a material matter; whether 40 grains or 80 grains are added the result is practically the same, and any initial difference in colour caused by the salt is quickly lost when

the toning proceeds. As to permanency, there is, I believe, nothing to support the probability of ultimate fading, and I have before me prints several years old, which are now as fresh and pure as on the day they were made. A word of caution is necessary as to fixing, as the usual strength of hypo is far too strong. A 10 per cent. strength is the best to use,andthe time of immersion, so long as the prints are kept in constant motion and not allowed to remain in contact for any but the briefest time, should not exceed ten minutes. The simplicity of this little-known process, combined with the enormous saving of time, should do much to increase the use of P.O.P. That few, if any, bromide developed printa can equal the results obtained on printing-out papers will be readily admitted, and although the self-toning papers on the market have proved themselves to be eminently successful, yet the range of tones possible in these does not approach that obtainable by a gold-toned P.O.P. And, what is most important, there is a very large section of the public that asks for, and likes best, the ordinary P.O.P., with its "real photographic" colour.—G. WILSON.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, July 4 to 9.

CINEMATOGRAPHY.—No. 18,523. Producing animated cartoon films. D. Barker.

RECOVERING RESIDUES.—No. 18,090. Treatment of waste cinematographic films, etc., for recovery of silver and gelatine. D. B. Macdonald.

DRYING PRINTS.—No. 18,387. Oven for drying photo prints, etc B. H. Rowe and Rowe and Elliott.

DEVELOPING AND FIXING.—No. 18,186. Apparatus for developing and fixing cartridge photographic films. R. Rycott.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

AERIAL PHOTOGRAPHY.—No. 159,310 (November 24, 1919).—The object of the invention is to produce negatives which overcome the difficulty and avoid the loss of time which has occurred in

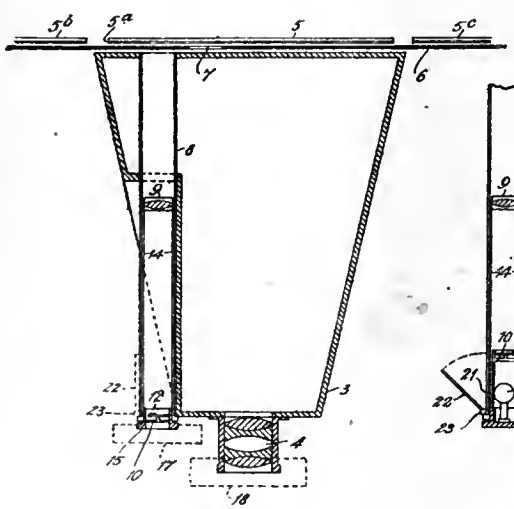

Fig. 1.

Fig. 2.

the effort to locate an indication of points of the compass on topographic photographs produced by aerial photography.

In the drawings 1 is part of a negative or print containing an indication 2, produced by my attachment, which is fitted to a camera 3, having any suitable lens 4. Any suitable photographic plate as 5 or the like is used having a sensitive film 5a. It is shown in a position to receive the ordinary exposure, its earlier and later positions being in some forms of magazine camera as shown at 5b and 5c respectively.

A casing 8, shown as tubular, is attached to the camera at any convenient part and is made of convenient size and form. This casing contains a suitable lens or lenses 9 and an indicator 10, details of which appear in figs. 4, 5 or 6.

The casing and its attachments form portions of a second camera, but with its parts located to allow of its use in co-operation with the main camera. In figs. 4 to 6, part 10 is a disc or fitting, its face 11 being adapted to act as a background or wall, and it may be arranged as a compass dial. On this face 12 represents the compass needle which is pivotally mounted to swing on the disc 10 as usual; 12 is a luminous faced compass needle: 13 is a slot pointing in a predetermined direction as north and south, and located to one side of the compass needle; and 13 shows slots pointing in a predetermined direction as north and south. The latter slots extend along the compass needle, and will allow light to pass through the background. The light is to pass through the slot or slots for indicating what is required on the photographic plate.

The light has somewhat the same reault as is secured when stencilling except that it acts by focussing the indicator through the lens 9, but for brevity the slotted members may be termed camera stencil plates. The lens 9 is shown in a tube 14 and is independent of the camera view lens 4.

The compass device and lens thereof are monnted in such positions that the indicator image to be produced becomes projected

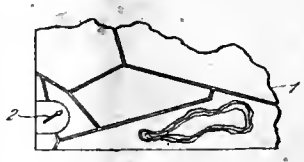

Fig. 3.

upon the sensitive plate when required, that is, when, or very nearly when, the exposure is made for the view to be photographed.

Tube 14 is removable from tube 8 and a removable fitting marked 15 can be used with its outer end open to daylight, carrying the compass indicator and is arranged as an attachment to tube 14.

Instead of shutter or blind 6 a shutter 17 may be nsed, which is independent of the view lena, which may also have a shutter 18, these shutters, being shown in dotted lines in fig. 1, but instead of the separate shutters there may be one outside shutter arranged to make by its action exposures for photographing through both lenses.

In fig. 1 daylight is supposed to be used, hence the background allows no light into the camero except where it passes through the slot as in fig. 4 or 6. In a modification of fig. 1, however, if the background be that of fig. 5, the light is kept out completely, but the needle 12a or indicator ia luminoua.

When artificial light is used, such as from a lamp 19 (fig. 2)

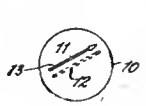

Fig. 4.

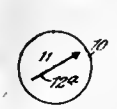

Fig. 5.

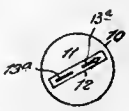

Fig. 6.

the latter is suitably attached as to a fitting 20 of the tube 14, this outer part of the fitting closing this tube light-tight. The fitting 20 is removable and replaceable at will. The use of a flash light or lamp renders a shutter as 17 (though atill usable) unnecessary.

A ruby window 21 may be provided in the lamp carrying attachment for indication of the lamp action to an observer, and a reflector 22 may be provided to reflect the flash light to the operator. This reflector may be hinged at 23 to close against the window at will, and may be fastened in closed position or held closed by spring means. Indicators prepared in advance may be at hand and be inserted or removed at will according to the photographer's requirements.—Thomas Edward Moorhouss, 79, Kooyong Koot Road, Hawthorn, Victoria, Australia.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

N. G. (DEVICE).—No. 412,035. Philosophical instruments, scientific instruments, and apparatus for useful purposes; instruments and apparatus for teaching. Nitsche and Günther Optische Werke, 4-5, Dunckerstrasse, Rathenow, Germany, manufacturers of scientific and optical instruments. January 29, 1921.

New Books.

DICTIONARY OF BRITISH SCIENTIFIC INSTRUMENTS.—This is a publication of the British Optical Instrument Manufacturers' Association, and serves the commercially useful purpose of giving a brief popular description of all kinds of scientific instruments, not only optical, but electrical, and also those for measurements of all descriptions. In addition, one or more index numbers are appended to entries in the dictionary relating to commercial apparatus and inform the consultant as to the British firm or firms from whom the apparatus can be obtained. A large number of pages is occupied by drawings of instruments, a feature which will be of great usefulness to the foreign buyer as a means of elucidating the text, which, of course, is in English. The volume is published by the Association at 2-3 Duke Street, St. James's, S.W.1, price 21*s*.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, JULY 24.

South London Photographic Society. Excursion to Langley Farm, Beckenham.

TUESDAY, JULY 26.

Hackney Photographic Society. "Portraiture." G. White.

THURSDAY, JULY 28.

Hammersmith (Hampshire House) P.S. "The Print." F. Bowen Williams.

SATURDAY, JULY 30.

Hammersmith (Hampshire House) P.S. Week-end. July 30, 31-August 1. Lewes.

Manchester Amateur Photographic Society. Ramble from Bramhall to Prestbury (via Swineseye).

CROYDON CAMERA CLUB.

Last week Mr. N. Ching gave the first of two demonstrations on "Dental Dentures." Without knowing the exact programme, many had heard that dentistry was to be dealt with, and gleefully anticipated a Croydon Grand Guignol and tense molar movements, with some heroic member taking the place of the versatile Miss Sybil Thorndike, the extraction of teeth being substituted for, say, the prising out of eyes, to take an optical incident from one of the charming nightmares at the Little Theatre.

Sad to relate, the demonstration provided nothing sufficiently startling to remove the languor induced by the hot-stuff weather, though it proved to be a very able exposition on the assembling and fitting of false teeth. Much specialised knowledge was imparted, and the usual vote of thanks was carried with much acclamation.

The previous week Dr. Mees was entrapped into another lecture, one of a series of papers delivered in the U.S.A. A title first selected, "The Importance of Scientific Research," he said, made but little general appeal, but when the "Road to Wealth" was substituted, it drew like smoke.

The main theme is well indicated by both titles in conjunction, and an unanswerable case was made out for the furtherance of research laboratories. In his opinion, any nation economising in industrial and scientific research is bound to fall behind other countries, for wealth invariably follows knowledge. In the States, laboratories on the most extensive scale, and operating at enormous expense, have been found to pay, and to pay well, the vast corporations running them.

Particularly interesting, too, were many illustrations showing how purely scientific investigations, with apparently not the remotest connection with anything practical, have directly paved the way to commercial developments of the utmost value. Nor should be forgotten the wonderful advances of medical science, which from knowledge acquired now conquers many a lethal disease. Suppose, said Dr. Mees, this country was invaded by a plague of pneumonia, all would be scared, for knowledge how to combat it would be wanting. On the other hand, if bubonic plague were to enter, few would be apprehensive, for it is known it is communicated to man by fleas from infected rats. Therefore, destroy the rats and dodge the fleas, and the peril vanishes. The correct procedure for dodging the fleas was not described, but obviously must postulate a fair degree of agility.

Many other considerations of great interest entered into the paper, which was accorded a hearty vote of thanks.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held at 35, Russell Square, on Friday, July 8, 1921. There were present Messrs. Marcus Adams, A. B. Basil, A. Bennett, Frank Brown, Gordon Chase, Tom Chidley, Alexander Corbett, C. F. Dickinson, Alfred Ellis, George Hana, W. Illingworth, T. C. Turner, and F. G. Wakefield, with Mr. Lang Sims (secretary).

Mr. Alfred Ellis took the chair.

Apologies for absence were read from Mr. Swan Watson (president), and from Messrs. Chapman, Haines, Lambert, Read, Spink, and Wheeler.

The Secretary said that a letter had been sent on to him by the secretary of the Royal Photographic Society, stating that the photographers of Vancouver desired to obtain for their Congress a few examples of work from leading photographers of London. He (the secretary) had seen the Commissioner of the Commercial Intelligence Branch in London, who had interested himself greatly in the matter. Mr. Marcus Adams, secretary of the Exhibition Committee, to whom the matter had been referred, reported that he had sent to Vancouver over thirty exhibits representing British work.

The Professional Photographers' Association in South Africa (Cape Section) had written asking whether the Council in London would accept exhibits from South Africa for their next exhibition. The letter which the secretary had written in reply, conveying cordial sentiments, and stating that the Council would display such photographs so far as their restricted space would allow, was endorsed by the Council, and the correspondence was handed over to Mr. Marcus Adams to be dealt with further.

Mr. Marcus Adams reported that Mr. Reginald Haines, a member of the Council, was visiting the United States, where he would attend the American Congress of Professional Photographers. The Council could not be consulted before he went, and he wished to know whether he could be authorised to convey to the Congress the good wishes of the Council of the Association in England, and to present a British flag in the name of British photographers.

It was agreed that the secretary should draft a letter which, with the approval of the chairman of the Council, would be sent on to Mr. Haines in New York, authorising him to convey the hearty good wishes of his colleagues to the photographers in the States, and that the flag which Mr. Haines had already taken with him should be presented in the name of the Association.

Mr. Frank Brown read a letter which he had received from Mr. Pirie Macdonald, and on the motion of Mr. T. C. Turner, who said that anything which assisted Anglo-American friendship was most welcome, it was agreed that the essential portion of the letter should be recorded in the minutes, viz.:—

"I am not going to Edinburgh, though I was chairman of the Onto Edinburgh Committee, and was booked to sail, and had my passage bought, but business here does not easily permit our getting away before the first of July, and something has occurred which makes it impossible for me to afford the time at that season this particular year. Of course, I am hugely disappointed, but what is, is. I have wanted for many years to attend one of your British conventions, but the same difficulty obtains. If they were only held in July I am sure that you would always have one or two of us over, and I cannot help feeling that it would be worth

while considering the change of date, because we *must* get the British and Americans closer together. If they only were to know one another better we could between us maintain the peace of the world. You would find Americans very likeable if you were to see enough of them. Of course, they are different, but they are very real. I am glad to find that you were interested in my talk on the code, and I am glad to be able to assure you that there are many, very many, Americans who live pretty close to the rule. It is not an inoperative and theoretical thing.

"I am glad to have got your letter, and I hope that we may meet some day.—Most cordially yours,

"PIRIE MACDONALD."

The Secretary reported that the Finance Committee met on June 17 and recommended payments to the amount of £67 10s. The recommendation was approved.

The following names of new members were read and approved :—Lena Gertrude Horsfield, Maltby; Rose Anna Carter, Romford; George William Pilkington, Annisland, Glasgow.

The Chairman reported that since the last meeting he had received a letter from the solicitor, Mr. Reginald Vaughan, and in consequence spent an afternoon with him, getting into final shape the Articles as amended at the last meeting. The Memorandum was now with the Board of Trade, and, so far, no reply had been received There the matter must remain until the next Council meeting.

Mr. Frank Brown proposed that the Council adjourn as usual for the summer recess and meet again on the second Friday in October, and this was agreed to.

Mr. Ellis having to leave the meeting at this point, Mr. Frank Brown (past-president) took the chair.

Mr. Marcus Adams reported that he had sent a collection of pictures, twenty-five in all, from those which had been selected by the jury for the Congress Exhibition, to Ohio, following upon a request from that quarter, and also, in addition to the Vancouver consignment, he had in hand a collection of pictures for the Copenhagen Congress, and these, as soon as they were returned, he would forward to South Africa. Next year he hoped that there might be a foreign section at the Exhibition. For these outside exhibition purposes, he would be glad to have, in addition to the pictures available from the annual Exhibition, others which any member of the Council or of the Association could furnish. The selecting committee was still in existence, and he would always bring any question of selection before it.

The Deputy-Chairman thought that the works chosen for dispatch abroad should be limited in the first instance to those which had been exhibited at the Association's Exhibition, but it was agreed to leave this and cognate matters to the Selection Committee.

Mr. Basil suggested the appointment of a permanent Selection Committee instead of the temporary one for the Congress-exhibition purpose.

Mr. Hana proposed that a committee be appointed to form a collection of representative work of the P.P.A., which collection was to be drawn upon for all exhibitions at which P.P.A. work might find space, and that the committee should be given a free hand to send what they liked, as many as they liked, and as often as they liked. Mr. Corbett seconded, and this was agreed. The committee was appointed as follows :—Messrs. Adams, Basil, Corbett, and Speaight.

Mr. Illingworth proposed that the committee should not send out anything without the sanction of the Council, but on some of the difficulties of the situation being pointed out—i.e., requests at short notice—he withdrew the proposition.

A further motion was agreed to, on the proposition of Mr. Gordon Chase, approving of the prompt action which Mr. Adams had taken, and thanking him for it.

The question was raised of a Professional Section in connection with the Salon and the Royal Photographic Society's Exhibition. This matter was not pressed, but it was agreed that individual members should be urged as far as possible to contribute to representative photographic exhibitions.

The question of the choice of a Press Agency which could be recommended to members of the Association who desired to know of a zealous and dependable firm to whom they could entrust their work was again mentioned by Mr. Tom Chidley.

Mr. Corbett proposed that a number of names be set out by the Association to be recommended as respectable and straightforward firms from which members could select. This was agreed to.

The Secretary read an extract from "John Bull" respecting what was alleged to be an enlargement fraud, and detailed the inquiries which he was making in endeavouring to follow up the complaint.

Correspondence was also read concerning a dispute with regard to reproduction fees, and it was agreed that the correspondent should be advised to stand by what he had originally written. Another member asked for advice on a small dispute as to the terms of an advertising contract which it was claimed he had not fulfilled, and it was resolved to seek the advice of the solicitor. Another member wrote for advice on the old question of payment for proofs, and it was left to the secretary's discretion to frame an answer, Mr. T. C. Turner urging that many of these troubles could be avoided if every photographer was explicit in making his contracts.

PROPAGANDA.

It was suggested that members of the Association should be provided with a card or certificate similar to that of members of the P.P.A. in America, with the date stamped across it to prevent improper use. Mr. Hana moved that a committee be formed to consider this question and other questions concerned with propaganda and publicity. Mr. Gordon Chase seconded, but ultimately it was agreed, on an amendment by Mr. Alexander Corbett, seconded by Mr. W. Illingworth, that this matter should be put on the agenda for the next Council meeting. Mr. T. C. Turner said that he would not like it to be thought that the Association was behind the times in any particular. At no time in its history had it enjoyed more largely the confidence, at all events, of photographers.

After a sitting of three and a half hours the Council stood adjourned.

News and Notes.

PHOTOGRAPHS AS LEGAL EVIDENCE.—During the hearing of a claim for possession of a house at Wandsworth County Court last Friday, for which an alternative house was offered, Judge Harington said that in these cases judges would be very much assisted if the parties concerned were to produce a photograph of the house for which possession was sought, and also one of the house offered as alternative accommodation. He stated that he could not go and look at every house, and the photographs would be of material assistance, but such pictures were seldom seen in court.

THE CENSORSHIP OF FILMS.—A County Council has no power to limit the licence for cinematograph films to those which had the certificate of the British Board of Film Censors. This was the unanimous decision last week of a King's Bench Divisional Court, composed of the Lord Chief Justice and Justices Avory and Sankey. During the hearing of a case, the Lord Chief Justice asked: Who are the British Board of Film Censors? Are they a statutory body? He was then told that they were a body established by the trade themselves to prevent undesirable films being exhibited. It was also stated that the Act provided for examination by a committee of justices, inspectors, and police The British Board of Film Censors was a body quite unknown in law, and there was no remedy against them.

DACTYLOGRAPHS BY WIRE.—We understand that a journal dealing with dactylography has been started. Dactylography (from the Greek *daktulos*, a finger) is the science of identification by finger-prints, and in the first number of the new journal Mr. Henry Faulds claims to have made the first suggestion that photographs of finger-prints should be telegraphed, he voicing the matter as far back as 1905, and again in 1912. "Nine years after these words were published," writes Mr. Faulds, "this feat has been successfully accomplished. M. Belin, the inventor of the photo-electric apparatus, now called after him the Belinograph, has adapted it for the identification of distant suspects by the transmission of finger-prints." Two impressions were sent from Paris, and Professor Ottolenghie, head of the detective college at Rome, who was present at the demonstration, expressed himself as quite satisfied, and intends to apply it practically in criminal cases. Mr. Faulds, it may be mentioned, is a leading authority on the science of finger-prints, and an article by him on the subject appeared in "Nature" as early as October, 1880.

Commercial & Legal Intelligence.

LEGAL NOTICE.—Notice is given of the dissolution, by mutual consent, of the partnership between Ernest Grattan Phillipse and Ernest Harold Lees, carrying on business as photographers and fine art publishers at 46, High Street, and 12, The Promenade, Ilfracombe, Devon, under the style of Phillipse and Lees. All debts due to or owing by the late firm will be received and paid by Ernest Grattan Phillipse, who will continue to carry on the business.

Correspondence.

**** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

**** We do not undertake responsibility for the opinions expressed by our correspondents*

A MEMORIAL TO FOX TALBOT.

To the Editors.

Gentlemen,—It is now 44 years since the death of Henry Fox Talbot, upon whose researches the present-day practice of photography and of photo-engraving has been built up.

At the recently-held Photographic Convention at Bristol, an opportunity was taken by his grand daughter, Miss M. Talbot, to present his collection of experimental apparatus and results to the Museum of the Royal Photographic Society. So far no steps have been taken by British photographers to perpetuate the memory of their distinguished fellow-countryman. To remedy this omission, the Council of the Royal Photographic Society has opened a fund by means of which some permanent memorial may be set up at Lacock, where his home was, and where his experiments and discoveries were made.

As President of the Royal Photographic Society, I appeal to all interested in photography in any way to take a share in remedying this omission by contributing to the fund. A half-crown subscription list is being opened by the Editor of "The Amateur Photographer and Photography," at 20, Tudor Street, London, E.C.4, to which all amateurs are invited to contribute. In addition donations, large or small, to the memorial will also be gratefully accepted and acknowledged by:—

(1) Mr. W. L. F. Wastell, Vice-President, Royal Photographic Society, 35, Russell Square, W.C.1.

(2) Mr. G. C. Weston, Chairman of the Affiliation of Photographic Societies, 22, Springwell Avenue, Harlesden Lane, N.W.

(3) Mr. Geo. E. Brown, Editor of "The British Journal of Photography," 24, Wellington Street, Strand, W.C.2.

(4) Mr. Arthur C. Brookes, Editor of "The Photographic Dealer," Sicilian Avenue, Southampton Row, London, W.C.2.

(5) Mr. Lang Sims, Secretary of the Professional Photographers' Association, 437, Brixton Road, London, S.W.2.—Yours faithfully,

GEO. H. RODMAN,
President of the Royal Photographic Society.

35, Russell Square, London, W.C.1. July 21, 1921.

DAMAGED LENSES.

To the Editors.

Gentlemen,—An editorial note on "Damaged Lenses," appearing in the issue of July 15, affords an opportunity for referring back to a similar note on "Rusted Lenses," published some months ago. In the previous note you warned readers against submitting atmospherically "rusted" or tarnished lenses to the process of re-polishing. In effect, you stated that it was better, or wiser, to leave the defect, though thereby the lens might be rendered less effective.

Acting on this warning, I refrained until quite recently from any attempt to submit a valued foreign anastigmat to treatment. Then, conscious of a certain rashness, I consulted a leading optical firm in London. Their definite opinion was that the "rust" could be completely and safely removed; also the scratches to which, I understand, the affected surface is particularly susceptible. I permitted them to "operate," and the result is completely successful, the lens being in all respects restored to its original brilliant working condition. I make this communication in the interests of others who may possess "rusted" lenses; also in the hope that a question of vital importance may be further discussed in your columns.—Yours faithfully.

LYULPH LUMLEY.

Hendon, N.W.2, July 12.

THE INVENTION OF SELF-TONING PAPER.

To the Editors.

Gentlemen,—Although not particularly interested in the question of who was the originator of self-toning paper, I read the communications of Mr. Wall and Mr. Debenham in your issues of April 8 and 15 last with some interest, being a user of large quantities of British made (I might say "home-made") self-toning papers.

Those interested in the history of papers should not, however, overlook a self-toning paper that was introduced a few weeks before I left my English home for the United States in April, 1886. This was Rivot's self toning albumen paper which toned without the use of gold. The prints were simply fixed in a hypo bath, washed and dried by heat, the tone depending upon the amount of heat applied. This method would, of course, be out of the question with many of the modern papers which are of gelatine, but I cannot help thinking that the modern dodge of ironing dried self-toning prints with a hot iron, when a richer tone is wanted, is a relic of the old Rivot days when heat really did play its part in toning.

The Rivot self-toning paper—made by A. Rivot and Co., of Willesden Green, London—probably never caught on, as I heard nothing of it after leaving England. Anyway, the fact of its appearance should interest many of your readers.

New York. J. K. BRYCE.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

A. P.—According to the manufacturers, D.50, made up according to the standard formula, has a factor of 5 for negatives of average contrast, one of 3 or 4 for soft negatives, and one of 6 or 7 for negatives of greater contrast.

E. B. C.—We are sorry we know of no reliable means of removing mould stains from a miniature in water colours. We think the best thing would be to send the miniature to the firm by whom it was painted for their opinion as to its restoration.

J. N.—If you use anhydrous sulphite instead of crystal sulphite you can use half the quantity of the former, that is to say, 5 grains of anhydrous equal 10 grains of crystals. In the case of carbonate of soda, 3¼ grains of anhydrous equal 10 grains of crystal.

A. M.—A half-plate reflex is certainly a very efficient camera for street scenes, views, etc., and enables work to be got through very quickly, but it is very bulky and heavy, and also, in many circumstances, it has a drawback owing to its conspicuous appearance. We still think that the tripod half-plate camera is the best for all-round purposes.

F. L.—We do not know of a collodion process that gives an amber image. We believe the collodio-albumen process was very slow to develop, and gave a light brown image. It is quite easy to print direct from a wet plate, as follows:—Slips of waterproof paper are folded in a V shape and clipped each end of negative, which should be varnished. The wet plate is well drained and laid on top, the paper preventing actual contact.

A. J.—The most reliable bleacher for clearing off the image around the subject is the iodine cyanide mixture, made up according to the formula in the "Almanac," or perhaps with addition of further water. Usually this reducer is applied simply with cotton wool. Of course you would block out as much of the negative as possible by means of a black paper mask, cut roughly a little larger to the outline of the subject which you require in the enlargement.

C. H S.—Offered, in the shape of prints first of all, in sets of six to the postcard publishers, you might dispose of a few negatives, though they are smaller than most postcard publishers like. As regards other outlet, the only thing we suggest is that you keep an eye on the general illustrated press and particularly on papers dealing with India, the names of which you can see in "Willing's Press Guide," issued by Messrs. Willing, 125, Strand, London, W.C.2, price 2s.

M. B.—The anastigmat differs from an R.R. or rapid symmetrical lens in giving sharper definition in the margins of the negative at a large aperture. This applies both to lenses of maximum aperture, f/4.5 or f/5.6, and so on, and also to wide-angles, the maximum apertures of which range from f/9 to f/16. On the other hand, the advantages of the anastigmat are pronounced only when it is used at the maximum aperture or with comparatively little stopping down. With stops such as f/22 or f/32 there is not a very great advantage.

P. S.—The causes of reversal in film negatives are not altogether understood, but a very common one is exposure of an under exposed film to an unsafe dark-room light. In this case the negative image which is first produced by the developer acts as a negative upon the emulsion underneath, and, so to speak, prints a positive on the latter, which, in the final negative, overpowers the negative impression. We think this is the most common cause, although we do not think it is the only one. But, generally speaking, the causes of these reversal and partial reversal effects are very obscure.

T. H.—We should think any of the plate makers would supply you with plates as large as 38 x 24, coated with lantern emulsion, that is to say, in a reasonable quantity. By the ordinary method of flowing on the warm emulsion on to a levelled plate it is not a matter of very great difficulty to coat plates of this size with emulsion that you make yourself, but naturally such large plates are a different proposition from half-plates or whole plates as regards obtaining evenness of coating and also uniform drying. So far as we know there is no mechanical method of obviating the acquirement of skill in hand-coating, and the accumulation of some experience in drying the coated plates.

P. F.—We are not surprised that you cannot get the kind of results you appear to want from the negatives you send. Most of them have the appearance of being both over-exposed and over-developed. That of the soldier, however, is plainly under-exposed and perhaps only a little over-developed. The one marked "A" on the envelope represents fairly well the type of negative for a decent soft enlargement, though this negative would be called rather flat and weak by people who like somewhat more vigour in enlargements. We should say you would do better by giving somewhat shorter exposures and using a pyro-soda developer, which tends to somewhat more pluck in the negative, but be careful that you don't over-develop.

F. B.—We doubt whether increasing length of the arcs will materially decrease exposure. Your reference to 25 amps. for running two 10-amp. lamps in series is not clear. We suggest you still further reduce your resistance and employ larger carbons. If longer arcs are, however, desired, the object should be to increase the voltage across them. We suggest trying the effect of putting the two lamps in parallel and cutting the resistance out gradually till 20 amps. is taken from the main. An ammeter should be placed in series with one main. It may then be found that the resistance will overheat. On the other hand, if the resistance be too high the lamps will not burn steadily. In the latter case this can be rectified by using smaller diameter carbons.

J. P.—Certainly a postcard or half-plate reflex is a very good thing for the job, the only drawback to it is that it is bulky and heavy and is rather conspicuous in use in streets. Still, if you must have a hand-camera for quick and certain work, it is by far the best type, so long as the subjects are such that you can work at a fairly large aperture. But for all-round purposes, except rapidity of working, a light field camera (with roller blind shutter), used on a tripod, is the best for views, groups, street scenes, etc. Slower in use, of course, but you can make certain of your view and can stop down if necessary, also give a time exposure when such is needed, and for commercial view cards this is the type of camera almost invariably employed, using a 9-inch lens or a 6-inch lens, the latter if you are working in rather confined quarters.

P. S. B.—From the appearance of the negatives, it looks as though the whitish deposit was due to scum of oxalate of lime deposited in the gelatine by mutual action of lime salts in the wash water and the oxalic acid. That is only a guess, but if yours is a very hard water supply it may be the cause. We are afraid there is no very certain means of removing the scum. About the best thing you can try is either 5 per cent. solution of citric acid, or a solution of potass citrate, say 5 per cent. strength, with a little citric acid added to it. There appears to be a good deal of the brown permanganate stain still left in the negatives. Although oxalic acid serves to remove this brown stain, we think a much better chemical for the purpose is bisulphite of soda, say the commercial bisulphite solution diluted with about ten times its bulk of water.

G. A. G.—(1) Apparently the prints were supplied to order at a price which, presumably, included the right of reproduction in the particular publication. In the case of those from your own negatives, it will depend entirely upon the particular form of words used by the Vicar in ordering whether you can now claim for the full amount. At any rate, you can claim for the supply of the prints, which have evidently been delivered in accordance with a definite order. (2) As regards the work of copying old prints and others out of books, the Vicar, as the person giving the order, had a right to reproduce these particular copies of non-copyright works, and therefore it is immaterial to you whether the publication appears or not. You should apply or sue for amount agreed upon. We think the above should be sufficient for your purpose, but if you are in any further doubt it would perhaps be best to obtain the advice of a lawyer, to whom you could show all the correspondence that has passed.

THE BRITISH

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Contents.

SUMMARY.

Mr. E. R. Bullock, in a communication from the Eastman Research Laboratory, describes the result of a comprehensive series of experiments on the effect of the various variable factors in the sulphide-toning process. His results emphasise the correctness of the "Almanac" formula for the bleach, and also the necessity of using ample quantity of sulphide solution in darkening the prints. (P. 447.)

In a leading article we bring into prominence the points of chief practical importance examined by Mr. Bullock. Although these latter consist almost entirely of methods which have been published in connection with sulphide toning, they usefully draw attention to the factors of chief importance in regular successful use of the bleach-and-sulphide method. (P. 442.)

In the two concluding chapters of his articles on press photography, Mr. W. Lancelot Vining deals with the advantages of the long focus lens for certain descriptions of subject, in particular, sporting events; and concludes with some hints and cautions on the drafting of titles of news photographs. (P. 443.)

The opportunities which exist for making press photographs (of an illustrative type) of topical interest are the subject of a paragraph on page 441.

Mr. W. Ermen, in a brief communication, records the results of measurements showing the metol-like character imparted to hydroquinone by use in conjunction with a safranine desensitiser. (P. 445.)

Dr. D'Arcy Power has given the formula for the amidol developer long used by him for all descriptions of work. (P. 446.)

A type of enlarging easel which is easily made is described and illustrated by "Thermit" on page 451

In a short article on page 446 Mr. W. Gard describes an outfit for electric illumination of the dark room in places where there is no public supply of electric current

While the photographer possesses the right to the custody of the negative, it does not seem that liability for the preservation of the negative is automatically attached to that right. (P. 442.)

The difficulties created in portraiture by the present fashion of jazz costumes are considered in a letter from a correspondent. (P. 455.)

An American correspondent gives some particulars of the pioneer in the United States in cinematography, C. Francis Jenkins, whose first demonstration of a moving picture was given in 1894. (P. 455.)

The addition of clouding or gradation to portrait negatives taken against black backgrounds can be easily done by methods outlined in a paragraph on p. 441.

The remarkable improvement obtainable in the mounting of a photograph by appropriate selection of mounting board and border tints is the subject of a paragraph on page 442.

EX CATHEDRA.

Worked-in Backgrounds. There is great scope for improvement in many portraits taken against black backgrounds, in the way of introducing some simple effect of light, to relieve a flat sunken-in appearance. This may easily be done by preparing the back of the negative with very fine matt varnish, or, what we prefer, a transparent varnish, *e.g.*, Billdup and stumping in with black lead such clouding or gradation as may be required. No especial skill is needed, as the thickness of the glass softens the work and prevents any appearance of patchiness. If matt varnish be used it is not advisable to scrape any away from the denser parts unless the negative is very harsh, as this proceeding always falsifies the original scale of tones. With a transparent varnish this does not arise, and it is, moreover, easier to see the effect of the working while it is in progress. With matt varnish it is necessary to inspect the film side from time to time, and this is troublesome. Besides clouds, more detailed backgrounds can be introduced by those possessing some knowledge of drawing, and the effect will then be similar to the Heliolette backgrounds which provide the same facility in commercial form for the benefit of those who cannot draw.

* * *

Free-Lance Press Work. A branch of Press photography which Mr. Vining, in the series of articles which come to an end this week, has passed over somewhat lightly, is that of the making of a topical Press photograph. It is a branch of interest to the many whose homes are in places where subjects for news photographs rarely occur. Such subjects may not present themselves ready-made, but materials for making them are available everywhere, needing only the journalistic sense to turn them to good advantage. By way of illustration we may quote on this point one of the many fertile suggestions in the lessons on Press photography of the Practical Correspondence College. The writer is showing how opportunities are made: When I was living in the country I read, one spring, an inch paragraph in the "Daily Mail" about the shortage of fruit that might result from the lack of bees to transfer the pollen from blossom to blossom in the orchard. "Some growers," the paragraph explained, "were attempting to fertilise the fruit buds by brushing the pollen from one blossom to another by hand, with a wad of cotton wool." It happened that some trees in my garden were just then glorious with drifts of pale pink blossom. I had no bees, but I had a picturesque old gardener who looked the part. A big hefty handful of cotton wool, an old ladder, and the old apple tree were the only props required to secure two dozen different pictures of the gardener seriously dabbing the wadding at the innocent bloom. I blazed away two boxes of plates, as I felt that I was on a good thing. . . . . All the London picture papers

printed one of my negatives. . . . . But, as I say, I was lucky in every respect, not forgetting the title:—"Man Doing Bees' Work." And under the title was a little description of about fifty words based upon the facts in the paragraph which gave me the idea for this picture. The title sold the prints, which were bright and sunny and pleasing. The artificial creation of photographs to illustrate a topic of the day is now a considerable part of Press photography. If a picture editor is offered photographs which bring a subject before people who would not read about it, he will use them, particularly if they are also of pictorial quality.

* * *

Multiple Mounts. Comparatively few professional photographers seem alive to the value of the multiple mount as an aid in emphasising the qualities of distinctive work. The commercial mount is often over-assertive in design and embellishment, though in its more refined form it has attained a very high standard of artistic excellence. Yet it is a fact, of which many photographers are aware, that the type of mount at their command is hardly suited to the particular pictures that they happen to be engaged upon, either by reason of its colour, size or shape. The solution of the difficulty in cases like these lies in the choice of a multiple mount of tints that completely harmonise with the picture. And it may be added in passing that many photographers are not alive to the widely-differing effect upon a print of two tints that appear closely similar, unless a comparison is made. At the present time white or light-toned mounts are in favour, and are decidedly superior to the drab, dull-looking browns and greys that did duty not so very long ago. Many photographers, especially in country districts, are surprisingly conservative in the selection of their mounts, and anything other than the commercial article is seldom seen. Recently, in a country photographer's window, we noticed an enlargement of really fine quality mounted upon a dark plate-sunk mount. Could that photographer have seen the same print mounted upon a light-toned mount with a narrow tint surround, he would hardly realise that the print was the same. Whatever may be the advantages of plate-sunk mounts they are certainly not the ideal settings for examples of fine portraiture, nor do they appeal to a discriminating taste.

* * *

Liability for Negatives. One of the things in the common law respecting the relations of the portrait photographer with his customer, which is by no means as clear as it might be, is the liability of the photographer to preserve negatives made in accordance with a sitter's order. While it is perfectly well established that the custody of those negatives is the photographer's right, it is on the other hand not so well established that the photographer thereby undertakes the liability to keep them for the sitter's use at any time when the latter may require them for the supply of prints. Cases in which this question has arisen are rare, and in ordinary practice are not very likely to arise, owing to the facility with which a duplicate negative may be made from a print in the sitter's possession. An exceptional instance came to our notice a year or two ago, in which untoned proofs from negatives taken thirteen years before were returned to a studio for delivery of the photographs. In the meantime, however, the studio had changed hands and the new proprietor had no knowledge of the existence of the negative, which presumably had been destroyed by the previous proprietor. In cases such as these common law is determined, in a measure, by common custom in the circumstances of the particular trade; and certainly it is not possible to say positively that it is the common custom among photographers to preserve all negatives for the use of sitters at any remote date. On the contrary, the usual relations between photographers and customers are contrary to this assumption, and in the absence of any case in the Courts, so far as our recollection goes, in the history of photography there is no reason for assuming that the photographer is under the liability of keeping each and every negative until, say, he has the customer's permission to destroy it.

THE EFFECTS OF VARIATION IN THE SULPHIDE-TONING PROCESS.

THE paper by Mr. E. R. Bullock, of the Eastman Research Laboratory, which appears on another page, brings together a volume of carefully-conducted experiments which is deserving of study by users of the process of sepia toning by bleaching in the customary mixture of ferricyanide and bromide and darkening or toning in a bath of sodium sulphide. With one or two exceptions it cannot be said, perhaps, that the paper discloses facts which were previously unknown, but it very usefully sets forth the effects of variations in the two parts—bleaching and darkening—of the process, and on that account renders a valuable service, particularly as regards the advantage or otherwise of modifying the standard practice. This is especially the case in reference to the use of the darkening sulphide bath, which, in our experience of many questions on the part of readers, is the chief factor in failure to obtain satisfactory sepia prints.

Mr. Bullock takes as the standard process for sulphide toning the formulæ which have appeared for some years past in the "British Journal Almanac" (page 461 of the current volume). These formulæ were the result of, chiefly, the very thorough experimental work carried out by the late Douglas Carnegie. They differ to some extent from formulæ recommended by makers of printing papers, chiefly as regards the smaller proportion of bromide to ferricyanide in the bleach. The composition of the bleach in this respect is one of the first points examined by Mr. Bullock, who shows that there is no advantage as regards either speed of bleaching or colour of prints in increasing the ammonium bromide beyond the proportion (one-third of the ferricyanide) of the "Almanac" formula. Adopting this 1:3 ratio of ferricyanide to bromide it is shown what is the effect of greater or less strength of the bleach bath. At a strength of 10 per cent. ferricyanide, bleaching is rapid, but the colour is somewhat more yellowish. At from 3 per cent. to 1 per cent. strength the bleaching is almost as quick, whilst the colour is normal. At strengths substantially less than 1 per cent. of ferricyanide, bleaching is much slower, whilst the colour is just as good. It therefore appears that the most advisable strength is about 3 per cent., that is to say, 240 grs. of ferricyanide (and 80 grs. ammonium bromide) in 20 ozs. of water. This, it will be seen, is not much less than that of the "Almanac" formula.

As regards variation of the chemicals in the bleach, it is shown that there is no advantage in modifying the standard ferricyanide-bromide formula. Ferricyanide alone or in conjunction with potass chloride or iodide gives a bleach which is slower than the standard; and the colour of the prints, particularly when iodide is used, are more yellowish. Mr. Bullock records the effect of replacing the bromide by other salts, such as sulpho-

cyanide, selenocyanide, and cobalticyanide, without finding any advantage and, in fact, disclosing, in some cases, great disadvantages.

When we come to the behaviour of the sulphide darkening bath the observations recorded in the paper fully confirm the advice which is commonly given for the avoidance of inferior results in sulphide toning. It is shown that up to a strength of about .5 per cent. of sulphide in the darkening bath, the action is slow and the results are yellowish. On the other hand, increasing strength beyond about 1 per cent. of sulphide produces no increase of speed in darkening and no advantage as regards colour. While not mentioned by Mr. Bullock, it is worth emphasising that too strong a sulphide solution favours the blistering of many papers. At the same time it is important that the sulphide bath should not fall below strength in use, on which account the "Almanac" formula for the working solution directs a strength of about 3 per cent. Even so, the bath should be plentifully used in order not to exhaust it by the passage of many prints through it. Such weakening of the bath is particularly harmful if hypo is present in it. Mr. Bullock dismisses the idea that hypo is formed by oxidation of sulphide in the darkening bath, and assumes, we suppose, that it comes there through insufficient washing of prints. At any rate, its effect is a very marked one as regards yellowing of the colour.

A recommendation, which we think is new in respect to sulphide toning, is to dip the prints for about 10 seconds in a 1 per cent. solution of soda carbonate immediately before darkening in the sulphide. With most gaslight papers this is found to favour a more purplish colour. This effect is found to be produced also if a bleach, such as ferricyanide and chloride—that is to say, one giving a bleached image of silver chloride—is employed instead of the customary ferricyanide-bromide.

Some experiments on the bleaching of prints to images of silver ferricyanide and silver ferrocyanide are described but appear not to have resulted in any sufficiently-marked advantage over the standard practice; in fact, the results appear to be more yellowish, which usually is precisely the effect which is not wanted. Experimenters, however, will be interested in the bleach formulæ for ferrocyanide and ferricyanide images given in connection with experiments B. 11 of Table II.

Perhaps the most valuable certificate of the process is contained in Table III. of Mr. Bullock's paper, where it is shown what very little difference is produced in the final tone by very considerable modifications of the procedure. That is certainly one of the chief merits of the sulphide-toning process, one which makes it exceedingly difficult to find a more satisfactory process for the sepia toning of development prints. Very considerable alterations as regards time and temperature of bleaching, time and temperature of darkening and duration of washing at various stages have practically no effect upon the final result. The things which do have an effect, and which therefore call for the particular attention of the user of the process, are those to which attention has been specially called in the previous paragraphs of this article. A study of these considerations, in reference to the very clearly tabulated experiments in Mr. Bullock's paper, should therefore serve for the discovery of the cause of any difficulties experienced in the process.

PHOTOGRAPHY FOR THE NEWSPAPERS.

[Below we conclude the publication of the series of eight chapters on the supply of photographs to the newspapers written by Mr. W. Lancelot Vining, until recently art editor of the "Sunday Pictorial." So far as we know this is the first occasion on which the subject has been dealt with by a writer intimately acquainted with the production of an illustrated newspaper, and considering the matter from the angle of the art editor. Mr. Vining, who has spent his life in press photography, first as a free-lance and subsequently as a press photographer on the "Daily Graphic" and "Daily Mirror," deals here with the use of the long-focus lens in press work, and gives some final miscellaneous hints.—Eds. "B.J."]

VII.—THE LONG-FOCUS LENS.

Very few photographic correspondents do any long-focus work, which I think is a mistake. Nearly all staff photographers carry a long-focus lens, especially when on a big news story. I have in my mind a big railway accident of some years ago. The order went out that no cameras were to be allowed near the wreck. Only one of the photographers had a long-focus lens, and he literally wiped the floor with his rivals, and, being an agency man, he secured all the publications in the next day's papers. The modern long-focus lens can be worked with great success on the non-reflex camera. There are several on the market which only require an extension of the bellows equal to half the focus of the lens. They work at a fairly large aperture, and have a focussing mount. Great care must be exercised in judging the distances, but you will more often than not be able to focus the main subject on the screen before exposing. Correspondents living near the sea would find this type of lens invaluable, especially in winter, when wrecks may occur, and these very often are some distance from land. A good plate for this work must be fast, and have a fine grain, and if the light is very good I strongly advise an isochromatic with 1½ times screen. This will get through any slight ground mist. Try a long-focus lens on a portrait, and you will be surprised at the result and never go back to a short one again.

Sports Photographs

This subject is perhaps the most popular, and the variety gives the photographer scope always to try to get a new type of picture, which at the moment he does not seem very anxious to do. There is far too much of "follow the leader" among press photographers, caused, I think, by the feeling that if they all take the same events from the same angle then one of them cannot beat the rest, and there will be no grumbling by their respective managers that they have been beaten by a rival. For years the finish of the 100 yards has been photographed from the one spot—15 yards beyond the finish, until at a recent L.A.C. meeting one of the photographers had a brain wave, and tried a broad-side of the finish. This produced a very interesting result, as it illustrated the distances between the competitors when the tape was broken. The result was that nearly every paper published this photograph, even art editors who had long ago given up using finishes of sprints snapped this up as something new. The moral is obvious. I am not going to deal with the photographing of every kind of sport, as it would take up far too much space, but a golden rule to follow is to work as fast as the light will allow, and use a very fast plate. The great trouble comes in winter, when the light is weak, and under-exposure cannot be avoided. A good plan during the winter months is to use

your developer warm, but great care must be exercised if this is done, as fast plates have a tendency to fog very quickly. My own plan when I had a batch of very under-exposed football plates to develop was to put them in a tank with a weak developer, and take them out to tea with me, turning the tank over from time to time. I always found that by this method there was no sign of fog, and I always got everything out of the plates that was possible.

Very little is done with the photographing of cricket matches, except by staff photographers of papers or agencies, and I suppose this is because a long-focus lens must be used, and, if possible, a reflex camera. Cricket provides an endless number of interesting pictures, and I am certain it would pay an amateur or correspondent living near a country ground to specialise in this work, especially in view of the Australians' visit this summer.

When I started as a press photographer in Fleet Street the only cricket photographs ever taken or published showed the teams or batsmen "going out" or "coming in," and sometimes the toss, but this depended on how the captains felt. The Australians were over that year, and I went to Northampton for their first match, and experimented with the back half of an 8 in. *f*/4.8 lens on a half-plate reflex, giving me a focus of about 16 in. at *f*/10. Next day my pictures were called wonderful, nothing had ever been seen like them before. This match marked the advent of the long-focus into press-work, and within a few days of my cricket pictures long-focus lenses appeared all over the place, and cricket pictures were soon as common as any other kind. But these pictures are not easy to take if they are to be truthful, as there is always one important moment in every incident, and it is very easy to miss it. The eye, brain and hand must work together, and when the fieldsman is about to make a catch the focus must be altered to follow his movements. I cannot better illustrate what I mean than by describing an incident which happened at the Oval during a test match. England were batting against Australia, and Mr. C. B. Fry was run out. He thought the decision was wrong, and so did the majority of the spectators. Fry tried to get a third run, and threw himself full length on the ground. Four cameras exposed on the instant. Three prints showed Fry's bat home by inches, and the bails on the ground. This looked as if the umpire had made a mistake, but my picture told a very different story—the bails were in the air, and Fry's bat was not home by about 2 inches. The other photographers had exposed a shade late, but it made all the difference to the result.

Use a fast isochromatic plate and use a weak developer. Don't get too much contrast, because you will only use the centre of your negative, and the enlargement will be fairly great.

Copyright.

Copyright law is rather complicated, but at the same time one or two simple facts about it should be known to every photographer. The most important clause in the Copyright Act is the one dealing with payment when a photograph is taken, because upon these conditions the ownership of the copyright depends. The Act expressly states that when the negative of any photograph is made for or on behalf of any other person "for a good and valuable consideration" the copyright belongs to the person for or on whose behalf the work is done, which means that with an ordinary sitter at a studio the copyright is his. In the case of a landscape photographer working for an employer, all copyrights in the views taken are the employers.

Correspondents, when collecting a portrait, should always try and find out who owns the copyright. A great many portrait photographers directly they see one of their photographs published rush in an invoice for 10s. 6d., or more, but if the sitter ordered them the photographer has no claim.

VIII.—TITLES AND CAPTIONS.

Great care must always be taken when writing out titles, and a good plan is to print the names of places and people. Photographers must remember that in a great many cases the caption-writer will know little or nothing of their story, which may be quite a local one. Very often correspondents think that we in the London office know everything that has taken or is taking place anywhere and everywhere. Well, we do not, and we want the particular points of the story. Don't write a life history, but enough to describe adequately the photographs you are sending. When sending a photograph which may have three people shown and you only know the name of one, do, please, say which one it is, right, centre or left. How should we know? Yet photographers seem to think we ought to; and if you know all three names, see that you get the correct order from left to right. You would scarcely credit how touchy people are about being called in print by wrong names, but it is only natural. Be very careful that the numbers on your captions agree with the numbers on your slides. Not long ago I was dealing with a set of plates of an agricultural show in the Midlands. The list of captions said No. 6 was Lord Perhaps talking to Lady Maybe. I wanted to use this, but No. 6 plate was a very fine bull, and there were several others of people in pairs, which did not fit in with the list, so I saved the paper money and gave the show a miss. Nothing causes so much trouble in newspaper work as wrong names under photographs, and once a photographer is proved unreliable his work is shunned as "unclean."

Packing.

I am stating a fact when I tell you that many times I have received glass negatives, sometimes with card and sometimes without, sent in an ordinary envelope, and, as if to ensure its safety, it has been registered. Have the senders never heard of the machine used by the Post Office for stamping letters? because I can assure them that this machine puts an end, and a very complete one, to whatever chance their photograph had of bringing in a cheque. Always pack glass plates as described in Chapter IV.

In conclusion, I can only hope that each reader will find some little item of help in his work. There is a great deal going on in this world, and you must not feel hurt if only two of your photographs are published when you expected four. The art editor deals with all photographs on their news value; leave it in his hands, and if your work is good you will be fairly treated.

A Few "Don'ts."

Don't think, because you have read these chapters, that your troubles are at an end; they may only just be beginning—it depends on you.

Don't imagine your photographs are the only ones a newspaper will receive on a certain day—their average is over 100.

Don't rely only on photographic apparatus to obtain pictures; let your brain help, and don't be afraid to work it overtime.

Don't get the numbers of your slides mixed; papers never pay for double exposures, and blank plates cost money to develop.

Don't forget to draw the shutter of your plate-holder; it is very difficult to get a battleship launched twice.

Don't forget to set your shutter; a little light always helps in exposing a plate.

Don't hold your flashlamp near anyone's face. It is not up to you to make things worse than they are, and the local hospital may be full.

Don't swear at the art editor if your picture is not published next day; he may never have received it. The railway company may have taken a fancy to it, or you may have exposed on an empty slide.

Don't send the wrong photograph for a murderer; the Law Courts are quite busy enough at the present time.

Don't tell the audience that your flashlight never makes any smoke unless you know a quick way out of the hall.

Don't set your tripod up on a slippery floor and then feel hurt if the subject laughs: medicine bottle corks are cheap enough.

Don't forget that a press photographer changes his politics, religion and views on things in general to suit the occasion.

Don't try to retouch your negatives unless you want to spoil them; every picture paper has expert retouchers. They can turn the ugly into beauty prize-winners, and dress or undress anyone in a few minutes.

Don't forget that a little tact will make many pictures.

Don't get cross with a policeman: the law is behind him, and not you.

Don't ask permission to take a photograph if you can get it without: they might say—No.

W. Lancelot Vining.

THE EFFECT OF SAFRANINE ON DEVELOPMENT.

Many allusions have been made in recent photographic literature to the acceleration of development with hydroquinone, which results from treatment of the exposed plate with safranine. But hitherto no numerical data have been given, so that a description of some experiments dealing with this side of the phenomenon may be of interest. Kodak Portrait Film was exposed behind a step wedge to a light of 200 candle metre seconds; it was then bathed for one minute in water and immersed, after draining for a fixed time in the following developer:—

Hydroquinone	0.5 gm.
Soda carbonate	2.0 gm.
Soda sulphite	1.8 gm.
Water to	200 c.c.s.

The image appeared in 130 seconds, and development was carried on for a total time of 5 minutes, that is to say, for a factor of 3.7.

A second film was given the same exposure, but before development was bathed for one minute in a 2 per cent. (by volume) solution of Desensitol. The image appeared on the desensitised film in 18 seconds after immersion in the developer; and development was again carried on for 5 minutes, a factor of 26.

Fig. 1 shows the curves obtained by plotting the densities produced on the two negatives against exposure. It will be seen that whilst in the "desensitised" negative all the squares of the step wedge are reproduced, and nearly all fall on to the straight line portion of the curve; in the untreated negative the three lowest exposures are not reproduced at all, and the greatest density is less than half that given by the same exposure when developed after treatment with Desensitol.

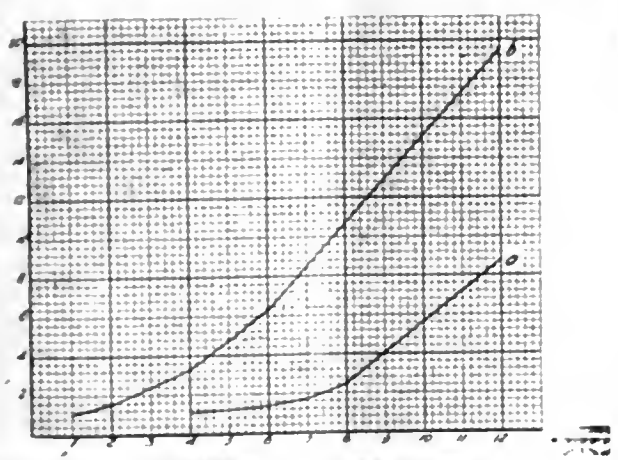


Fig. 1.—*a*, Hydroquinone; *b*, hydroquinone-Desensitol.

Similar experiments were then made with metol, using, in the first instance, a developing solution containing:—

Metol	0.25 gms.
Soda sulphite	1.0 gms.
Water to	200 c.c.s.

On the untreated film the image appeared in 53 seconds; after desensitising, in 85 seconds. Development was continued for 8 minutes, as before. Two further films were exposed and developed, with and without desensitising, in a normal metol developer, containing:—

Metol	0.25 gm.
Soda sulphite	1.0 gm.
Soda carbonate	2.0 gm.
Water to	200 c.c.s.

In this case the image appeared on the untreated film in 6 seconds, on the desensitised film in 4½ seconds.

Fig. 2 shows the curves given by these four negatives. In the absence of carbonate, safranine produces a more pronounced diminution of activity, whilst the presence of a normal amount of carbonate does not restore normal activity to the solution.

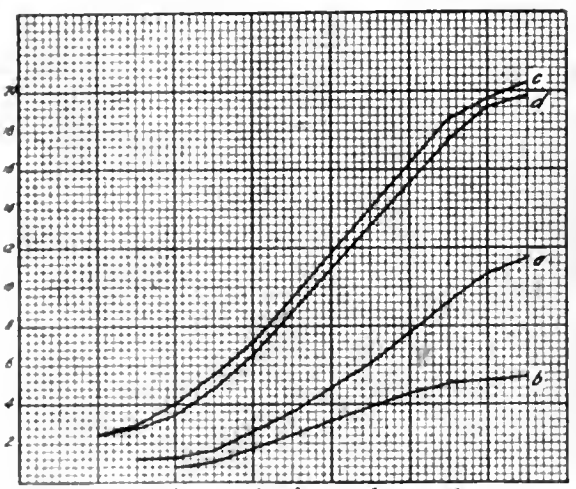


Fig. 2.—Metol—*a*, without carbonate; *b*, desensitised; *c*, Metol-carbonate; *d*, desensitised.

On comparing Figs. 1 and 2 it will be seen that the curves given by the normal metol developer are almost identical with that given by hydroquinone after Desensitol. Time of exposure and length of development was the same for both, the only essential difference being that the first developer contained 0.5 gm. of hydroquinone, as against 0.25 gm. of metol in the second. Since metol is more than twice the price of hydroquinone it appears that hydroquinone, after Desensitol, should be a more economical developer than metol.

Confirmatory tests were made on Wratten Panchromatic plates exposed in a camera, and bathed in Desensitol before development with a developer containing:—

Hydroquinone	0.5 gm
Soda sulphite	1.5 gms.
Soda carbonate	2.0 gms.
Water to	100 c.c.s.

The image appeared in 17 seconds, and gave a well graduated negative after developing for 340 seconds, *i.e.*, to a factor of 20.

Two plates were also developed, after having received equal exposures, with a rodinal type of developer. One was bathed

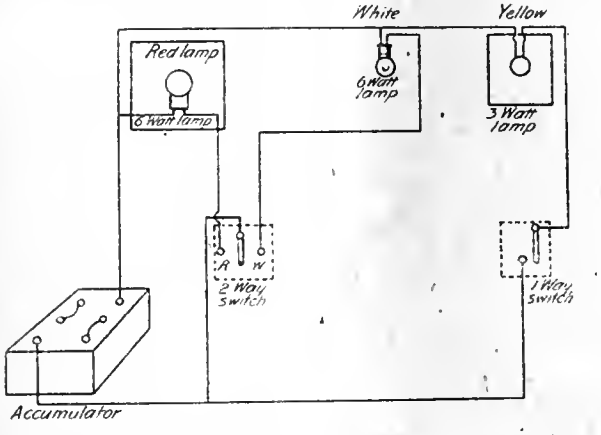
in Desensitol, and developed to a factor of 30. The second plate was immersed in a developer of the same strength, and developed for the same time as the desensitised one. The two negatives were practically identical, except that the untreated one showed a trace of fog on the rebates, although it had been developed in absolute darkness, whilst the desensitised one showed perfectly clear rebates, in spite of the fact that it had been freely exposed to red light during development.

W. ERMEN.

DARK-ROOM ILLUMINATION.

Much has been written on the above subject, and there can be no question as to the advantages of the electric light for this purpose. This is, of course, quite easily fitted where one has the current in the house or a public supply available, but, unfortunately, owing to grandmotherly legislation, there are thousands who are unable to take advantage of a public supply which should be available in all our towns. For those who can get current there are plenty of excellent dark-room lamps on the market, and my idea in this article is to point out the best way in which those who cannot get current in the ordinary way can still have all the advantages of electric light in their dark-rooms and for enlarging purposes with very little trouble and not much expense.

A word of warning is, perhaps, advisable as to the so-called dry cells, fitted in cases with a miniature lamp. Except for the



most temporary use while travelling just for plate changing, they should be regarded as useless, unless one is prepared to pay through the nose for refills; as for serious work in the dark-room, it is simply throwing money away. Now the first thing to obtain is a *6*-volt accumulator in celluloid case. This should be of ample capacity, not less than 40 ampère hours (actual), not ignition capacity (this latter term is most misleading to the uninitiated). 60-ampère hours actual would be much better if much dark-room work is done, but do not on any account be persuaded to purchase a second-hand one; go to an electrical engineer, and get him to have a proper first charge put in, as this first charging is the most important, since on it depends the whole life of the accumulator. You will then want two or three 6-volt motor car side lamps and holders. One should be 3-watt and the other ones 6-watt size. Then get a few yards of electric light flexible cord and one ordinary and one two-way and off switches, and join them up as diagram. This will give you a good light for bromide printing, a good light in your lamp, and a white light for general illumination. I strongly advise the use of a safe light in the lamp, and, this being connected up as shown, it is impossible to have a white light alight at the same time as a red or other safe light. This is a great advantage; the bromide lamp is left alight all the time, and is simply covered with a piece of yellow paper, which gives ample light for putting the paper on negative. The white light is then used for the exposure. I have had this arrangement in use for a long time.

Should it be desired to do some enlarging, it will be necessary to get a motor car head lamp and holder, 6-volt 12-watt. This will be found to give ample light for a lantern for enlarging, and the light is of the right kind in colour and form, being almost a point. Of course, the accumulator will have to be charged occasionally, but it is surprising how long it will last on one good charge. It depends on the use it has, but by way of giving some idea how often this will be necessary a 40-ampere hour battery will run the darkroom lamp *continuously* for about *40* hours before requiring to be recharged, which can be done at almost any motor garage.

This article is addressed more to the really serious amateurs, and for that matter to professionals as well, and not to the button-pressing fraternity, who leave it all to Faith, Hope and Charity (Faith in the local chemist, Hope that there is something on the film. Charity—this latter dispensed by the owners of the faces on which attempts have been made). I can assure anyone who proposes to try this system of dark-room illumination that it is a treat to work with it. Admittedly it costs a little to start, but the amount greatly depends on the individual; the serious amateur is generally a handy man with tools. I shall be only too glad to give anyone any further information if it will help along the best of all hobbies.

WM. GARD.

CURIOUS ACCIDENT WHILE BEING PHOTOGRAPHED.—A seventeen-year-old lady school teacher of Bath is the heroine of a remarkable rescue from drowning. With her mother, she accompanied a party of friends to the meadows bordering the Avon, near Grosvenor Bridge. She had a camera, and desiring to photograph her mother, selected a picturesque setting on the high bank of the river, where the lady posed, leaning against a post. The daughter went a few paces away to focus, but on glancing up before making the exposure, was horrified to find the post had given way and her mother had disappeared into the water. Instantly the daughter, an accomplished swimmer, plunged in to the rescue, and succeeded in freeing her mother from some obstruction which held her down, and bringing her ashore. The mother was unconscious, but revived under respiratory attention

AMIDOL DEVELOPER.—Quoting the recent article of ours on the properties and preservation of the amidol developer, Dr. D'Arcy Power, in "Camera Craft," adds the following note:—"I have used amidol exclusively for the last ten years for plates—including Autochromes, Paget colour plates, lantern slides, bromide prints and enlargements. In all these fields I have found it as good as any other developer and for some purposes better. I dissolve a pound of sodium sulphite in half a gallon of water (64 ozs. in English measure.—EDS., 'B.J.'), add two ounces of sodium bisulphite, and one ounce of potassium bromide. This is a stock solution to be diluted from one in three to one in six. The amidol is added at time of using, according to required contrasts, in from three grains to half a grain an ounce of diluted developer"

EXPERIMENTS ON SULPHIDE TONING.

(A communication, No 116, from the Research Laboratory of the Eastman Kodak Company.)

I. *The Effect of Modification of Ordinary Indirect Sulphide Toning.*

THE ordinary indirect (or "re-development") method of sulphide toning, as described, for example, on page 461 of the "British Journal Photographic Almanac" for 1921, was followed, and, without making any very radical alteration at any point in the process, systematically modified, with the object of discovering just what the conditions are which influence the final tone, and the direction and extent of this influence. Then, the ordinary method was more profoundly altered. However, there were not included any of those variations, such as the addition of copper or mercury salts or bichromates to the bleach solution or the use of Schlippo's salt in the darkening bath, which are known to change the composition of the final toned image.

First, in order to avoid complications due to variations in the character of the silver images taken for toning, the method of obtaining these images was standardised as follows: (1) All experiments were made on each of two emulsions, "Special Velvet Velox" and "Artura Carbon Black," from two different negatives. (2) Development always followed exposure either immediately or after an interval of not more than about one hour; and the papers were immersed directly in the developer without any preliminary soaking in water.

TABLE I.

EXPERIMENTS IN VARYING THE METHOD OF BLEACHING.[1]

Series	Expt. No.	On effect of	Solution used.	Time of Action.	Result.	Remarks.
A[2]	2	Composition of bleach bath.[3]	(*a*) 40 gms. ferricyanide per litre (*b*) 30 gms. ferricyanide + 10 gms. am. brom. per litre. (*c*) 20 gms. ferricyanide + 20 gms. am. brom. per litre. (*d*) 10 gms. ferricyanide + 30 gms. am. brom. per litre.	30 minutes .. 2 „ .. 2 „ .. 2 „ ..	(*a*) Colour more yellowish than normal. (*b*), (*c*) and (*d*) Indistinguishable, normal results.	
A	3	Total concentration of salts in bleach bath.	Ratio of ferricyanide : bromide kept constant at 3 : 1, the ferricyanide used in concentrations of (*a*) 10%; (*b*) 3%; (*c*) 1%; (*d*) 0.3%.	(*a*) 2 minutes .. (*b*) 2 „ .. (*c*) 3 „ .. (*d*) 15 „ ..	(*a*) Colour more yellowish than normal; slight loss of image in high-lights. (*b*), (*c*) and (*d*) Indistinguishable, normal results.	
A	6	Duration of washing between bleaching and darkening.	.. ..	(*a*) No washing, 30 sec., 20 mins., and 18 hrs. (*b*) 3 min. (normal) vs. 17 hrs.' washing.	(*a*) No concordant results obtained. (*b*) 17 hrs.' washing produced more yellowish colour than normal.	
B	1	Ferricyanide vs. ferricyanide - halide as bleach bath.	(*a*) 3% Ferricyanide .. .. (*b*) 3% Ferricyanide + 1% potass chloride (*c*) 3% Ferricyanide + 1% potass bromide. (*d*) 3% Ferricyanide + 1% potass iodide.	.. .. ..	(*a*), (*b*) and (*d*) Slower than (*c*). (*a*) and (*b*) gave same tone, which was more yellowish than that from (*c*). (*d*) Still yellower than (*a*) and (*b*).	The yellowish colour in the case of (*d*) is not changed by even greatly prolonging the time of immersion in darkening bath.
B	3	Substituting potass sulpho-cyanide for potass bromide in usual bleach.	(*a*) 3% ferricyanide + 0.3% Sulphocyanide. (*b*) 3% ferricyanide + 0.1% sulphocyanide.	(*a*) .. .. (*b*) Somewhat longer than usual.	(*a*) Useless, because of solvent action. (*b*) Slight solvent action; gave with some papers a purplish tone.	
B	4	Substituting potass selenocyanide for potass bromide in usual bleach.	(*a*) 3% ferricyanide + 0.3% selenocyanide. (*b*) 3% ferricyanide + 0.1% selenocyanide.	.. ..	(*a*) Slight red stain, yellowish tone. (*b*) More yellowish tone than normal.	
B	5	Substituting potass cobalticyanide for ferricyanide in usual bleach.	2% cobalticyanide + 1% potass bromide.	3 hours	No perceptible bleaching action.	
B	6	Potass cobalticyanide alone as bleach.	2% solution cobalticyanide ..	Over night ..	No bleaching action.	

1. It may be remarked here that, while throughout these experiments ammonium bromide has been used, dry *sodium* bromide in equal weight gives indistinguishable results. This is true also of potassium bromide; in this case, however, it is desirable, for safety with continued use, to increase somewhat the amount of the salt taken; and 12 gms. per litre of potassium bromide is accordingly recommended in place of 10 gms. of either ammonium or sodium bromide.

2. Experiments in Series A were done in co-operation with Mr. D. S. Mangello.

3. We have not tested experimentally the effect of composition on the *useful life* of the bleach bath; but, assuming the equation:

$$4Ag + 4K_3Fe(CN)_6 + 4NH_4Br = 4AgBr + 3K_4Fe(CN)_6 + (NH_4)_4Fe(CN)_6,$$

as representing the action of bleaching, it can be calculated that potassium ferricyanide and ammonium bromide will be withdrawn from the bleach bath in the ratio 33.6 : 10; and the use of a bath containing these salts in the ratio 30 : 10 will probably ensure that as long as the bath will bleach at all it will bleach satisfactorily as regards the final tone.

TABLE II.

EXPERIMENTS IN VARYING THE METHOD OF DARKENING.

Series.	Expt. No.	On effect of	Solution used.	Time of action.	Result.	Remarks.
A	8	Concentration of sodium sulphide in the darkening bath.	(*a*) 0.01% sodium sulphide ..	(*a*) 2 hrs.	(*a*) More yellowish than normal.[1]	
			(*b*) 0.03% „ „ ..	(*b*) 30 min.	(*b*) Slightly more yellowish than normal.	
			(*c*) 0.1% „ „ ..	(*c*) 15 „	Others normal.	
			(*d*) 0.3% „ „ ..	(*d*) 3 „		
			(*e*) 1.0% „ „ ..	(e) Normal		
			(*f*) 3.0% „ „ ..	(*f*) „		
			(*g*) 10.0% „ „ ..	(*g*) „		
			(*h*) 30.0% „ „ ..	(*h*) „		
A	11	Presence of hypo in the darkening bath.	(*a*) 1% sodium sulphide+0.3% hypo.	(*a*) Normal	(*a*) and (*b*) Normal tone.	These results confirm Carnegie's investigation of this point.
			(*b*) 1% sodium sulphide + 1% hypo.	(*b*) „		
			(*c*) 0.3% sodium sulphide+1% hypo.	(c) 3 min.	(*c*) Slightly more yellowish than normal.	
			(*d*) 0.1% sodium sulphide+1% hypo.	(*d*) 15 min.	(*d*) Distinctly yellower than normal.	
B	7	Potass cobalticyanide + soda sulphide on silver images.	2% cobalticyanide + 1% sulphide	.. ..	Toning action slow; tone resembling that given by the polysulphide bath.	Sulphide alone, in presence of atmospheric oxygen, tones to a similar colour, but very slowly.
B	9	Bath of soda carbonate immediately prior to darkening.[2]	(*a*) 0.1% soda carbonate ..	10 min.	(*a*) Produced purplish tone	This is a useful effect for the majority of D.O. papers; to produce it an immersion of 10 sec. in 1% soda carbonate solution is recommended.
			(*b*) 0.3% „ „ ..	10 „ ..	(*b*) More pronounced purplish	
			(*c*) 1.0% „ „ ..	10 „	(c) Like (*b*).	
			(*d*) 3.0% „ „ ..	10 „	(*d*) and (*e*) More nearly normal tone.	
			(*e*) 10.0% „ „ ..	10 „		
B	10	Soda carbonate bath immediately prior to darkening, the time of action being varied	1% soda carbonate	5 sec. ..	No differences in final tone, showing that a very brief immersion is all that is needed to change the final tone.	
				20 „		
				1 min.		
				3 „		
				10 „		
B	12	Soda carbonate as in B. 9, used after bleaching to AgCl.	.. ..	.. ..	Results as in Expt. B 9.	
B	11	Bleaching to images of silver chloride, silver ferricyanide, silver ferrocyanide and silver bromide.	For bleaching, see last column. Darkening as usual.	.. ..	Chloride images gave more purplish tone than usual method. Ferricyanide and ferrocyanide gave less purplish (more yellowish) than usual method. Bromide, of course, was normal.	For bleaching, to silver chloride image use freshly mixed solution containing 0.2% potass permanganate, 3% sodium chloride, and 1% sulphuric acid. Transfer directly to clearing bath of 2% sodium bisulphite+1% sulphuric acid, and wash 5 minutes. To convert to ferricyanide image, use bath of 9% potass ferricyanide+0.1% potass permanganate. Wash 30 min., clear in 5% oxalic acid solution and wash 20 min. By using 1% sodium bisulphite for clearing instead of oxalic acid and leaving until orange colour disappears, the image is ferrocyanide. For bromide image use usual ferricyanide-bromide bleach
B	13	Adding potass iodide..	1% potass iodide added to usual bleach, to the darkening bath; or 1% potass iodide bath used immediately before darkening.	.. ..	Final tone rendered more yellowish in each case.	
B	14	Polysulphide vs., usual darkening bath.	(*a*) 1% solution of potass pentasulphide.	(*a*) 1 min.	Polysulphide gives much yellower tone.	
			(*b*) 1% solution of sodium-sulphide.	(*b*) 1 „		
B	16	Adding potass seleno-cyanide to darkening bath.	Usual darkening bath + up to 2% seleno-cyanide.	.. ..	Additions up to 2% give progressively increasing yellowish tone.	

1. We thought at first that this phenomenon, which was described by Douglas Carnegie twelve years ago ("B.J.," 1909, p. 666), might be entirely explained by the action of the thiosulphate formed by the rapid aerial oxidation of very dilute sulphide solutions; but experiments in which thiosulphate was present from the beginning, and other experiments in which oxidation was kept at a minimum by using frequently changes of freshly-prepared sodium sulphide solution, have not supported this view, and we are inclined to believe that a very dilute solution of sodium sulphide, even if perfectly pure, would give a tone deviating from the normal in the direction of yellow, and increasingly so with increasing dilution of the bath.

2. The colour changes resulting (during rapid coagulation) from the addition of various electrolytes to colloidal solutions of silver sulphide (in glass vessels) have been observed and described by F. V. v. Hahn ("Kolloid-Zeitschrift," October, 1920, p. 172).

(3) The developer used for the Velox paper was the following:—

Elon	0.9 gm.
Hydroquinone	3.6 gms.
Sodium sulphite (des.)	14 gms.
Sodium carbonate (des.)	19 gms.
Potassium bromide	0.46 gm.
Water to	1000 c.c.s.
Methyl alcohol	23 c.c.s.

The time of development was 45 seconds, the temperature of the developer having been adjusted to 20 deg. C. (68 deg. F.). For the Artura paper the following developer was used:—

Elon	1.7 gms.
Hydroquinone	6.7 gms.
Sodium sulphite (des.)	21.7 gms.
Sodium carbonate (des.)	15 gms.
Potassium bromide	1.7 gms.
Water to	1000 c.c.s.

In this case the time of development was 3 minutes, the temperature being, as before, 20 deg. C. (68 deg. F.) (4) All prints were transferred from the developer to an acid stop-bath of 3 c.c.s. of concentrated sulphuric acid per 1000 c.c.s. of water. (5) The fixing bath used was the following:—

Chrome (potassium) alum	6 gms.
Sodium bisulphite	10 gms.
Water to	50 c.c.s.
Hypo 35 per cent. solution to ...	1000 c.c.s.

Two trays of this were in use, the prints being allowed at least 5 minutes in each tray in succession. (6) After fixing, the prints were washed for a total time of at least 30 minutes in running water with, intermediately, at least one transfer of the prints, one at a time, from one tray to another. (7) The washed prints were mopped with clean towels and left to dry, face down, on muslin-covered frames. (8) When dry, the prints were examined visually, and only those from each negative and on each kind of paper that were indistinguishable in contrast and average density, and otherwise apparently perfect, were kept for toning.

The following conditions were taken as representing the normal procedure in indirect sulphide toning:—(1) The print

TABLE III.

Variations in Bleaching and Darkening which did not Affect the Final Tone.

Series.	Expt. No.	On effect of	Method of treatment.	Result.
A	1	Soaking in water immediately prior to bleaching.[1]	No soaking vs. 5 hours' soaking	No difference in final tone.
A	4	Duration of immersion in bleach bath	Immersed for 1 minute, 3 minutes, 10 minutes, 30 minutes at 20° C.	No difference in final tone.
A	5	Temperature of bleach bath	Used at 10° C., 20° C., and 30° C., for times decreasing from 4 minutes for 10° C. to 1 minute for 30° C.	No difference in final tone.
A	7	Exposure to light during washing between bleaching and darkening.	Four gradations of light, from total darkness to midday sunlight. Duration of washing, 3 minutes.	No difference in final tone.
A	9	Duration of immersion in darkening bath.	Immersed for: 1 minute, 2 minutes, 4 minutes, and 8 minutes.	No appreciable difference in final tone, though prolonged immersion caused softening of gelatine, which made exact comparison impossible.
A	10	Temperature of darkening bath ..	Used at 10° C., 20° C., and 30° C., for 2 minutes, 1 minute, and ½ minute respectively.	No difference in final tone.
A	12	Use of hardening bath after darkening and before final washing.	Hardening baths used were: (*a*) 4 gms. ordinary alum, 4 gms. soda sulphite, dry; 8 gms. glacial acetic acid; water to 1,000 ccs. (*b*) 6 gms. chrome alum; 10 gms. soda bisulphite; water to 1,000 ccs.	No difference in final tone.
A	13	Duration of final washing	Washed for 5 minutes, 40 minutes, 5 hours, and 40 hours.	No difference in final tone.
A	14	Rate of drying of toned image ..	(*a*) Very slow drying, in moist air (8 hours). (*b*) Ordinary drying on muslin-covered frame (2 hours). (*c*) Quick drying, by electric fan (15 minutes). (*d*) Very rapid drying, by hot-air blast (about 1 minute).	No difference in final tone.
B	2	Usual ferricyanide bromide bleach vs. successive baths of ferricyanide and bromide.	(*a*) Usual procedure with usual bleach. (*b*) Immersed in 3% potass ferricyanide until "bleaching" completed, washed 3 minutes, and immersed in 1% potass bromide 2 minutes.	No difference in final tone.
B	8	Bromine water as bleach bath ..	Bleached in bromine water, washed 10 minutes, and darkened as usual.	No difference in final tone, though emulsion is stained, due probably to effect of bromine water on traces of metallic impurities in the emulsion.
B	18	Adding potass bromide to darkening bath.	Added up to 5%	No difference in final tone.

1. If, however, the prepared black-and-white print is not allowed to dry between washing and bleaching, the tone is altered slightly in the direction of purple.

is immersed *dry* in the bleach bath. (2) The bleach bath has the composition:—

Potassium ferricyanide	30 gms.
Ammonium bromide	10 gms.
Water to	1000 c.c.s.

The time of immersion is 2 minutes, and the temperature of the bath 20 deg. C ± 2 deg. C. (64 deg. F. to 72 deg. F.). (3) When bleached, the print is washed in running water for 3 minutes. (4) It is then immersed in 1 per cent. sodium sulphide (Na_2S) solution for 1 minute at 20 deg. C. ± 2 deg. C. (64 deg. F. to 72 deg. F.). (5) It is then washed for 30 minutes in running water. (6) Finally, the free moisture is removed by means of a clean towel and the print is allowed to dry spontaneously, face down, on a muslin-covered frame.

The water used for making up all solutions in the experiments was distilled water, and the running water used for washing the prints was Lake Hemlock water of the Rochester City supply.

The experiments and results have been summarised in tables, Table I. giving the effects of modifying the method of bleaching prints preparatory to darkening, and Table II. indicating the changes produced by variations in the composition and manner of use of the darkening bath. Many of the experiments which would normally be included in Table I. or Table II. gave negative results in that the final tone of the print was in no way different from that obtained by the usual procedure. These have been grouped in Table III.

The results of experiments on the polysulphide method of toning (Series C) are given in Table IV.

The above experiments show that simple variations of the usual procedure in the indirect sulphide toning (re-development) method may modify the final tone in the direction of either a more purplish or a more yellowish colour, the former to but a slight degree. The maximum purplish tone is obtained by bleaching to an image of silver chloride and then using a bath of sodium carbonate immediately prior to darkening, as in Experiment No. B 12. By merely bleaching to a chloride instead of to a bromide (Experiment No. B 11), or again by merely interposing a bath of sodium carbonate in the usual method immediately before darkening (Experiment No. B 10), the resulting change is smaller in extent, but still distinctly useful. The change of tone in the direction of a more yellowish colour, on the other hand, may be brought about to a comparatively large extent, and in a variety of ways. The substitution, partially or completely, of sodium sulphide by potassium pentasulphide (or by "liver of sulphur") in the darkening bath (Experiment B 14), or the addition of a soluble iodide to either the usual bleaching or darkening bath (Experiment No. B 13), can be recommended for this purpose. But for most emulsion papers increased yellowness of colour is undesirable. From a practical point of view, therefore, and assuming that the black-and-white print has been sufficiently developed and fully fixed and washed, it is only necessary to *avoid* the following conditions in indirect sulphide toning:—

1. Entire absence of soluble bromide from the bleach bath.

2. The use of a bleach bath containing an excessive concentration of soluble bromide. (In which case there is an appreciable loss of image by dissolution of silver bromide in the bath.)

3. Excessive duration of washing between bleaching and darkening.

4. Excessive dilution of soluble sulphide in the darkening bath.

5. Presence of hypo in the darkening bath, to an extent considerably relative to the sulphide.

TABLE IV.

Series C. Expt. No.	On effect of.	Method of treatment.	Effect on rate of toning.	Remarks.
1	Time of immersion in the polysulphide bath.	Immersed in toning bath: (*a*) 15 minutes; (*b*) 30 minutes; (*c*) 60 minutes. Washed 30 minutes; left to dry on muslin-covered frames.	.. ..	Prolonged immersion tends to produce increased yellowness of tone.
2	Adding "hypo" to the polysulphide bath.	35% "hypo" in quantities of 1/10 of volume, 1/5 of volume, and ¼ of volume of bath.	None	Therefore the toning action of the bath in the Fenske process (British patent 18545 of 1912) is apparently due essentially to its content of polysulphide.
3	Adding potass. iodide to the polysulphide bath.	Potass. iodide in amounts of 0.1%, 0.3%, 1%, and 3% was added to the polysulphide bath.	None	No effect on tone.
4	Adding potass. sulphocyanide to the polysulphide bath.	0.5% to 10% potass. sulphocyanide was added to the usual bath.	Increased with increasing concentration of sulphocyanide.	Presence of 2% sulphocyanide approximately doubles the rate of toning. No difference in colour. Colour modified to a purplish tone, intermediate between the polysulphide tone and that characteristic of a single-solution selenium bath.
5	Adding potass. selenocyanide to the polysulphide bath.	10 ccs. of 5% potass. seleno-cyanide added to 60 ccs. polysulphide bath.	Greatly accelerated ..	No effect on tone.
6	Adding thiosinamine to the polysulphide bath.	1% added to bath..	Somewhat accelerated.	No effect on tone.
7	Adding thiocarbamide to the polysulphide bath.	1% added to bath..	Greatly accelerated ..	No effect on tone. Thiocarbamide alone in 1% solution has a very slow toning action, accompanied by loss of image. No loss, however, when used with the polysulphide bath.

II. *The Polysulphide Method of Direct Sulphide Toning.*

"Potash Liver of Sulphur," which is produced by fusing together potassium carbonate and sulphur in a closed vessel, consists essentially of a mixture of "potassium polysulphide" and potassium sulphate. Potassium carbonate and potassium thiosulphate may also be present, according to the conditions of manufacture and the extent of the subsequent exposure of the product to the air. The only one of these substances which alone in aqueous solutions is capable of toning a silver image

is potassium polysulphide; and therefore, if we assume the absence of any interdependent effect of the constituent compounds of potash liver of sulphur in the process of toning, we must conclude that the only effective toning agent in potash liver of sulphur is potassium polysulphide.

A solution of potassium polysulphide may be conveniently prepared as follows:—Dissolve one hundred gms. of potassium hydroxide in water and make up to 1,000 c.c.s. Saturate 500 c.c.s. of this solution with hydrogen sulphide, and mix with the remaining 500 c.c.s. To this solution, which is substantially one or normal potassium sulphide (K_2S), add 120 gms. of pure sulphur in powder, heat the mixture to boiling, stirring constantly, and boil for about five minutes. The solution, which is now substantially one of potassium pentasulphide (K_2S_5), is allowed to cool, filtered, and kept, preferably in the dark, in a rubber-stoppered bottle. For use as a single-solution toning bath, this stock solution may be diluted with twenty times its volume of water to give a bath containing approximately 1 per cent. of potassium pentasulphide. The turbidity which usually appears upon diluting with water is due to the separation of finely divided sulphur. This is not seriously detrimental in toning, but a clear solution may be obtained, if desired, by adding a little sodium sulphide solution (and warming, if necessary), or by filtering the diluted solution, or by allowing the precipitate to settle and pouring off the clear liquid.

The bath used in the following experiments was made by taking 950 c.c.s. of water, adding 50 c.c.s. of the stock solution of polysulphide and then immediately 2.5 c.c.s. of 20 per cent. solution of sodium sulphide (Na_2S). This bath when in use in a photographic tray will remain clear for an hour or so, after which sulphur may commence to separate out. The odour of this bath is not nearly so objectionable as the usual sulphide bath.

The results of experiments in varying the composition, etc., of the baths used in the polysulphide method of direct toning are given in the table on page 450.

The practically useful conclusions from this short third series of experiments are that it is possible (1) to prepare a polysulphide toning bath containing about 1 per cent. potassium pentasulphide and 1/20 per cent. sodium sulphide, which tones satisfactorily, although somewhat slowly; and (2) to accelerate the rate of toning of this bath by the addition of either potassium sulphocyanide or thiocarbamide.

We may add the following general notes on sulphide toning, both "liver" and "bleach and sulphide":—

First, the character of the emulsion has a very great influence on the result. As a rule, it may be said that the fastest papers give a purplish and the slowest a yellowish tone. Secondly, with a given paper and given method of toning the degree of development has a considerable influence, although this influence can in extreme instances be entirely overshadowed by the character of the emulsion. Thirdly, with a given paper and given method of making the black-and-white print, the two principal direct sulphide toning methods ("hypo-alum" and "polysulphide") give results identical with each other, while the indirect sulphide toning method gives, as is well known, a very different result—namely, one which is comparatively yellowish. Finally, it may be remarked that the effect of the often-recommended use of a preliminary sulphide bath in the indirect sulphide toning method is to give mixed direct and indirect sulphide toning; and the results, while often excellent in quality of tone, depend largely upon the exact procedure followed, and therefore are apt to vary in colour.

E. R. Bullock.

MAKING AN EFFICIENT ENLARGING EASEL.

There are so many types of enlarging easels on the market, and so many designs have been put forward for home-made ones, that another might seem to be superfluous. I am convinced, nevertheless, that the one I am going to describe has certain advantages over many others, and is simple to make, requiring no expensive materials or tools, nor any great skill. It may be limited in size, the principal part being constructed from a printing frame, but old frames up to 15 × 12 are still to be found among professional junk and in brokers' shops. For smaller work only, there is no advantage at all in having an easel larger than the largest enlargement likely to be made.

Besides the easel, we require a strip of wood about 3 in. wide by ¾ in. thick, a couple of small hinges, a few screws, and a piece of stiff mounting board. The frame should preferably have an equally divided and hinged back, and if this is not the case, it is worth the extra trouble to construct such a back roughly from ½-in. or ¾-in. wood. The springs are first removed from the frame,

Fig. 1.

and a piece of good flawless glass found to fit it tightly. A cleaned-off negative will serve if the edges are bound with slide-binding to secure the necessary fit. A stiff piece of mounting board is cut to fit the frame comfortably, but not tightly, and if this has one pure white side, it will be an advantage. Failing this, a sheet of white paper should be mounted on to it, and then, on the white side, sizes of smaller enlargements are drawn. In the case of 15 × 12 easel, the sizes 12 × 10, 10 × 8, 8½ × 6½, and half-plate can be drawn alternately in black and red inks. One of the springs is screwed to a corner of the easel, in such manner that it can be used to hold the board tightly in the easel. Failing a sufficiently strong board, the two springs can be used, one at each of two opposite corners. Fig. 1 shows the position and use of a single spring.

The strip of 3-in. wood is fashioned into a leg for the frame, and is cut of such a length that when one end is screwed to the front of the frame, as shown at B, fig. 2, and the whole is stood up on the leg, the centre of the frame will be brought to a height

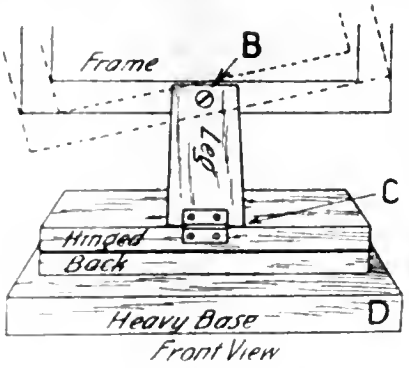


Fig. 2.

about 1 in. below the normal level of the lens in the enlarger. The leg is secured with one screw only, which should be of the short, fat variety, and care is necessary when putting in the screw if we would avoid splitting the frame. If the leg and frame can be cleanly drilled with a brace and bit or a red-hot tool, a bolt and wing nut will be superior to a screw.

The leg being cut, the bottom front edge is fastened to one end of the back, as shown at C. If the back is a heavy, substantial one, the easel is now finished, but a heavier base can be made

by screwing the other half of the back to a square of thick wood, as shown at D.

In use, the easel is placed before the lantern and moved about till each corner of the frame is the same distance from the centre of the lens as the other three corners, the lens being at its normal height. In this position, lines can be drawn on the bench along the side edges of the easel base, or thin trackers can be tacked down, between which the easel can be moved forward or backward.

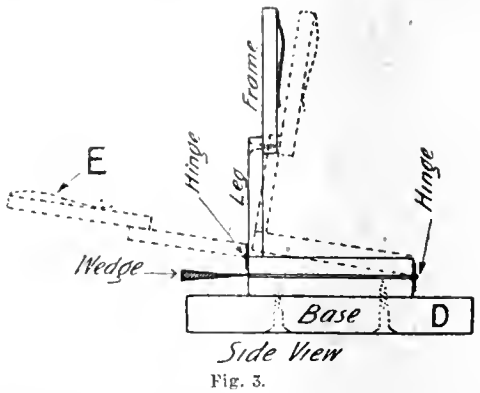


Fig. 3.

With the white board in position, focussing is done, and then the easel is pushed over on its front hinges into the position shown at E, where the board is lifted and the bromide paper inserted between it and the glass, after which the easel is pushed up again and the exposure made.

The joint B allows an amount of swing which is useful for quick straightening, and a thin wedge of wood or cardboard inserted between the two halves of the back will tilt the easel out of the vertical when tilt is required to correct leaning buildings, etc. If further elaboration is desired, the leg can be made in two pieces, when by slotting one and drilling the other, the two can be fastened together by a bolt and wing nut, and the frame can then be easily raised and lowered. In this case the joint at B can be made a fixture, as the side tilt will be obtainable at the lower joint.

I have carefully tried out an easel made as above, and, given careful construction, with attention to the rigidity of joints, the stiffness of the white board, and the strength of the spring, this piece of apparatus is distinctly useful. THERMIT.

MASK MAKING.

To those who have never had occasion to make a printing mask, the cutting of this important little article might not appear difficult, but the printer who does a great deal of masked printing knows how much trouble can be taken in getting that degree of accuracy which is so necessary to a good mask.

Masks can be bought, but if it is possible to cut one's own quickly and accurately, greater satisfaction will be obtained. For instance, where various sizes are in constant use, as in an "amateur finishing" workroom, if bought masks are the rule, it is necessary to keep a stock of each size used, and in the case of an odd-sized negative, or anything else necessitating an odd-sized mask, the printer is reduced to the doubtful process of fixing two or three masks together.

By regularly cutting one's own masks, only a small stock of material is necessary, and any negative can be covered in any desired way.

Of the various materials which serve for mask making there is one that has certain advantages. It is the thin orange celluloid supplied by Messrs. E. B. Fry, Ltd., of Pratt St., N.W., which can be obtained in blanks of required sizes. It is stronger than paper, but thin enough not to interfere with good contact, if used between negative and printing paper. It is transparent enough to see through, but sufficiently opaque to actinic rays to preserve the borders. Masks made of this celluloid last well if handled with anything like reasonable care.

Sheet celluloid for masking can be cut expeditiously in the following manner:—The desired opening is first drawn in pencil on a piece of white paper or card the same size as the blank. If a good inch rule and a small right-angled set-square are used, it is a simple matter to draw any rectangular size correctly. The next step is to fix the blank over the drawing with a couple of wire paper fasteners or pins. With pins, care must be taken not to crease the blank, which will not stand doubling to push a pin through. Laying the two on a sheet of glass or an old negative, with the blank up, the design is traced on the blank with a sharp darning needle or a long-handled push pin. It is only necessary to scratch the celluloid. No attempt should be made to cut through. The celluloid will break cleanly along the scratches when bent back, just as glass does when scratched by a diamond. The bending must not be done until the complete design has been traced and the blank removed from the drawing, and care must be taken not to bend too violently, or the lines may split past the corners. But it is not difficult, and with a little practice a perfect mask can be cut this way in something under a minute, though such haste is not exactly advisable. The drawing will do for any number of future masks if not thrown away or damaged.

Circles can be cut by fixing a push pin in the pencil holder of a pair of compasses. In this case the underlying design can be dispensed with. With masks over of quarter-plate size and over, the centre pieces are large enough for further use. For examples, the piece from a 5 × 4 mask will make a good 2Brownie mask, and that from a quarter-plate will provide a v.p., or we can get in the same way a p.c. and a 1A mask out of the same half-plate sheet of celluloid. Thus, for quantity mask users the material is economical. THERMIT.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, July 11 to 16:—

PRINTING FRAMES.—No. 18,696. Printing frames. W. Aitken.

PRINTING MACHINES.—No. 18,702. Machines for photographic printing. S. H. Morse.

OPTICAL PROJECTION.—No. 18,706. Automatical optical projection apparatus. F. Ontrey.

STEREO-CINEMATOGRAPHY.—No. 19,213. Production of stereoscopic moving pictures. H. Windebank

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

STRIPPING OR TRANSFER PAPERS.—No. 164,448 (March 2, 1920). The invention relates to photographic transfer processes in which the film of photographic emulsion after being exposed, developed, fixed, and washed to form a positive picture, is transferred from its original base or support to a mount of wood or other suitable material, by means of a suitable adhesive, for example, a 5 per cent. solution of warm gelatine, in the usual and known manner, the base, after drying, being then stripped off.

manufacture of the [illegible] for use in
process, the base is [illegible] which has
passed through a bath of [illegible] dried, and is
then has been appl[illegible] to enable the water
to be applied evenly to the [illegible] first instance, to
the emulsion from stripping [illegible] during the
operations, and afterwards [illegible] printing
stripped from its original [illegible] required. This
film in certain cases con[illegible] waterproof
such as sandarac or [illegible] however, being
water; portions of it [illegible] adhering to
film in the finished pictu[illegible] all the effect of

According to the inv[illegible] supporting substratum
used by applying to the [illegible] a solution of
some hardening agent [illegible] employed, for example,
constituent of the ordin[illegible] emulsion), in the gelatine
solution, and drying the [illegible] to leave the
print ready for action on [illegible] when the latter
A suitable hardening agent [illegible] alum, but any
alkali hardener, such as [illegible], may be
hardening agent also serv[illegible] the substratum to
size by its incorporation [illegible] emulsion after the
applied, and therefore in [illegible] may also be regarded
thickening agent.

An anti-greasing agent [illegible] quillaia bark, as
to allow of even spreading [illegible] on the substratum.
certain glycerine is also [illegible]

A plain photographic [illegible], a paper which
baryta coating) is impreg[illegible] paraffin wax by passing
through a bath of paraffi[illegible] low degree of saturation
for example, 10 grs. of par[illegible] dissolved in 1 oz. of
is a suitable strength.

This waxed paper, when [illegible] coated on one side only with
a substratum which may be [illegible] as follows:—

1 oz. water.
4 drachms of 5 per cent. [illegible] chrome alum.
1 oz. alcohol or methyla[illegible]
4 dr. of 2 per cent. solut[illegible] quillaia bark.
½ dr. glycerine.

The alcohol may be omitt[illegible] that case the substratum
will take a much longer ti[illegible]

The chrome alum is empl[illegible] only for its hardening and
binding effect, but also as [illegible] of frilling and blistering
the quillaia bark to enable [illegible] and even flow of the
tion over the surface of the [illegible] paper, and the glycerine
give flexibility and to bind [illegible] ingredients. The
stratum is applied to the [illegible] in the usual manner,
in leaving the bath the [illegible] subjected to the action of
one or more warm-air [illegible] in order to reduce
quantity of the substratum [illegible] the base.

An ordinary photographic [illegible] emulsion is then applied
over this substratum [illegible] the usual manner, and
positive print taken [illegible] developed and toned by the
standard formula whilst [illegible] usual base.

In the preparation of the [illegible] intended for transfer
photographs on to wood, [illegible] previous formula should be
altered to the following, [illegible] also be varied to suit
circumstances:—

Water, 1 oz.
Chrome alum, 2 dr. [illegible] solution.
Alcohol, 1 oz.
Quillaia bark, 1 dr. [illegible] solution.
Glycerine, 1 dr.

After developing, [illegible] and washing the print in the
a warm 5 per cent. gelatine solution is brushed [illegible]
side of the wet print, which is to be ironed into the
known manner. The print is laid on the fabric, and
or flannel blotting-paper placed under the fabric [illegible]
print, and an iron heated to 150 to 200 deg. F. [illegible]
passed over the cloths, or blotting-paper, with [illegible]
pressure, until the print is dried. The wax paper
stripped off in the ordinary way. The fabric with
pictures can be afterwards placed in a bath of 2 per
lime solution (which may also contain glycerine) for
minutes at atmospheric temperature, and dried [illegible]
or otherwise, the [illegible] being only required to remove
The fabric is then washable by ordinary domestic
without affecting the photograph.

A quantity of the base coated with this substratum
is rolled, packed, and sent away to be afterwards coated

in accordance with the manner in which the photographic matrix is obtained, and in some instances both a male and female embossing die may be formed between which the prints can be embossed.

Plastic casein suitable for carrying out the invention may be prepared in various ways: for example, casein mixed with lime or other alkaline material is converted by the action of water into a plastic mass which dries so as to form a transparent, hard, elastic mass. Also sulphonated rape oil may be mixed with dried powdered casein and kneaded into a homogeneous gelatinised mass, to which resin or caoutchouc and chalk or lime may be added, and the product hardened by vulcanising with sulphur or exposing it to the action of formaldehyde. A solution of casein may also be mixed with a solution of resin and incorporated with lime, or any suitable vegetable or mineral ingredients, and hardened with formaldehyde. Plastic casein may also be obtained by heating milk to 140 deg. F., adding borax, and raising the temperature to 190 deg. F., in the presence of barium chloride or other mineral precipitant of casein. The washed precipitate is pressed and ground with an addition of acetic acid, soda, or other solvent, and the resulting mass is steam heated. Casein may be made into a plastic mass with an aqueous solution of borax, the excess water removed, and a sufficiency of elastic nitrocellulose may then be added, and the whole kneaded into a homogeneous mass.—Henry Percy Gormanston Steedman, 84, Ebury Street, London, S.W.

New Materials.

Boomerang Envelopes.—Messrs. Houghtons have just introduced a very convenient pattern of envelope for the sending and return of proofs. The envelope has a transparent window and contains an enclosure sheet, on one side of which the photographer's name and address are printed. The sitter therefore has only to reverse this sheet when returning the proofs; unsealed, the proofs are transmitted at the penny postal rate. The price per 1,000 of the envelopes, inclusive of printing name and address, are: £3 1s. in 7¼ x 5¼ size; and £4 1s. in 9 x 7 size

Negative Papers.—As a less expensive substitute for glass dry-plates, negative paper has always had its supporters, and though the ratio of economy remains about the same, the inducement to use this form of sensitive material appears to be greater at the present time. MM. Guilleminot have recently introduced a negative paper under the name "Folio-Brom. Guilleminot," the film of which strips off after drying, yielding a thin transparent negative. This material is evidently of high quality, and certainly removes the objection of greater time in printing inevitable with the ordinary negative paper. Folio-Brom is sold at the rate of 3s. 3d. per dozen half-plate sheets by M Jules de Gottal, 17, Cecil Mansion, Marius Road, London, S.W.17. We have also received a very similar product (except that it is non-stripping), viz., Brantom negative paper, from Mr. B. A. Coppez, 24, Cross Street, Hatton Garden, London, E.C.1. This is a very good example of the ordinary negative paper, and is supplied at the rate of 3s. per dozen half-plate pieces.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, August 1.

North Middlesex P.S. Outing to Godalming.

Tuesday, August 2.

Scottish C.W.S.C.C. (Glasgow). Tank Development.

Thursday, August 4.

Hammersmith (Hampshire House) P.S. Members' Evening.
Kinning Park Co-op. Soc. Criticism of Holiday Prints.
North Middlesex P.S. Competitions: Prints and Slides, General.

Saturday, August 6.

Bradford P.S. Excursion to Denton Park, via Ben Rhydding.
Kinning Park Co-op. Soc. Outing to Langbank.
Scottish C.W.S.C.C. (Glasgow). Outing to Neilston.

News and Notes.

Messrs. Ilford, Ltd., announce that their works will be closed from Monday, August 15, to Saturday, August 20. They will therefore esteem it a favour if customers will kindly anticipate their requirements for that period, in order to avoid disappointment.

Ultra-Violet Rays.—M. L. P. Clerc asks us to remedy an omission to carry out a correction of the proof of the paragraph in his "Paris Notes" of July 15 last, on sensitive materials for ultra-violet rays. In line 2, col. 1, p. 418, the correct reading should be:—with æsculine dissolved in glycerine, or with some brands of machine oil having naturally a blue fluorescence.

Action of Light on Water-Colours.—Valuable water-colour paintings have, on the advice of the director of the National Gallery, been removed from the Crystal Palace War Museum during the summer months, the director reporting possible injury because of "excessive light owing to the glass roof." Those of our readers who have water-colours framed and hanging in their studios will, no doubt, take warning, and remove them to a place less brilliantly lighted until the arrival of autumn.

A Link with the Past.—Last Saturday's papers announced the death of Mr. Alexander J. Wilson, at the age of 81 years. Mr. A. J. Wilson, who was a well-known London financial expert and journalist, and the author of several works on financial and commercial subjects, was the son of George W. Wilson, founder of the well-known Aberdeen view publishing firm, who, the papers say, was "H.M. Photographer for Scotland," and "the first man to photograph Queen Victoria." Mr. George Wilson died in March, 1893.

Portrait Styles.—The writer of the "Star's" "Tea-time Gossip" column writes:—"There is a growing tendency amongst women who like to be photographed for the benefit of the general public to appear as incongruous as possible. They clothe themselves in gorgeous evening gowns, and then pose for the photograph that is to amuse the multitude, with a background of rural scenery, usually including a sundial and a pond. Apparently they see nothing strange in reclining on the grass in a brocaded evening gown—and they are not the new rich, either."

Bird's-eye View of the Isle of Wight.—We are told of a remarkable and complete "air view" of the Isle of Wight, which has been taken by a Farnborough member of the Royal Air Force. The operator used what he termed an aviator's camera, and made the exposures at a height of 3,000 feet. A report states that the view "clearly shows the busy streets of the towns and villages on the island at practically one time," whatever that may mean. The airman-photographer left Farnborough during the morning and returned for lunch, "the time taken to complete the return journey, including the taking of the photographs, was ninety-five minutes."

Mr. F. C. Tilney, we are informed, has severed his connection with the "Amateur Photographer," to which for more than twenty years (previously under its title of "Photography") he has been a regular contributor on art subjects, and in which of late he has been the writer of the weekly criticism of photographs reproduced as supplements to our contemporary. During the past year or so, Mr. Tilney has been identified with a movement for individual training in a knowledge of the fine arts, and it is to be presumed that the claims of this latter upon his time have determined the discontinuance of his regular writings for photographers in the Press.

Are English People Becoming Better Looking?—Had photography been discovered two or three centuries ago the task of physiognomists would have been very much easier than it is to-day (writes a correspondent). Anyway, British types of faces are changing, Prof. Sir Arthur Keith, seems to suggest in his annual report on the museum of the Royal College of Surgeons, of which he is curator. He has charge of the most representative collection of human remains and specimens in the British Empire, perhaps in the whole world. So great has it grown that a classification, just started, will take several years. From the evidence accumulating under his hands Sir Arthur Keith has become convinced that definite changes, particularly in the face and jaws,

have been taking place in a large proportion of the British people during the last century or two. The date at which these changes took place the professor does not indicate. He considers that their exact nature and extent can be determined only by a systematic study of ample material. The change believed to be taking place in the British type of face is due to an alteration in the palate, and there are differences noticeable in the formation of the upper jaw. Whether this means that we are becoming more handsome or otherwise is an interesting problem which future research will show.

THE WELSH SALON.—At a joint meeting, held at Cardiff on Saturday last, it was decided to hold the Welsh Salon of Photography organised by the Wales and Monmouthshire Federation of Photographic Societies either during the last fortnight in November or the first in December, as best suits the Cardiff City Hall Museum authorities, whose assistance is expected in the exhibition. The latter fortnight is preferred by the Federation, as by December the Welsh exhibitors' prints from the Royal Photographic Society's Salon will be available for inclusion in the exhibition. The Federation is dropping the open salon rule this year and reverting to five distinct classes. These include classes for survey and scientific camera workers, and also for the beginner in pictorial photography.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents*

PHOTOGRAPHING THE CRETONNE GIRL.

To the Editors.

Gentlemen,—In the vernacular of the bus conductor and taxi-driver, photographers are now "fairly up against it." Designers of modern dress materials and wall-papers, jazz and futurist artists, with a host of fellow conspirators, have plotted together to so clothe the female form divine in multi-patterned myriad-coloured fabrics that were intended to defeat the camera. The season's raid of bizarre frocks which has been sprung upon us, however, has given many an average professional studio worker a very rude shock, and many conservative and old-fashioned operators who have in the past scorned the use of isochromatic and panchromatic plates are now inquiring the price of them and worrying about their use.

Subdued colouring and sanity of design appear to be as rare at our seaside resorts as the sea-serpent, the piers and promenades being filled with flappers and sedate spinsters clothed more or less in garments of hectic hue and daring design mostly reminiscent of "the morning after the night before," combined with a Brock's benefit. And the cretonne craze is spreading, causing many of us to dread the coming of Bank Holiday crowds, and men, who really ought to know better, have been seen with cretonne ties and handkerchiefs

Refusal to photograph a cretonne-clad creature, as some of the hot-heads have suggested as a reprisal, would never do, since it means a loss of business. The use of an "ordinary" plate, as others suggest, is an equally bad proposal; the result such a plate would give is, in the majority of cases, as unsatisfactory to the photographer as the sitter. The most surprising results are sometimes obtained when an ordinary plate is used, results which picture the original as being quite a different article.

Colour-sensitive plate and filter experts could no doubt name at sight the proper plate and filter to use to give the best monochromatic rendering of a given cretonne dress, but what would suit one costume might not serve for another, designs and colours being so numerous.

Then there are the questions of likeness and exposure to consider. One cannot play about with screens, plates and exposures when taking a portrait, as one may do when taking a negative of a dress with no lady inside it. The likeness in some cases, but certainly not in all, is quite as important as the correct rendering of the dress, and one cannot always sacrifice an artistically-lighted portrait head for a dress, however tempestuous, jazzy, or zoological the design may be. The obvious remedy is to "give and take," to get as much light and shade on the face, and, incidentally, as good a portrait as possible, at the same time screening the plate only enough to allow of a comfortable exposure.

It would be an act of folly to "go for" the dress and lose the likeness, as it would also be to secure the likeness and lose the dress Better to lose a little on each than much upon one. The difficulty of securing an absolutely perfect rendering of both may with safety be explained to the sitter.

The most successful photographer of the modern cretonne girl the writer has met with is in favour of an unscreened panchromatic plate, or a self-screen plate with a light or medium yellow filter added, with a tendency to favour the latter. Non-filter and self-screen isochromatic plates used with added light-filters give the most surprising and useful results, and deserve to be more largely used than they are at the moment. Much, of course, depends upon the predominating colours in the cretonnes, and no hard and fast rules can be laid down; the operator must use his judgment, and visualise to the best of his ability how the colours—particularly the blues, greens and yellows—will be pictured by a screened or unscreened self-screen plate. This plan of working will take a lot of beating if one keeps an eye on the blues and adds the right filter to master them

GODFREY WILSON.

AMERICA'S FIRST "MOVIE SHOW."

To the Editors.

Gentlemen,—A day or two before Mr. W. Friese Greene's death in May last the New York "Tribune" gave an account of America's first cinematograph show, and the now almost-forgotten man who engineered it. His name is C. Francis Jenkins, and the date of the show was June 6, 1894.

Mr. Jenkins, we are told, was a clerk in the Treasury at Washington, who was interested in photography and the lantern; he worked hard on what the historian calls "animal locomotion" and with plates, but it was not until films came along that he progressed. His first picture was of a vaudeville dancer named Annabelle doing a skirt or butterfly dance in a backyard.

All we are told up to the present is that he got a satisfactory picture, and that he went to his home, Richmond, Ind., to exhibit it to his friends, travelling the whole distance of 720 miles on his bicycle.

The home of a cousin, who kept a jeweller's shop, was selected for the show. The only electricity available was a trolley-wire passing the door, and using a pail of water as a rheostat, he made the necessary connections. Invited in were his parents, with a few friends, including the editor of a local paper.

The story of the show as given by the "Tribune" is distinctly American in style. It tells how his parents were not told what they were to see, how surprised they were, particularly the ladies, when they witnessed the "wicked" dancer's rather daring gyrations and movements of the skirt.

However, Jenkins was a hero, and the machine is—or was a few days ago—in the National Museum at Washington.

The first public show for which there was a charge for admission was at Atlanta, Ga., in the spring of 1895, but it was a huge failure. Jenkins sold his interest in the invention for 2,500 dollars, and that was all he got. Those of your readers who are interested in the matter will find further particulars of Jenkins and his show in the "Literary Digest," dated April 30, 1921. This publication, I believe, is more easily referred to in your libraries than the "Tribune."

It is, indeed, a curious coincidence that the Americans should be calling attention to their pioneer at the very same time the English newspapers were directing attention to Mr. W. Friese Greene.—Faithfully yours,

J. W. DICKERSON.

Washington

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

K. P.—Potass carbonate and carbonate of potash are the same thing. "Potasche" in the German formula evidently denotes caustic potash.

P. W.—A good cleaning preparation for prints showing stress marks is:—Borax, ½ oz.; water, 30 oz.; methylated spirit, 5 ozs.; rubbed over with soft rag or cotton wool.

GAMMA.—We are afraid there would not be a sufficient demand to justify the reprinting of the recent H. and D. articles in book form. The issues are, however, still in print with our publishers, price 5d. each, post free.

N. W.—Our advice is not to buy until you have seen that the lens will do what you want. The instruments of this name are not by a maker of the first rank, and it is not safe to assume that each one comes up to a standard.

MANSFIELD.—On the whole, it is not worth while to make up hypo in stock solution of saturated strength. A solution containing 1 oz. of hypo in every 2 ozs. (fluid) is strong enough and convenient in use. It is very quickly made by dissolving 1 lb. of hypo in (hot) water and adding water to a 32-oz. mark on the bottle.

N. E.—The gum-bichromate process had its day for pictorial purposes from about 1894-1904. In the volumes of the "Amateur Photographer" of these years you will find many papers on it by M. Demachy and others. The oil process introduced by Mr. G. E. H. Rawlins in 1904 turned the control pictorialists into a new channel.

EXEN.—Usually if a person is susceptible to metol skin poisoning, the only thing is to discontinue the use of the developer. An ointment which is often beneficial is Sphagnol or Ujah; or Ichthyol, 10 grs.; lanoline, 40 grs.; boric acid, 40 grs.; vaseline, 30 grs.; applied two or three times a day and well rubbed in before going to bed.

M. R. E.—For bleaching out bromide or gaslight prints which have been outlined in Indian ink, there is no better mixture than the iodine-cyanide reducer. Solution of mercury bichloride as used for intensifying is nearly as good. If you want a less poisonous solution than these, there is: Thiocarbarmide, 240 grs.; nitric acid, 4 drs. (fluid); water, 20 ozs.

E. S. N.—In the U.S. (uniform system) of stops, *f*/4 is taken as the unit, and is marked 1. Smaller stops are given numbers which indicate the required number of times of exposure compared with *f*/4, *e.g.*, *f*/8 is 4, *f*/16 is 16, *f*/32 is 64. The system has never been generally used by English opticians; in fact, it has practically been applied only to the lenses of Kodak cameras.

T. F.—We really think it is too late in the day to expect a great demand for a printing paper of this kind. Surely you realise that in this country, at any rate, the bulk of printing material sold is of the development type. If the qualities you name are realised, there would no doubt be a demand, but we think it would be a select one, not on a scale to justify the plans you appear to entertain.

D. B.—We should not care to use the potash carbonate method of drying for negatives which are to be kept, unless washed again; otherwise, it is a quite satisfactory process. You can economise in spirit considerably by seeing that negatives drain thoroughly from the spirit; and it is also economical to use two baths in succession, discarding the first after a time. The water which collects in the spirit can be largely extracted with potass carbonate.

S. E.—It makes no difference to the photographer's ownership of the copyright that the family now order and pay for prints. It is evident from what you say that the copyright was originally the property of the photographer, and in the absence of a definite assignment of it to somebody else, it remains his copyright. The mere act of supplying copies is not such assignment. We are quite sure that if you were to copy any of the prints you would render yourself liable to action for infringement by the original photographer.

M. E.—Woodburytype is an obsolete photo-mechanical process. Messrs. Waterlow and Sons, we think, were the last to work it commercially in this country. A lead mould (made from a gelatine relief from the negative) forms the printing surface. The "ink" is a warm solution of gelatine, containing pigment, printing consisting in taking casts (in this gelatine mixture) from the mould. The results were exceedingly good; their chief defect was the "cirtiness" of pure high lights, such as skies. The process was chiefly used for portraits.

F. MEYNELL.—A 9-inch *f*/4.5 lens on your quarter-plate hand camera, even if you can manage to fix it on the front, will be a white elephant, unless you are prepared either to stop down or work with the camera on a tripod. In any case, depth of focus is so small that the opportunities for using it effectively are comparatively few—portraits and figure studies. We think you will do better by enlarging the negatives taken with your 6-in. lens. If you wish to have a lens of longer focus there is no need for the maximum aperture to be greater than *f*/8 or, at and rate, *f*/8.

H.D.—(1) For an 8-ft. picture of the 1-inch dimension of the film at 60 ft. throw you require a lens of approximately 8 inches focal length. Your 115 mm. lens is, of course, only just over 4 inches. (2) For projection behind the screen you could get your 8-ft. picture at 20 ft. throw with a 2½ inch lens. So far as the angle of projection is concerned there is no disadvantage in this, but the brilliancy of projection through a screen is a good deal less than by projection *on* to a solidly surfaced screen. (3) As regards the colour and stereo processes, particulars of patents announced as applied for are not available until the complete specification is published, which may be not until a year, or longer. We are afraid it is impossible to say from the meagre particulars whether your process is worth following up, but although we do not want to be discouraging, it is right to say that the chances of commercial success are against an inventor who has not very powerful backing in the way of trade influence and resources. At any rate, we think you had better do nothing until you have taken out provisional patent protection for it, which you can do at the cost of about £1.

THE BRITISH

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Contents.

SUMMARY

Detailed instruction in the many purely mechanical precautions required in the making of light-filters is given in an article by Mr. C. Smyth. This relates to the choosing and testing of the glass, and its cutting and edging; to the preparation and stripping of the gelatine films, and to the cementing of the cover-glasses. (P. 459.)

The first portion of the review by Mr. Raymond E. Crowther of photographic progress during 1920, compiled for the Annual Report of the Society of Chemical Industry, will be found on page 461.

In a leading article we have some hints to give on the clear rendering of distance in landscapes when using both ordinary and telephoto lenses. (P. 458.)

At the Croydon Camera Club, Mr. E. A. Salt recounted his experience with the new universal developer D.50. (P. 466.)

A patent by a Chinese inventor provides for the use of wide-angle lenses on reflex cameras. (P. 466.)

For the accurate masking of lantern slides by means of single strips the accessory described by Mr. D. Charles in a note on page 463 will be found of great service.

The uses of cork-lino in the printing and mounting room, the renovation of studio stands, and the improvement of the developing sink are the subjects of "Assistants' Notes." (P. 463.)

In alteration of premises carried out for the purpose of erecting a daylight studio it is important to see that full light from the sky actually reaches all the glazed area of the studio. (P. 458.)

Changes in town views by the erection of statues, such as that of George Washington in Trafalgar Square, provide the occasion for the making of fresh negatives as a means of keeping view postcards saleable. (P. 457.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

In a communication, MM. Lumière and A. Seyewetz describe their experiments on the development of Autochrome plates after desensitising. They find that aurantia is a desensitiser which allows of the plates being handled in a moderate yellow light, and which has the further advantage of permitting of a time method of development within fairly wide limits of exposure. (P. 29.)

Mr. E. J. Wall contributes a résumé of methods of making reliefs for colour transparencies and prints by processes other than those depending on the action of light on bichromated gelatine, etc. (P. 30.)

By means of a recently invented taking camera, the Prizma process of colour cinematography is now being employed for the production of a photo-play in colours under ordinary conditions of production. (P. 32.)

Further improvements in the Traube copper-mordant process of dye-toning have been patented. (P. 32.)

Brief details of improvements in the Christensen process of making colour screen-plates are given on page 32.

EX CATHEDRA.

Interesting the Sitter. It is said of Sir Joshua Reynolds that he always wished that he could dine with a man before painting a portrait of him. Whether this be true or not, it is a fact that many of his finest pictures were of sitters with whom he was well acquainted. The portrait photographer is in a less fortunate position than the painter, for he has often only the opportunity to study his sitter for as many minutes as the latter has hours. If, however, these few minutes are judiciously employed it will be found easy to get a fair summing up, not only of the appearance, but the character of the sitter. Most people, especially men, are somewhat ill at ease when facing the photographer; whose aim it should be to remove this feeling and bring out their true nature. We have seen a well-known barrister enter the studio wearing his sternest "court" expression, which might do very well for a daily paper reporting a trial, but which would not be acceptable to his family and friends. But after a couple of minutes quite another expression was obtained by raising some non-legal point of interest. A copy of the current "Who's Who" is a useful reference book in a studio to which sitters of standing may come, as it gives a clue to the tastes and recreations of a vast number of people. The right subject is touched at once, and the sitter is flattered at the idea that the photographer knows all about him.

* * *

Keeping Local Views Saleable. Makers and publishers of picture postcards and other forms of views would do well to keep a sharp eye on such productions, as many little things happen to alter the topographical truthfulness of a view and so spoil the market for it. Sometimes the changes are trivial and perhaps unnoticed by the photographer and casual visitor, but small as a change in a view may be it will serve to date a negative, and cause a print to be rejected. For instance, a statue was recently added to the more or less satisfactory collection on view in and around Trafalgar Square—a statue of George Washington—thus making the thousands of existing postcard views of one corner of the Square out of date. Views of the St. Martin's Church corner of Trafalgar Square taken before June 30 last will probably be sold in their thousands for many years to come, as many purchasers will not notice the statue's absence, but American trippers will be on the look-out for it, and will no doubt reject views not showing their national hero. It therefore behoves all publishers of postcards to see that their views of the National Gallery and Square are up-to-date. An over-sanguine reader of our pages, whose place of business overlooks the Square, expected to see some hundreds of photographers at work for some days after the unveiling of the statue, but has not seen one. He tells us that an enterprising Continental firm of postcard publishers he could name would have had operators

at work within a few hours, had the statue been in Paris, and hundreds of new and up-to-date views in the dealers' shops the next day.

* * *

Skylight Construction. When erecting or altering a room which is to be used as a daylight studio, it is very necessary to see that all the glass which is put in provides effective illumination. In some of our American contemporaries are advertised ready-made skylights for inserting into existing roofs, so as to convert them into "single slant" studios, and the advertisements show them as being notched into a building leaving the original roof higher than the glass at both ends. There is no objection to this arrangement provided that a sufficient run of glass is provided, but as we were recently in a studio in which from the sitter's end two rows of glass were more or less obscured by the upstanding angle of the original flat roof, we think it desirable to draw attention to this contingency. The operator was quite unaware of the disadvantage until it was demonstrated to him that the opening of the end blind admitted practically no light which could reach the sitter directly, although there was certainly an increase on diffused light. The moral is that with a notched-in studio in which an effective 10-ft. run of glass is wanted, at least 2 ft. more should be allowed in the skylight.

DISTANCE AND TELEPHOTOGRAPHY.

Let us hasten to disclaim any intention to treat distance in this article from the artistic standpoint. We shall not stoop to say anything about distance lending enchantment to a view, and are not in any way concerned with the cunning and deliberate representation of comparatively near objects, so as to create an impression of remoteness. Even that idea of distance which depends upon the obstructive or dispersive influence of the atmosphere, and is comprehended by the term "aerial perspective," is largely outside our present purpose. What we have in view is the actual photographic reproduction of actually distant objects, and the technical difficulties which such reproduction involves. As regards the question of exposure, probably the plan of giving to a distant landscape a quarter the exposure which one would give to a landscape with a strong foreground satisfactorily covers the majority of cases. But distant seascapes and distant snow-clad hills need only half the exposure required for most distant landscapes, and not infrequently less than half. If there is any foreground in either case the problem may, as we all know, become complicated, and failure may be caused by an attempted compromise between exposing for the shadows and letting the lights take care of themselves—most venerable of rules at which some iconoclasts are now throwing stones—and *vice versâ*. Several years ago the Hydra plate did in effect get over this difficulty, but the method did not prove popular, and the plates are no longer, we believe, commercially obtainable.

But exposure is not by any means the only, or indeed the most formidable, difficulty in connection with the photographic rendering of distant objects. It is quite possible to give an absolutely correct exposure on an ordinary plate, and yet to obtain a representation of distance which is entirely unsatisfactory, simply because such a plate records no difference between pale blue and white. When the orthochromatic or panchromatic plate is used without a filter improvement begins, and with a filter it continues, until truly remarkable results are attained, not only in differentiating blue distances from the sky, but also in reducing the effect of the intervening atmosphere. Short of the condition technically known as "boiling," which defies every effort to cope with it, haze in a distant landscape presents very little difficulty to the photographer properly equipped with filters and suitable plates. But the filters need to be much stronger than those commonly used, in which the multiplying factor is only, say, from four to seven. In the field equipment of the printing companies of the Royal Engineers during the war 40-times filters were used with excellent results. Sometimes even a light fog can be neutralised by a red filter employed, of course, in conjunction with a panchromatic plate. The whole question of the application of filters to the rendering of distance is a most interesting one which can hardly be said as yet to have been studied with any degree of finality.

There are distances and distances, and, when only a soft and vague rendering is desired, an ordinary lens in conjunction with a deep filter will frequently meet all requirements, more especially as in such cases it is generally necessary to include middle distances or foregrounds. When detail in the distance is desired, recourse must be had to the telephoto lens, precisely as in ordinary vision the aid of the telescope has to be called in to bring distant objects nearer. If the telephoto lens were regarded purely as a photographic telescope its function would be more universally understood, and in many cases its practical application to the everyday purposes of photography would be simplified. But the telephoto lens has the important advantage that, while there are some people who cannot, or will not, learn how to use a telescope properly, the sensitive plate is just as ready to record a telephotographic as an ordinary photographic impression, provided that certain simple precautions have been taken. Except where the magnification is very low, as with the popular single-focus tele-lens, a hood is necessary to prevent internal reflections, and in the great majority of cases the intelligent employment of light-filters produces vastly improved results.

In connection with exposure a difficulty arises in telephotography which is apt to be overlooked. Calculations are generally made on the basis of the exposure which would be given if an ordinary lens were used, this being multiplied by the square of the magnification, and due allowance made for distance. But it sometimes occurs that the latter allowance is wholly superfluous, the action of the telephoto lens having brought distant objects so near, that in place of blue remoteness we have what is to all intents and purposes an ordinary landscape with a strong foreground. These, it is true, are somewhat extreme cases, but when they arise they must be cautiously dealt with, the appearance of the picture on the focussing-screen being a more trustworthy guide than any arithmetical or mechanical method of computation.

It is not, perhaps, sufficiently clearly realised that at this period of the year a great deal of good and interesting instantaneous telephotography can be done without the help of fast single-focus lenses, if fairly distant objects are selected, and the fullest advantage taken of favourable light-conditions. At the sea-side, for instance, pictures of yachts at a considerable distance from the shore can be telephotographed at quite respectable magnifications, even if a filter be used, while records of bathing scenes, bright and amusing, without being vulgar, can be unobtrusively secured from piers, using a fast positive and a telephoto attachment giving a magnification of x 4 or x 5. Best of all, groups of happy children playing on the sands can frequently be instantaneously telephotographed with results far more

satisfying than those achieved in the average holiday snapshot. In such cases, while the "distance" may be actually very near, the interval between camera and object is sufficiently long to produce that happy unconsciousness on the part of those photographed, which we all want to see exhibited in the pictures of celebrities in our illustrated Press. But that, one fears, is at present a very distant view.

THE MECHANICS OF LIGHT-FILTER MAKING.

As a general rule light-filters are best bought, not made, but there are many who take a pride in making their own apparatus quite independently of any saving in cost, though this feature must always make a certain appeal. It is not suggested that the manufacture of one or two small light-filters can be effected in most cases more cheaply than by buying them, but cases not infrequently arise when home-made filters save the pockets very appreciably.

From time to time much information has been published in various journals relating to the spectral qualities of the various aniline dyes employed in filter making, and precise formulæ for coating have been given in past numbers of the "B. J." The reader is directed to coat a certain area of glass with a definite weight of dye incorporated with a stated quantity of gelatine solution, but the mechanical side is usually left severely alone, or but briefly alluded to. Yet the mechanical aspect is of the utmost importance with light-filters employed in front of, or just behind the lens if its optical properties are not to be impaired.

With the exception of a few remarks regarding the general characteristics which dyes must possess to render them suitable for filter making, only the mechanical side will be dealt with by the writer who has had a long and practical experience. It consists in the selection and cleaning of the glass used for the temporary and the final support for the dyed gelatine pellicle, stripping the film, and cementing and drying the finished article.

The Dyes.

Dyes for filter making fall into two broad classes—those suitable for "compensating" or "correcting" filters, and those adapted for "selective" filters. In the former type, familiar to all photographers, the dyes used must have a gradual absorption, subduing or damping down the actinic light (to which the plate is most sensitive) to an intensity that allows the less actinic light to adequately record itself within the period of correct exposure for the more actinic rays. Complete, or partial correction can be obtained in this way, dependent upon the degree of sensitiveness of the plate to the spectrum, and the spectral qualities of the light-filter. The dye must not cut off any portions of the spectrum entirely, but only damp them down to such a degree that they are recorded in their correct visual luminosity. Too sharp a cut, say, of the violet and blue results in these colours being rendered as unnaturally dark. On the other hand, too sharp a cut is not possible with "selective" filters, which demand the minimum absorption in the transmission region, the ideal aimed at being the complete cutting off of certain portions of the spectrum, and the passing of the remainder in full intensity.

Optical Conditions.

In addition to the correct spectral qualities of the dyes, the following conditions are essential for the production of filters to be used in front of, or immediately behind the lens.*

(*a*) The glass must be flat, and have both sides parallel.

(*b*) It must be free from strain, air-bells, and scratches.

(*c*) The coloured gelatine must be transparent, of even density, and free from dust, etc.

(*d*) The filter must be mounted so that no pressure is applied to it, and be sufficiently large not to obstruct marginal rays.

* Tricolour filters must also have the same focal-length, give the same size image, and be of identical thickness.

If the filter is placed close to the focal-plane parallelism is not of so much consequence, but the presence of scratches or dust is then even more objectionable. If used outside the lens system, as over the slit of a spectroscope, the only essential is correct absorption.

Selecting the Glass.

The best glass to choose is known in the trade as "extra-white patent," or "parallel-plate," though for many purposes the cheaper "patent plate-glass" may be used, though it has smaller areas of flatness, and is somewhat green in colour. For the highest class filters optically worked "flats" are employed, which should not be thinner than ¼ in. to avoid any tendency to buckle in cementing. For all ordinary work glass 1/16 in. thick will be serviceable for filters up to 2 ins. square or in diameter; for larger sizes slightly thicker is preferable.

To test for flatness the well-known expedient of holding the glass at an angle of 45 deg. to the cross-bars of a window and observing the reflections from the front and back surfaces is satisfactory. Still better, as a test object is a thick cord stretched taut. The glass is moved about so that its whole surface is tested. If the two images keep the same distance apart the glass is flat, divergence, or convergence, indicates the contrary. Mark the flat parts with a piece of dry soap cut to a point, which if free from grit will never scratch the surface. Apart from flatness, any portions which show air-bells or scratches should be rejected.

A perfectly regular divergence or convergence indicates the glass to be wedge-shape. By selecting two glasses exhibiting the same error in equal degree, it is possible to compensate for their departure from flatness by so mounting them that one error neutralises the other, but the selection of flat portions is to be preferred.

Cutting and Edging.

If only a comparatively small area of glass is being dealt with the simplest way of cutting it into squares is to lay on a flat surface some squared paper, as a guide, marked to the size, or sizes, required, and on top the glass; cutting may be done either with a diamond or good wheel-cutter, the latter being more liable to produce fine splinters. A flat rule or straight-edge is applied to the guide marks, with the necessary allowance for the clearance between the straight-edge and the cutting surface of the diamond or wheel-cutter. An allowance of about 1/32 in. is also made for the subsequent grinding. All cuts in one direction are made first, the glass is then turned over, again adjusted to the guide marks, and the cuts at right-angles executed. Then, and not before, break apart. In commercial work special boards are, of course, employed.

The edges now require to be smoothed, which for squares is an easy operation. A piece of fine emery cloth is glued to a flat board, or a length of flat iron has some fine emery or carborundum powder sprinkled on. Using a small quantity of turpentine as a lubricant, the glass is worked up and down the surface with long and steady strokes, taking care to *first* remove the sharp edges by bevelling them. This is effected by holding the glass at an angle of about 45 deg., and is a precaution which should never be neglected, as it prevents chipping.

Circles of glass are usually cut with a special apparatus which gives the glass a circular movement under a stationary diamond. They can only be edged satisfactorily by a circular stone of fine grit. "Craigleith," or manufactured stones are generally employed. Use steady pressure and keep the glass moving in the opposite direction to that of the stone. Care

is necessary to avoid flat places and facets. Several same size circles can be edged in this way in one operation if they are stuck together with paraffin wax.

Glass squares can be fashioned to circles, but some practice is required. The square is first roughly shaped with "glass-shanks," and then ground to fit a circular ring. For an occasional job discs of metal or other material stuck on the glass will furnish the necessary guides. The observations as bevelling squares apply equally to the edging of circles.

When edged, wash in warm soda solution, wipe with soft cloth, and polish with fine tissue paper damped in alcohol. In pre-war days good quality methylated spirit was employed; much of the present-day spirit may be unsuitable.

Throughout all operations, great care should be taken not to scratch the glass, splinters of glass on the cutting board being a fruitful source of trouble.

The Gelatine Film.

Many will prefer to purchase the spectroscopically tested dyed gelatine obtainable at comparatively modest prices, but if its manufacture is undertaken the actual glass used for the filter should never be coated with the dyed gelatine solution. In the first place, the pull on drying is considerable; so much so, that even thick plate-glass may be distorted, and in the second place, the gelatine coating in the centre will be perceptibly thicker than at the margins owing to its drying there first.

In the following instructions it is assumed that the requisite dyes are incorporated together, and therefore only one piece of gelatine will require cementing. It may be candidly admitted that making the gelatine pellicle and stripping it certainly does require care, but if the directions given are carefully followed success is assured, provided the operator is not "all fingers and thumbs."

The Temporary Support.

Thick plate-glass is employed as the temporary support, and it is essential that the surface to be coated be absolutely clean. The glass is placed in boiling water and allowed to soak for a short time, and then rubbed over with a soft brush to thoroughly loosen any adhering dirt or grease. Remove the glass, and pour on the surface to be coated boiling water from a kettle, drain off, and, before quite dry polish with clean tissue paper and wrap in clean paper. When the glass has cooled down sprinkle on a few drops of benzole, and again polish with clean tissue paper until not a suspicion of smear remains. If coating is not immediately to be proceeded with two glasses should be so treated and placed, polished sides in contact, in clean paper.

It may here be remarked that if the glass is well cleaned and polished it is not necessary to wash it again after the gelatine film has been stripped. Any adhering gelatine at the edges is removed, and the glass re-polished with the benzole. Should, however, the gelatine film after stripping show any signs of being smeary, a repetition of the washing procedure is required.

Coating and Stripping.

The plate-glass, polished side up, is placed on a slab and levelled. If the slab be level in the first instance this alone should not be relied upon, for the glass may be somewhat uneven. Stout and squat legs of "Plasticine" placed underneath the slab (as first suggested by Mr. J. W. Purkis, who prefers four legs, not three) afford a ready means of adjustment. For the occasional worker, coating glass larger than whole-plate is not recommended.

With the glass slightly warm and perfectly level, the hot dyed solution is carefully poured on the centre, when it will readily flow over the surface and take up its own level. The amount of gelatine solution usually given for a certain area is such that whilst flowing to the edges it will not overflow.

When the coating is perfectly dry, it and its support are placed vertically about 2 ft. above a bowl of steaming water for about four minutes. A sharp knife is then quickly run round the edges of the gelatine, when, if the glass has been properly cleaned, the gelatine film should strip readily, and require nothing in the nature of hard pulling. If resistance is met with, more steaming is wanted. On the other hand, if the gelatine is found to be soft and elastic from over-damping, it is put aside for a few minutes and tested again for stripping. The stripped film is placed between tissue paper, and when quite dry examined for any uneven edges which are cut out, and the pellicle stored between stout cardboard.

Cementing.

Having selected a piece of the dyed gelatine free from dust specks, hair, etc., it is placed between the two glasses, and trimmed round with a sharp knife. The film is then ready for cementing. Canada balsam dissolved in xylol is recommended, as it flows better than when chloroform or ether is used as the solvent. The right consistency is about that of golden syrup, not thicker.

Having placed the component parts of the filter on a piece of waste paper supported on a level surface, lift the top glass and gelatine film with the left hand, and from a broad-mouth pipette pour on enough balsam in the centre of the glass on the paper to about cover one-fifth the surface, and at once drop the film on to it. No attempt at this stage should be made to distribute the balsam. A similar pool of balsam is immediately poured on the gelatine, and the remaining glass lowered on to it. Central pressure by a finger will now force the balsam, and any airbells formed, out towards the edges. As much balsam as possible should be squeezed out, and the edges wiped before putting the filter aside to dry.

Drying and Cleaning.

Quick drying by heat is always to be avoided, as it dries the balsam at the edges rapidly, and usually causes distortion. Three weeks should be allowed, the filter being kept in a warm room. Neither can placing the filter under a weight be recommended, though if the filter is on a level surface and the pressure applied is moderate and uniform, there is no theoretical objection. A practical one is that the filter more often than not sticks to both support and weight.

The best plan to adopt is to rest the filter on some wooden slips cut to triangular section and supported in a level position by a tray of some sort. This allows any balsam that may ooze out to run clear of the filter and drop on the tray. When the three weeks have nearly expired if much balsam is seen to protrude it may be gently scraped away. Finally, the filter is cleaned with methylated spirits and a soft cloth, and polished with alcohol or good quality methylated and tissue paper. To employ a stronger solvent, such as benzole, is dangerous, as if any were to run between the glasses the balsam might be attacked and star, when the work would all have to be done over again.

A word of warning may also be given against the use of binding strips, which are prone to cause distortion. The neatest way of finishing is to black the edges with a black celluloid varnish or paint. Varnishes containing turpentine, or other solvent capable of dissolving the balsam, are, of course, inadmissible. After polishing, and thus edging, the filter should be tested for flatness in the same way as suggested for its component glasses.

Mounting.

Filters should never be placed in cells or holders that are liable to exercise undue or uneven pressure on the edges, as distortion will inevitably result. The performance of many a high-class filter has been ruined by a clamping ring screwed up too tightly. A clamping ring should always have a shoulder so adjusted that when the ring is screwed home the filter is only *just* held with no tendency to rattle. A point occasionally overlooked is that the filter must be sufficiently large not to cut off marginal rays of the lens. Thick flats require more allowance in this respect than filters of lesser substance.

C. Smyth.

PHOTOGRAPHIC MATERIALS AND PROCESSES.

[The fifth annual volume of reports upon progress in the various branches of chemical manufacture, issued by the Society of Chemical Industry, includes, as did the preceding issues, a report on photographic materials and processes. This is again by Mr. R. E. Crowther, A.I.C., who (writing early in the present year) reviews the literature, published during the year 1920, representing original contributions to the technical improvement of processes of making negatives and positive prints, orthochromatics and colour photography, cinematography and photo-mechanical processes, and also the methods of research and measurement which are generally described as "sensitometry." Inasmuch as these reports are, so to speak, a series of annual stocktakings of what has been done during the twelve months preceding the issue of the volume, we have naturally wished to give them a place in our pages, since no other publication of the year so well reviews what has been done in reference to the current state of knowledge. As regards the references to original sources of publication, it should be explained that the contraction "J" denotes the fortnightly "Journal" of the Society of Chemical Industry in which are published abstracts of the chief papers relating to photography from the chemical standpoint.—EDS. "B.J."]

THE now famous Sankey judgment[1] on the legality of confiscation of a consignment of pyrogallic acid has been responsible for the appearance, during the past year, of foreign competitive materials of "key" characteristics, on the market in this country. The consumer has temporarily benefited from this competition, but the manufacturers who had, under the protection afforded by war conditions, achieved commendable success in the manufacture of products never before made in this country, have been confronted with a set of conditions which, unless radically modified, will undoubtedly strangle their efforts to build up an industry capable of joining in world-wide competition later. Against a country which, previous to the war, enjoyed a virtual monopoly in most of the fine chemicals used in photography and which at present has the advantage of an abnormally low rate of exchange, it could not be rationally expected that anything but disaster would overtake the new home industries under the conditions of open imports. When it is recollected that photographic fine chemicals are in many cases intermediates in the dye manufacturing industry, which has also suffered greatly in consequence of the Sankey judgment, the reason for the very noticeable fall in the amount of British manufactures on the photographic market is not far to seek.

Of the developers, *p*-aminophenol, metol, amidol, and monomet are still being made in this country, and the manufacture of quinol (hydroquinone) has recently been commenced. Some new matter connected with the preparation of pyrogallol[2], [3] and of quinol[4] has been published, and W. J. van Sicklen[5] claims to have prepared metol free from all tendency to cause skin trouble. This important question of skin attack is one which might well be considered by a Research Association; there are undoubtedly other factors to be taken into account than personal idiosyncrasy, and it is probable that a very small amount of some specific impurity, resulting from the method of manufacture, is the cause of the trouble.

p-Aminosalicylic acid, under the name of "Neol," has been placed on the market by J. Hauff and Co., who claim that in conjunction with a caustic alkali, it will correct the undesirable effects of gross over-exposure to a greater degree than other rapid developers. The correction is attributed to pronounced tanning powers of the substance formed by reaction with the light product in the film. Luppo Cramer, however,[6] expresses doubts both as to any specific corrective action and on the theory propounded. As far as other chemicals are concerned, there has been a marked tendency towards a reduction in prices, more particularly perhaps in the case of bromides. Of the base materials, paper of suitable quality has been more and more difficult to procure. The quality of that most readily procurable leaves much to be desired. Even when well isolated from the emulsion in the process of manufacture, considerable deterioration of the emulsion has been frequently met with. The materials used in the wrapping and the method of packing usually employed, in which the face and back of alternate sheets are in contact, are frequently responsible for the failure to "keep" on storing. The deterioration is most apparent when sulphide-toned prints are produced, although in many cases even two or three months' storage effects deterioration which can be observed in ordinary black-and-white developed prints—a state of affairs which only resulted after prolonged storage of pre-war material under indifferent conditions. The recovery of the silver from exhausted fixing baths has been the subject of some discussion in the photographic press,[7] but no suggestion of the use of a salt other than "hypo" as the fixing agent has been forthcoming in order to facilitate the electrolytic recovery of silver in the metallic state. F. F. Renwick[8] has called attention to the practicability of a solution of potassium cyanide for the fixing of gelatine emulsions, and it should be worth while investigating the electrical recovery of the silver from exhausted baths of this salt. As was to be anticipated, the abnormally high price of silver was not long maintained, and no work on its replacement by less expensive metals has appeared. The process of photography devised by K. Wilcke,[9] although it employs no light-sensitive silver compound, can scarcely be considered of practical importance. It is of theoretical interest, however, as affording another instance of the application of the characteristic property of selenium of decreasing in its electrical resistance when illuminated. Attempts have been made in the past to utilise this property in the construction of photometers, but without much success. Recent improvements in the manufacture of light-sensitive cells indicate that experimentation with the new materials would give interesting and probably successful results, leading to the construction of an instrument which would entirely eliminate the personal factor.

Negative Processes.

The properties of gelatine are receiving the attention which the importance of this product demands, and, as a result, the chemical rôle of this amphoteric colloid is becoming more and more apparent. D. J. Lloyd,[10] in publishing experimental evidence of the amphoteric nature of gelatine, expresses the opinion that gelatine consists of a solid framework of neutral gelatine (only stable at its iso-electric point, p_H=4.6 at 20 deg. C) which is insoluble in cold water, containing some combined water, and an interstitial fluid which is a solution of a gelatine salt.

T. R. Briggs and E. M. C. Hieber[11] have studied the phenomenon of the liquefaction and gelatinisation of gelatine by salts, and conclude that the processes are strictly reversible. Luppo-Cramer[12] offers a satisfactory explanation of some hitherto obscure features of development by reference also to the chemical department of gelatine. The idea that gelatine acts only as a protective colloid, allowing of the formation of relatively large and sensitive grains or crystals in the preparation of emulsions, and physically inhibiting the action of developing solutions on the unexposed areas of the film, will have to be abandoned in view of the work which has been pub-

1. "J.," 1919, 481A.
2. Nitrittfabrik A.-G., E.P. 140,694; "J.," 1920, 426A.
3. J. E. Marsh, E.P. 144,897; "J.," 1920, 582A.
4. U.S.P. 1,318,631 and 1,322,580; "J.," 1920, 94, 100A.
5. "Camera Craft," 1920, 27, 23.
6. "Phot. Korr.," 1920, 57, 270.
7. "Brit. J. Phot.," 1920, 67, 351, 499, 663.
8. "J.," 1920, 1561.
9. "Phot. Korr.," 1920, 57, 173; "J.," 1920, 705A.
10. "Biochem. J.," 1920, 14, 147; "J.," 1920, 419A.
11. "J. Phys. Chem.," 1920, 24, 94; "J.," 1920, 274A
12. "Phot. Ind.," 1920, 173.

lished during the past year.[13] The physical properties of gelatine cannot be disregarded with impunity, however, and the turbidimeter described by S. E. Sheppard[14] should prove useful in any photographic laboratory.

Development.

The action of developers on the latent image has been the subject of some considerable amount of study. B. Homolka,[15] continuing his work on the isomerism of developers (in this instance, the polyhydroxybenzoic acids), and taking into consideration the dissociation constants of the hydroxybenzoic acids, concludes that the failure of gallic and protocatechuic acids to function as developers is attributable to anhydride condensation between the OH group of the carboxylic radicle and the H of the OH situated in the para position. It is pointed out that the anhydride of the former acid can be regarded as a derivative of resorcinol and the latter as a derivative of phenol, neither of which substances functions as a developer. If the disposition of the side-chains or their constitution is such that anhydride condensation yields a derivative of an *o*-dihydroxy compound, or is prevented, developing properties are exhibited. Thus, pyrogallolcarboxylic acid (COOH : OH : OH : OH = 1 : 2 : 3 : 4) and the ethyl esters of gallic acid and of protocatechuic acid, will all develop the latent image. The reactivity of the sodium salt of cyclohexane-1.4-diol-1.2.4-trisulphonic acid as a developer[16] is of interest, since it necessitates a re-statement of the theory enunciated by Homolka and already referred to.[17]. A general survey of the mechanism of development is given in a communication by S. S. Sheppard and G. Meer,[18] who, reasoning by analogy from the proved adsorption of dyes by freshly precipitated silver bromide, conclude that the Lainer effect, *i.e.*, the acceleration of development resulting from the treatment of an exposed plate with dilute potassium iodide solution, and which is chiefly noticed when organic developers of low eduction potential (*e.g.*, quinol) are used, is due to increased adsorption and complex formation as between silver halide and developer. A fogging action of dilute potassium iodide solution on silver bromide emulsions is recorded in the same communication, and is ascribed to nucleus infection of the grains.

A. H. Nietz[19] has conducted an inquiry into the development potentials of the organic developers. A new and valuable method of determining these potentials was worked out and the following conclusions were arrived at:—"The effect of bromide on a developer depends upon its reduction potential. If a developer is of low potential, a given amount of bromide will have a larger effect in lowering the density than it will if the developer has a high potential. . . . . Maximum contrast . . . . . is not correlated with reduction potential. No definite relation can be shown to exist between the time of appearance and the reduction potential, neither does the fogging power of a developer depend upon its potential." Figures are given which show that the aminophenols are the most energetic, the hydroxyphenols next, and the amines the least. Both nuclear and side-chain (in the amino group) methylation increases the energy. Introduction of a second amino group greatly increases the energy, whilst change to a glycine and the introdnetion of a $-CH_2OH$ group lower the energy. Evidence was found that fog is practically absent from the high densities and increased as the image density decreased.

Lüppo-Cramer is responsible for the publication of much valuable matter relative to development reactions. In addition to the explanation of the developing power of aqueous solutions of amidol and similar compounds already referred to[12]—an explanation which assumes reaction of the gelatine with the salt-forming acid of the developing compound, with consequent liberation of the active free base—he has thrown light on the phenomena of "depth" development, and the desensitising action of developing solutions[20]; the study of the latter action has led to the discovery of a practical method of developing even highly colour-sensitive plates by inspection, in bright yellow light.[21] It is only necessary to treat the exposed plate for one minute in the dark with a 1:2000 solution of phenosafranine. The desensitisation effected by such treatment is of such an order that thereafter the plate can be handled without any risk of fog in light sufficiently actinic to fog rapidly wet "slow" bromide paper. The action of the phenosafranine appears to be entirely chemical, since a film of gelatine dyed under the same conditions transmits the entire visible spectrum; any colour-screening action of the dye is thus precluded. Moreover, Lüppo-Cramer has been able to demonstrate that the free amino groups contained in the dye play an important part in the reaction.[22] The marked acceleration of the action of the slower developers resulting from the desensitisation treatment affords further evidence of the chemical nature of the process, as does also the fact that the printing-out sensitiveness is enhanced as the desensitisation to latent image formation becomes more pronounced. Altogether the subject appears to be of great importance, both practically and theoretically, and promises to lead to a clearer understanding of the mechanism of sensitisation. The accelerative effect of increasing amounts of sodium sulphite in amidol developing solutions is attributed by Abribat[23] to reciprocal catalytic action of the sulphite in the oxidation of amidol, other oxidation catalysts producing a similar effect. Exactly what proportion of the acceleration caused by the sodium sulphite is attributable to this catalysis is difficult to judge, in view of the fact that increase in the sodium sulphite concentration leads to increase in the basicity of the amidol, a fact which would alone account for most of the observed acceleration. A general review of the organic developers is given by A. Seyewetz,[24] who repeats the statement that the developing properties are raised to a maximum by the introduction of a nuclear methyl group in the ortho position to the hydroxyl group, a statement which does not agree with the results obtained by Nietz,[19] who quotes a reduction potential of 7 (quinol=1) for *p*-amino-*o*-cresol and 9 for p-amino-*m*-cresol. The tendency of repeatedly used developing solutions to produce dichroic fog has been found by L. Lobel[25] to be due to the accumulation of colloidal silver in the solution. The conditions of low carbonate concentration with high sulphite concentration favour the formation of colloidal silver, and it was found that an addition of 20 per cent. sodium sulphate causes flocculation of the silver, which can be readily filtered off. Simultaneous development and fixation of photographic images has been further investigated by A. and L. Lumière and A. Seyewetz.[26] These workers confirm the previous conclusions of C. Otsuki and T. Sudzuki, and suggest a combination of chloranol and caustic alkali, or of metoquinone and tribasic sodium phosphate as practical formulæ. The process is particularly recommended for the treatment of over-exposed images. Identification of the products resulting from development reactions appears to be receiving no attention. Workers in this branch of research will be interested in the results of W. Eller and K. Koch,[27] who find that the dark brown substances formed by the action of air on phenols, *e.g.*, catechol and quinol, are identical with the humic acids, which are found amongst the decomposition products of vegetable organisms and of certain sugars.

RAYMOND E. CROWTHER, A.I.C.

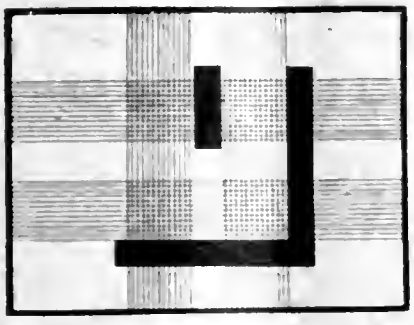
(To be continued.)

13. "Report on industrial applications of colloid chemistry. Dept of scientific and industrial research." "Brit. J. Phot.," 1920, 67, 645.
14. "J. Ind. Eng. Chem.," 1920, *12*, 167; "J.," 1920, 282A.
15. "Phot. Korr.," 1919, *56*, 387; "J.," 1920, 428A.
16. W. Fuchs and B. Elsner, "Ber.," 1919, *52*, 2281.
17. "Ann. Repts.," 1919, *4*, 516.
18. "Phot. J.," 1920, *60*, 12; "J.," 1920, 248A.
19. "Ibid.," 1920, *60*, 280; "J.," 1921, 62A.
20. "Phot. Ind.," 1920, 505, 664.
21. "Ibid.," 1920, 378; "Die Photographie," 1920, No 10, 1; No. 11, 1.
22. "Der Photograph," 1920, 337.
23. "Bull. Soc. Chim.," 1919, *25*, 569; "J.," 1919, 963A.
24. "Chim. et Ind.," 1920, *3*, 28; "Brit. J. Phot.," 1920, 67, 186
25. "Bull. Soc Franç Phot.," 1920, 7, 21; "J.," 1920, 558A.
26. "Brit. J. Phot.," 1920, 67, 747; "J.," 1921, 28A.
27. "Ber.," 1920, *53*, 1469; "J.," 1920, 717A.

MASKING LANTERN-SLIDES.

Many devices have been introduced with the object of avoiding the use of stock masks and of treating each subject individually. The little piece of apparatus illustrated was made to assist in this, and is employed in connection with "masking strips" of plain black paper cut to a variety of widths, but of a uniform length of three and one-eighth inches. Such strips are marketed already gummed as one of the "Specialist" series of lantern-slide accessories, but whether these are used, or whether the operator prefers to cut his own, I recommend that the adhesive should be wetted or applied, as the case may be, only on the extreme margin of the slide where the binding will subsequently cover it. Such little points as these may not make any difference from the exhibitor's point of view, but do assist in creating a "finished" or "professional" appearance to one's products when examined in the hand.

The purpose of the device shown in the cut is to make the application of the black strips an easy and rapid process, and to get the finished subject masked squarely with just the same ease as though one were trimming it as a print. It consists of a couple



of waste whole-plate negatives, one of which is first soaked in iodine or other bleaching solution till white, and then rinsed and fixed out in hypo. The other may be treated either in the same way or may be cleaned off, as it is merely to act as a cover-glass. The first one, when washed and dried, is ruled on with drawing ink in the manner shown. To ensure the maximum accuracy of the lines the plate is pinned down to a drawing board with one long edge against a fixed ruler, and the lines drawn in with the aid of set-square and parallel ruler. When dry the cover-glass is bound on with gummed strips, and then two strips of thin card are glued on the outside of the glass to act as registration stops or carrier for the slides to be masked. These strips are shown in solid black in the illustration. The black patch in the centre represents merely a bit of paper stuck on the glass. The reason for putting this on is that there is a tendency when a slide has been masked on this device to find that it shows a slight reluctance to be lifted off owing to suction between the two glass surfaces. This is a hindrance to rapid work when one is busy, and only a very thin bit of paper will prevent any trouble of this sort.

The method of using the masking guide requires only the briefest, if any, description. It is supported in a retouching-desk or on the top of a printing-box, and the slides are slipped one at a time against the cardboard strips. Two or three spots of fish-glue are applied to one edge of the slide (or water in the case of the ready-gummed variety), and a strip is laid on to suit that side of the subject, immediately adjusting it on or parallel to one of the black lines on the guide underneath. Naturally, one cannot trouble to find a strip of the exact width for each side, so one uses pieces a little too wide in every case. All four sides are masked in the same way in rapid succession, and then the slide is laid aside to dry. As soon as the pile of slides is finished the superfluous paper is trimmed off, preferably by the use of a long pair of scissors, such as paper hangers use. The slides are then fed into plate-racks and placed in a hot place, say over a gas-stove for thorough dessication of both slide and mask, and while still warm each slide is dusted with a brush and is laid flat with a previously cleaned and dusted cover-glass upon it. This procedure prevents the re-absorption of moisture before the final binding up.

D. Charles

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

A Makeshift Acid-Fixer.

A passably good acid-fixer, particularly suitable for negatives, may be made according to the following formula:—Water, 20 ozs.: hypo, 4 ozs.; soda sulphite, ½ oz.; citric or tartaric acid, 150 grs. The proper method of mixing the above is to dissolve the sulphite in 2 ozs. of water, the citric or tartaric acid in 1 oz. of water, and mix the two solutions. Next dissolve the hypo in water to make 17 ozs., and when quite dissolved add to it the acid sulphite mixture slowly and with constant stirring. Made in this way, the bath keeps and acts well, and has, I believe, no harmful chemical action, negatives being clear and good and keeping well.—L. T. W.

Improving the Developing Sink.

Earthenware and lead-lined developing sinks are not very kind to porcelain dishes, glass measures, and negatives, when the latter are accidentally dropped or brought too suddenly in contact with them. False bottoms of wooden laths are commonly used in such sinks, but an old, or even a new, india-rubber mat is very much better and much more safe. Rubber mats with small holes, such as are commonly used in motor cars, are the things to use, and the more completely such a mat covers the hard bottom of the sink the better. The holes are small enough to prevent measures of an average size slipping through, and the rubber forms an excellent cushion-like base for dishes on which they may be rocked with little or no "clatter," while the holes in the mat permit of easy removal of dishes. The rubber is also soft enough to prevent breakages should a negative be dropped upon it. The rubber mat will last for a generation and will not be affected by most chemicals. Another useful dodge is to fit rubber heels—old or new, revolving or otherwise—to the four corners of the bottom of large wooden dishes used on an earthenware sink.—L. T. W.

Renovating Studio Stands.

It is said that all trades have their closely-guarded secrets, and I cannot help thinking that the use of Vandyke brown ground in water is a secret of painters and decorators, for there is nothing like it, nor anything so cheap, for the renovation or redecoration of wooden studio camera stands, doors, and other things needing a walnut finish. No cleaning off of old paint is required. The article is simply wiped down with weak soda water, say one eggcupful to ½ gal. of warm water. Then procure two- or three-penny worth of Vandyke brown ground in water from any paint store and mix with water—or, better still, stale beer or stout—to form a very thin paint, and apply to the wood work with a brush or sponge in the usual way, brushing straight, stippling or dabbing, as may be required to get a desired effect. When quite dry varnish with copal varnish. Should the Vandyke not yield the exact tone desired other colours may be blended with it—burnt umber to darken or raw sienna to lighten. These colours, however, like the Vandyke, must be purchased ground in water, colours in dry powder form not serving. The cost of the Vandyke need hardly be considered because of its cheapness—less than threepenny worth serving for a large door—but the varnish is at the moment rather expensive. The work must be varnished in order to set and make perfect the colour, the unvarnished Vandyke rubbing off easily.—P. R. S.

Cork Lino in the Workroom

Some odd pieces of rather good quality cork lino, left over from covering the floors of some of the more important offices in a certain establishment, found their way (by means that need not be made public) into the photographic department, where they were promptly made use of.

The largest pieces were fastened on to the fronts of the copying and enlarging cases by coating the latter with thin glue well worked up to a froth and rolling the lino well and finally tacking round the edge with lino-brads. After a year's use pins are just as easily stuck in and pulled out, and there are no signs of per-

manent holes; a new coat of white paint on the enlarging easel saves the cost of many sheets of white paper for focusing upon.

Smaller pieces of the linoleum were used for cleaning backs of negatives and lantern-slides. The surface affords just enough grip to prevent the film slipping and becoming scratched, while the absorbent nature of the cork soaks up any superfluous moisture and so prevents the cleaning mixture running underneath and getting on the film. The smooth level surface allows plates to be laid face down and cleaned with a proper amount of pressure, and is a far easier and safer method than doing it while holding the plate in the hand.

One piece found its way into the mounting-room. Primarily it is used as a pad for stroking prints and to lay them upon while attaching the adhesive tissue. On occasion its resilient nature affords a means of securing adhesion when portions of a multiple mount have not been properly stuck. It is merely placed under the mounted print in the press and a long pressure given. In the case of a print or tints of rather unusual thickness the whole is laid face downwards, and the surface of the soft lino forms a temporary counterpart, as it were, to the projections of the various papers, and permits of pressure being exerted on each surface.—X.N.

Studio Feminities.

It is often a difficult problem to screen off a corrider, reception room, or dressing room window having an ugly view (as so many windows on photographic premises have in industrial centres) without a loss of light. Many of the new rippled or wavy, or even starred and frosted glasses may, of course, be used, but it is not always convenient to re-glaze a window, and interior work of some kind is called for. I have covered my employer's small windows very successfully by putting a light curtain of finest sheer white linen, held by narrow brass rods at top and bottom. At the lower end of the linen screen are inserted some large motifs of fillet lace placed in an artistic pattern. The fine white linen excludes a sight of the ugly roofs and chimney pots and allows plenty of light to enter, and its whiteness seems to enliven the whole place, while the arrangement of the lace takes away any effect of severity plain white linen may have.—A Lady Operator.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

Sooty Studio Lights.—Photographers who have studios in London, and who complain of falling soot obstructing their light, will be interested to know that London is far from being the sootiest place in England, and the records of the Meteorological Office place the distinction on Liverpool, where during January alone there were 26.03 tons of dirt deposited on every square kilometre. Kingston-upon-Hull came next with 20.24, and Newcastle-upon-Tyne showed a deposit of 18.35 tons. The dirtiest neighbourhood in London is Southwark Park, which totalled 16.91 tons a square kilometre. Some parts of the metropolis were astonishingly clean; Finsbury Park, for example, was only one-third as dirty as Southwark. Golden Lane and Wandsworth Common showed 14 and 12 tons deposit respectively. It should be understood that these were only totals for one month, but in the following months the statistics bear approximately relative proportions. Glasgow is a much cleaner place above ground than London, but Birmingham is distinctly bad, and, with the exception of Southwark, showed a much higher percentage of "sootiness" than London.

Photo-Mechanical Notes.

Chromo-Litho Screen Negatives.

According to a patent specification, No. 146,143 (open to inspection before acceptance), of M. L. Bassani, Neuilly-sur-Seine, France, the following method is used for making the screen negatives for chromo-litho or similar printing processes: In making one of the negatives, the screen is shifted along the lens axis, and in making the second negative the screen is displaced both axially and transversely, the two movements being preferably made simultaneously.

Bitumen Printing.

A recent patent specification, No. 139,472, granted to F. Hausleiter, 5, Lefèvre Strasse, Friedenau, Berlin, describes a process of bitumen printing in which a coating of bitumen is applied to a dyed negative gelatine image.

A picture is produced by printing or exposure in the camera, for example on a glass plate coated with gelatine sensitised by a haloid silver salt. For a half-tone picture a screen is used. The negative is developed with a developer which enables the gelatine of the undeveloped parts to be washed off with hot water. When this has been done the gelatine is coloured with a substance opaque to all light-rays acting on bitumen. This is essential if the silver deposit is not very dense, inasmuch as, according to Eder, bitumen is sensitive to the whole of the visible spectrum. The plate is then coated on the image side by pouring bitumen over it, and is exposed from the back. The bitumen is thus rendered insoluble at the parts not screened by the gelatine. The bitumen picture is developed in the ordinary way, and the gelatine is removed by a solvent. A positive bitumen picture is thus produced, well adapted to be etched. The free access of air to the bitumen during the exposure renders the same very uniform, even with pictures of large size.

The following patents have been applied for :—

Colour Photogravure.—No. 12,178. Rotary multi-colour photogravure printing machines. W. Pickup.

Printing.—No. 12,387. Photo-mechanical printing. A. R. Trist.

Lithographic Transfer.—No. 12,616. Preparation and treatment of photographic ferric films for lithographic transfer purposes. H. L. Shawcross.

Rotary Photogravure.—No. 15,299. Rotary intaglio or photogravure printing machines. T. R. Johnston.

Printing Screens.—No. 16,008. Methods for production of screens for photo-mechanical printing. A. R. Trist.

Process Screen.—No. 18,346. Photo process screen and method of preparing same. J. A. H. Hatt.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, July 18 to 23 :—

View Finders.—No. 19,641. Photographic view finders. C. W. Beevor and A. E. Cooke.

Photographs.—No. 19,842. Taking photographs. O. von Bronk.

Daylight Development.—No. 19,364. Daylight development apparatus for flat films. J. Worms.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Lenses for Reflex Cameras.—No. 162,829 (February 13, 1920). In the use of a reflex camera it is usual to open the lens aperture to the full during focussing, and watching the ground glass

before taking the photograph, and then to close the iris diaphragm immediately before taking the picture. This necessitates a considerable delay between the time at which the camera is focussed, and the time at which the actual exposure is made, because it is necessary to examine the graduations in order to see that the aperture is reduced by the correct amount. The invention is designed to provide rapid setting of the working aperture.

Upon the revolving portion of the lens mount which actuates the diaphragm is placed an adjustable handle, and on the fixed

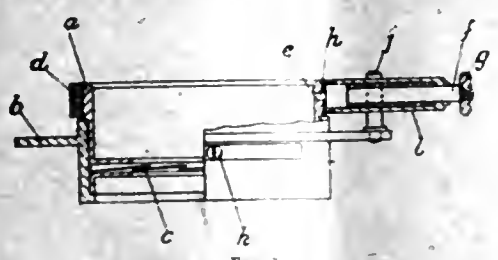


Fig. 1.

portion of the lens is placed a stop which limits the motion of this handle in one direction. The method of use is then as follows:—

Having determined the aperture at which the photograph will be taken, the diaphragm is set to that aperture. The adjustable handle is then moved until it is in contact with the stop on the fixed portion of the lens mount. The table handle is then clamped so that it is no longer adjustable as regards that portion of the lens mount which actuates the iris diaphragm, but is attached to it. The diaphragm can now be operated by means of this handle, but only within limits such that one end of the travel is when the aperture of the lens is fully opened, and the other end is when it is closed to the pre-determined aperture for exposure. The diaphragm can then be set to give either of these two positions by feel without examining the graduations, and the photographer having focussed and arranged his picture with the full aperture of the lens, can close it down without shifting the position of the camera to the aperture at which he requires to take the photograph.

In the drawings, the ring *a* revolving in the main flange portion of the mount *b* actuates the iris diaphragm *c*. The method employed for fitting *a* and *b* together is a fine screw thread, on

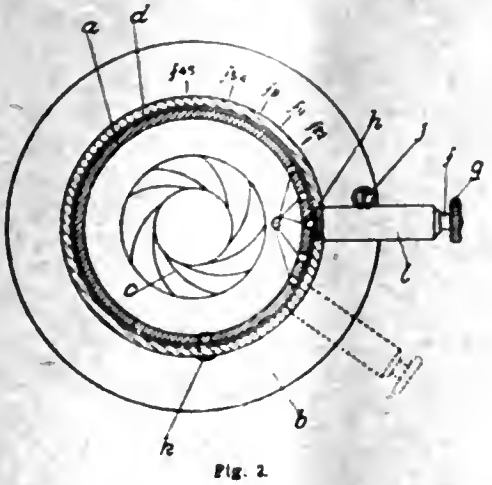


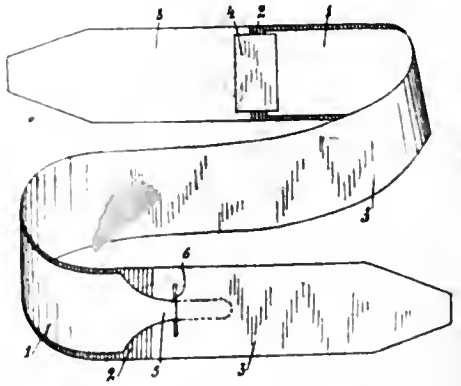
Fig. 2.

which *a* will turn with reference to *b*. Revolving on the ring *a* is a ring *d*, to which is attached a handle *l*. Within the handle *l* is a spring plunger *f*, at one end of which is a milled knob *y*, and at the other end of which is a stud *h*, which engages in holes *e* in the ring *a*, and fixes ring *d* to the ring *a* in various positions according to the positions of the hole *e*.

On the outside of the ring *d* an indicator or arrow is engraved which reads against a scale on the flange portion of the mount *b*, which is so arranged that when it is set to any of the divisions on the flange *b* the spring plunger *f* will drop into a hole in the ring *a* and fix the ring *d* with its handle to the ring *a* in a series of different positions corresponding to the divisions on the flange *b*.

On the flange *b* is fixed a stud *j* against which the handle *l* is stopped in its travel in one direction. It is stopped in its travel in the other direction by a permanent stop *k*, in such a position that the aperture of the lens is fully open. The result of this arrangement is that by pushing the handle in one direction the iris diaphragm of the lens is always open to its full aperture, but by pushing it in the other direction the diaphragm is closed to differing amounts, according to which of the holes *e* the handle (by means of the spring stud *h*) is in engagement with.—Conrad Beck, 68, Cornhill, London, E.C.

Roll-film Spools.—No. 163,913 (May 21, 1920). The end of the film is removably attached to its protective wrapper by a tongue on it passing through a lateral slot in the wrapper. This tongue is permitted to slide freely in the slot to allow of the displacement of the film relatively to its wrapper whilst at the same time securing sufficient relative fixity between the film and the wrapper to prevent the film being drawn with the paper when they are wound on the reel of the developing apparatus. The adherence of the tongue to the paper is also increased by the



tendency which the material of the film has to wind up on itself.

The tongue may also take the form of a label, on which particulars of the exposure may be written.

The film 1 is shown wrapped with its back against the black surface 2 of its protective wrapper, which is coated with a sheet of red paper 3. The ends of the wrapper extend beyond the film to enable them to be fixed to the reels or bobbins. The end of the film 1 is stuck to the protective wrapper by means of a gummed label 4 whilst the final extremity forms a tongue 5 which is inserted freely in a slot 6 in the protective wrapper.

After the film has been exposed, inscriptions for the identification of the film may be made on the back of the tongue 5, by unwinding, with precaution, the film until the back of the tongue appears.—W. P. Thompson, 12 Church Street, Liverpool, for L. Gevaert & Co., Vieux Dieux, Antwerp.

Reflex Cameras. — No. 161,736 (January 29, 1920). The invention aims to permit of the use of a wide angle lens with the least possible disturbance as far as the ordinary parts are concerned, and with minimum change in the shape, size and appearance of the camera.

The casing of the camera, 10, is provided at one side with a vertically slotted opening, 12. This partition is slotted similarly to the camera casing at its side next to the camera slot, 12, and is grooved internally around its other three sides, so as to provide for the reception of a ground-glass, in a frame or a plate-holder.

In this way the lens may be brought into close proximity with the sensitive plate, and a wide angle lens may thereby be effectively utilised.

The casing of the camera, 10, carries a hinged cover, 19, which normally closes the slot, 12, and it is thus obvious that the invention will not interfere with the ordinary use of the camera, but will simply supplement its action and increase its range of use.

The image is focussed on the ground-glass through the open rear end of the casing with the mirror raised and therefore a

lens shutter as distinguished from a focal plane shutter is required for the wide angle lens.- Kung-Cho Chen, 75, Baikal Road, Shanghai, China.

The following specifications are open to inspection before acceptance.

REPRODUCTIONS.—No. 166,513. Methods and devices for the photographic reproduction of pictures represented on curved surfaces. G. von Lücken.

APPARATUS. — No. 166,524. Photographic apparatus. W. Feuerzeug.

DAYLIGHT DEVELOPMENT.—No. 166,555. Daylight development apparatus for flat films. J. Worms.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, AUGUST 9.

Hackney Phot. Soc. Print Competitions.

THURSDAY, AUGUST 11.

Hammersmith (Hampshire House) Phot. Soc. Architectural Photography. A. H. Page.

North Middlesex Phot. Soc. "Intensification." H. G. B. Wood.

SATURDAY, AUGUST 13.

City of London and Cripplegate P.S. Outing to West Wickham.

Hammersmith (Hampshire House) Phot. Soc. Outing to the City.

Hackney Phot. Soc. Outing to Ruislip.

CROYDON CAMERA CLUB.

LAST week Mr. E. A. Salt brought the new developer D 50 to the attention of members. It is, he said, one of the many products of the Cooper Laboratory, established in 1904, and originally used by the founder, Mr. W. F. Cooper, for technical research, but since the war the manufacture of fine chemicals, among other things, has been undertaken.

D 50 is a two-solution developer, the A solution being supplied in concentrated form. The B solution contains the usual sulphite and soda carbonate (to which ¼ grain of potass. bromide per ounce of mixed developer is added), and is made up by the user, but the ingredients will shortly be on the market in tablet form.

Personally he never mixed the sulphite with the carbonate, as the preservative often deteriorates rapidly in alkaline solution, but dissolved each separately in half the quantity of water prescribed for the B solution, neutralising the sulphite with one-eighth its weight of potass. metabisulphite, as first suggested by their late member, Mr. C. Welborne Piper. Stored in well-stoppered bottles, the sulphite keeps for a very long time, and, when required for use, the solutions are mixed in equal parts, and form the B solution.

D 50 is considered to hold a medium position between high and low reduction developers, and it is alleged that, compared with other developers, less exposure can be given. Its lasting properties in concentrated solution appear to be remarkable, the makers stating that the developer will keep indefinitely without losing its developing power. They also mention that some solution made up in March, 1920, is still perfectly good. The origin of the rather distinctive name arose out of the fact that a number of developers had been tested in the laboratory and studio, and the developer, numbered 50 for identification, was finally selected. The big "D" stands for "Developer," and not the "other thing," despite a strong sulphurous smell when the bottle is opened.

It is, he said, claimed for D 50 that it presents the most universal developer ever placed on the market, and "owes its unique properties not alone to the careful blending of certain standard forms of reducing agents, but principally to the incorporation of agents *new to science*," a wording which a vendor of a hair-restorer might well envy. Considering that a 4-oz. bottle, making 160 ozs. of mixed developer, is priced at 4s. retail, it may seem somewhat expensive when compared with pyro. To the worker who only develops a plate or two at long intervals, this, of couse, is so, but here the added cost is not worth mentioning. On the other hand, considering its universal application and undoubted capacity for developing plate after plate, or print after print, D 50 may prove to be very economical to the busy operator.

In a eulogistic article in a recent number of the "B.J.," Mr. John H. Gear recorded that six whole-plate negatives had been developed with only 5 ozs. of the developer, the last negative being equal to the first in every respect. He also stated that tests extending over months had demonstrated the developer to be first-rate for bromide and gaslight papers. The same article also recorded a distinct difference of opinion between the author and Dr. Adolphe Abrahams as to whether a strong or weak developer was best for under-exposed plates. In his, the speaker's opinion, the matter might well be settled between them one evening at the R.P.S. with 8-oz. gloves. It would undoubtedly be the fixture of the session.

A test made in the short time at his disposal certainly illustrated the remarkable staying-power of the latest comer. Twelve half-plate bromide prints were developed at irregular intervals over a period of five days with 3 ozs. of developer, the last print 45 hours after the one preceding it. The former showed a deposit inclining to olive-green (quite suitable for some subjects), but the remainder were of a good black tone, which warmed a trifle towards the end. Each print was immersed in water till limp, drained, developed, washed for half-a-minute, and fixed in hypo solution, to which a little neutralised sulphite had been added. It remained water-white throughout. If a batch of prints is developed one after the other in a relatively small amount of solution, a shade more exposure seems desirable for the last, to compensate, in some measure, for the waning power of the developer. With correctly exposed prints the period of "full development" is clearly indicated by the growth of the picture ceasing.

Mr. Gear had stated that "the negative is free from colour, yet, if desired, the density of that given by pyro can be easily produced," a statement which throws little light on the printing value of the deposit. As all photographers know, the deposit of a non-stained pyro-developed negative affords by inspection a good idea of its printing value, whilst the blue-black and transparent deposit of a metol-developed negative prints far flatter than it looks. He had only developed one dry-plate with D 50—a "fine grain ordinary," exposed in the camera to a contrasty negative, but of good quality. The exposure was very full, the developer diluted to half-strength, when the colour of the resulting positive proved to be a fine olive-black, closely resembling a pyro-developed plate, but, perhaps, more transparent. The gradation was all that could be desired, but this, he thought, was more a function of subject, plate, exposure, and period of development, than any inherent quality in the developer.

In the discussion, the president, Mr. J. Keane, said he had given D 50 a good trial, and was very pleased with it; the negatives were admirably adapted for enlarging. Mr. Harpur spoke on many things, lapsing occasionally into the subject of the evening. D 50, in his opinion, scored chiefly by the ability to use it over and over again. Others expressed a similar view. Mr. H. W. Berry said no other developer was capable of the feat illustrated by Mr. Salt's set of bromide prints. The question arose whether the last of the batch would sulphide as well as the first, a most important point for a professional.

SURGERY ON THE FILM.—Much interest is reported by the "Times" Berlin correspondent in a new type of cinematograph apparatus exhibited privately to medical men in Berlin yesterday. Dr. Forch, in introducing the new invention, claimed that it would prove of especial value to surgeons and surgical students. It is a ball-shaped apparatus, which can be fitted to the ceiling of the operating theatre and set in motion from below. While an operation is being performed it enables films to be taken showing the minutest details of the operation. At yesterday's exhibition films were displayed showing the course of various amputations, the removal of an appendix, the sewing up of a broken kneecap, the breaking open of abscesses, and, finally, an operation on a child for wryneck. After the exhibition, it was announced that the Government was considering establishing a technical cinematograph institute in Berlin, and a special lectureship in cinematography at the Charlottenburg High School.

News and Notes.

HURTER-DRIFFIELD MEMORIAL LECTURE.—On the invitation of the Hurter and Driffield Memorial Committee, Dr. The Svedberg will deliver the memorial lecture in 1922.

"TAKE A KODAK WITH YOU'"—Asked at Bow County Court whether defendant had been spiteful to her lately, a woman plaintiff replied: "Yes, she even photographed my new costome and got one like it the following week."

OBLIGING THE PHOTOGRAPHERS.—At the test match played at Manchester last week, the captains of the English and Australian teams tossed twice for choice of innings. The first toss was official, the second one was to oblige the Press photographers, who were not ready with their cameras for the first spinning of the coin.

BARGAINS IN FRAMES, ETC.—Consequent upon rebuilding and extension of their works, and to avoid expense of removing stock to temporary premises, Messrs. J. Epstein & Co., Rupert Street, Bristol, are offering some exceptional bargains in frames and mouldings, cardboards, etc. Application to the above address will bring particulars.

LANCASHIRE SOCIETY OF MASTER PHOTOGRAPHERS.—In consequence of the recent industrial trouble, the annual meeting of the Society cannot be held just yet, since many members are on holiday, and those in the seaside resorts are kept busy. The President has decided to postpone the holding of the annual meeting until the month of September, when members in Blackpool will be free to make arrangements for the holding of this meeting.

HIGH ART—AND JINKS—IN SYDNEY.—The Australian papers just to hand contain particulars and programme of a "Soft Focus Evening," arranged by the Sydney Camera Circle. There was "song, music, laughter, eats, drinks, and smokes," the whole affair being run on the lines of the "Salon Smokers" of pre-war days. A very happy evening was spent, and, at the end, an "extra turn" was suggested, namely, "Has anybody here seen Tilney?" by Messrs. Paton and Wakeford. "What on earth has dear old Tilney been doing?" asks a correspondent, who sends us particulars of the social evening.

IDEAL HOMES EXHIBITION.—An interesting feature of the Ideal Homes Exhibition, to be held in Glasgow from September 19 to October 8, will be the Photographic Section. The arrangements have now been made for the classification of the different competitions. There will be five sections in all. The first will deal with landscape and seascape, the second portraiture and figure studies, the third architecture, the fourth any subject, and the fifth will be devoted entirely to amateurs. With the exception of class 5, the prizes will be: 1st £10 10s., 2nd £5 5s., and the 3rd £3 3s. For classes 1, 2, and 3, one print in each mount will be asked for, while in class 4 three prints on each mount, ½-plate and under are desired. In class 5, which is for amateurs only, this has been divided into three sections, A, B, and C. A is for six contact prints illustrating a happy holiday, B for any subject, C for landscape or seascape. Valuable prizes will be offered for the amateur competition. The Photographic section is under the auspices of the Scottish Photographic Federation.

Correspondence.

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

No notice is taken of communications unless the names and addresses of the writers are given.

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

PHOTOGRAPHY FOR THE NEWSPAPERS.

To the Editors.

Gentlemen,—By way of minor comment on the very excellent articles by Mr. Vining, may I mention one feature of my experience in press photography for the possible encouragement of some tyros.

Many photographers who send photographs to newspapers, and who are unfortunate enough not to have them used in the next issue of the paper, usually grumble and write letters asking for their immediate return. This is excusable enough when the submitted prints are of current interest, but when they are not of the latter variety it is a mistake to ask for their return.

Most of the pictures I have had reproduced in the Press have been of the genre type, or, say, of the "pretty-pretty" and "Kiss Mamma" school, and it is my usual custom not to ask for their return. Editors like to have a few things "up their sleeve," and I like to know that their files or "In Abeyance" drawers contain a fair number of my prints.

One never knows what may turn up, and I have had several strokes of luck by working on this plan. For instance, seven or eight years ago there was a big fire in a pretty country village I once photographed, and I at once sent pictures of the village, but missed the market. Last year, however, to my surprise, three of the pictures were used simply to illustrate pretty corners of England, but had I worried or asked for their return they would never have been published.

Your readers must have many pictures that editors would be glad to file, pictures that might be used at any time, either as "fill ups," or when something happens to make them of particular interest. Such pictures, however, need careful selection, and some knowledge of a paper's requirements, as no editor will fill his files with pictures that will never be of the slightest use. The point I wish to make perfectly clear is that no one need worry the editor of a well-known paper to return his submitted prints unless they are of current interest. The fact that pictures are being kept proves—in the majority of cases at any rate—that there is something of interest in the prints, and that there is a chance of them being used—some day.—Yours faithfully,

FREE LANCE.

REPOLISHING OF LENSES.

To the Editors.

Gentlemen,—We have noticed with interest the editorial note in your issue of July 15, and also Mr. Lyulph Lumley's letter in the July 22 issue.

We would like to say that we have, during the past few years, undertaken the repolishing of several hundreds of high-class anastigmats of various makes, and our experience has shown us that if work of this kind is done properly, the performance of the lens is considerably improved. The rust or tarnish, which is inevitable sooner or later with all modern anastigmat lenses, if they are exposed to the influence of moisture, sudden changes of temperature, or fingered, as so many people do, always has the effect of slowing the lens, and generally gives flat, foggy negatives. In fact, a good deal of the flatness one very often sees in professional negatives is due entirely to this cause.

In repolishing lenses it is necessary to make a tool for each individual lens, so as to repolish it evenly and retain exactly the original curves. Further, no attempt must be made to remove deep scratches, as the original curves will be altered thereby, with the result that the focus, and even the definition, will be impaired.

We have occasionally had lenses brought to us with the complaint that the definition has been degraded. In several cases we have found, in the endeavour to remove the tarnish, that the lens has simply been rubbed with a polishing agent, which method has altered the curves, and consequently spoilt the definition.

Rusting and tarnishing can, of course, almost be entirely prevented by keeping the lenses clean, and not touching them with the fingers. In this connection it has often been a matter of surprise to us that more care is not taken with valuable lenses by the average professional.

All modern anastigmats are made of glass which is softer, and consequently more susceptible to bad treatment, than that of the old type of R.R. or portrait lens, and for this reason anastigmats should be treated with greater respect than was accorded to the older type of instruments.

May we say that we carried out the work for Mr. Lumley, and his experience is similar to that of many other customers for whom we have done similar work.—We are, dear Sirs, yours faithfully,

PEELING AND VAN NECK, LTD.

4 to 6 Holborn Circus, London, E.C.1.

Commercial & Legal Intelligence.

LEGAL NOTICE.—Since July 30 last H. Scott Orr, The Studio, Woodford Green, will have no further interest in the business carried on there. Any communications addressed to his agent, W. Geo. Snell, Trewithian, Westbury Lane, Buckhurst Hill, will receive attention.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C. W. E.—A bromide print can be toned to yellow by a modification of the lead intensifier. Bleach the print in a mixture of lead nitrate and potassium ferricyanide as for lead intensification, but instead of darkening with sulphide, use a solution of potassium chromate, which gives a pale yellow image consisting of lead chromate. This is a very old process in making three-colour prints.

R. S.—It can be done, but it is not the satisfactory process that it is with the thin coating of emulsion on an Autochrome plate. Unless you are prepared to make the exposures on a thinly-coated plate, such as a lantern plate or one or other of the special process plates, we are quite sure that you will not find the process economical of labour. In any case it would want quite a little experience to get it into working order.

C. E. M.—If the plates have been stored in a fairly dry and cool place they may very likely be in good condition, but the bromide paper is scarcely likely to be. There is no way of remedying the defective results which the materials may give by adding anything to the developer. As regards the only possible means, namely, bathing the plates or paper in weak bichromate solutions, etc., the game is really not worth the candle.

M. W.—Unless you are soliciting business by canvassing from house to house no permit or licence is necessary, and it is not always necessary if you canvass for business in this way. In some districts the police certainly do require photographers who solicit business at people's houses to have a hawker's licence, but the practice of the police authorities in this respect varies greatly in different parts of the country. We think you can afford to ignore it unless you are pulled up by the police.

J. N. M.—It is an old idea, which you will find embodied in a device illustrated in a past Almanac. It consists of a galvanised iron pipe about 2 ft long and 8 ins. diameter, with a metal disc about 10 in. diameter soldered to each end to form a flange. The drier is screwed to the wall by one flange and an electric lamp arranged within the pipe. The heat from the lamp serves to warm about a 12-in. length of the towel, so that by moving the towel round from time to time it is kept continuously dry.

W. E. W.—Postcards or prints on double-weight paper are conveniently flattened by putting through the hot dry-mounting press, but the secret of making them *remain* flat is to first press face up (assuming the press is heated from above), then to remove from the press and at once lay face down on the still hot zinc plate. The print instantly begins to curl the reverse way, *i.e.*, the face becomes the convex side. If removed as soon as this tendency becomes evident, it will remain indefinitely in this flat condition. With a good size press, several prints can be done at once, and it takes less time than the ordinary dry-mounting.

F. N.—Pyro-metol developer is very liable to give strong negatives owing to the amount of stain occurring in the image. This developer is very little used for portraits on this account. We think you would do much better to use the ordinary pyro-soda developer given by the makers of the plates which you may be using. Generally speaking, if you mix the ordinary dish developer with three or four times its bulk of water, it will give negatives of about the right degree of strength in from 15 to 20 minutes at 60 deg. F. The development of one or two plates will show you whether you need to develop for a shorter or longer time.

F. F. E.—Some years ago at the Royal Photographic Society, Mr. R. Malby insisted on the necessity of using a panchromatic plate and suitable screen when making negatives from which slides were to be prepared and to be coloured. As compared with slides from negatives on ordinary plates, such positives were exceedingly transparent in the right places and, therefore, were susceptible of being coloured by tinting dyes to yield slides of extreme clearness and brilliancy of colour. Mr. Malby employed the aniline tinting solutions of Messrs. Johnson, applying them on the dry gelatine slide with small sable brushes and allowing one portion to dry before proceeding to colour adjacent parts.

Chas. N. Heff.—An old method of protecting carbon prints to a degree which renders them as durable as japanned goods and practically as permanent as fired enamels is as follows:—The carbon print is first mounted with glue upon a wooden panel or transferred directly to the surface of the wood. It is treated with a thin coating of chrome alum gelatine to fill any breaks in the surface. When dry it is taken into a warm room and given a coat of the best pale copal varnish. When quite dry and hard a second and third coating are given, each taking quite three days to dry. When thoroughly hard, the surface is rubbed down until quite even and free from brush marks, etc., with wet pumice powder applied with a cork rubber. Two more coats of varnish, followed by another rubbing down, should leave a perfectly even surface, which has to be polished to a mirror-like surface with rotten-stone and oil.

M. N. E.—A solution worked out some year or two ago by Messrs. Ilford, Limited, for the removal of even heavy pyro stain from negatives is the following:—

Potassium permanganate	50 grs.
Common salt	¼ oz.
Acetic acid (glacial)	1 oz.
Water to	20 ozs.

The stained negative should preferably be hardened first in a weak chrome alum solution containing one grain per ounce, unless it has been dried before the treatment is applied, as the film tends to become a little more tender in the process. The negative should then be soaked for ten minutes in the solution given above, and after a brief wash transferred to a solution of potass. metabisulphite 1 oz. in 20 ozs. of water, where it remains until the bleached image is quite white everywhere to the back of the film.

The image is then re-developed in any non-staining developer, such as hydroquinone, when a good neutral black deposit with clean shadows is produced. All the processes are performed in daylight.

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Contents.

SUMMARY.

In a contributed article, Mr D. Charles details the advantageous uses which can be made of gaslight paper in the copying of certain descriptions of original, and in the production of borders and masks for the addition of titles to photographs. The gaslight type of paper further serves for addition of key-letters to photographs of machines, and also for making of photographic copies which, as regards certain parts, require to be variations of the original. (P. 471.)

Mr. P. King describes the customary procedure and appliances in the development of cinematograph film, both positive and negative, and the printing of positive film by the continuous or step-by-step type of printer. (P. 474.)

In a further portion of his review of recent advancements in photographic processes, Mr. Raymond E. Crowther deals with colour sensitising and systems of colour photography, and with certain modifications in methods of producing positive prints. (P. 478.)

The value of aerial photography in making sea charts, particularly of shallow waters, has recently been emphasised in a paper by M. Volmat. (P. 483.)

The combination of two panoramic cameras with an ordinary aerial camera is described in a recent patent specification. (P. 480.)

A psychological cause of inferior output of prints is mental fag on the part of assistants regularly employed in one particular operation. We refer to this and to similar instances of mental fatigue in the printing room in an article on page 470.

A studio follow-up system for obtaining orders for portraits of children is recommended by an American professional photographer. (P. 477.)

Precautions in the use of a white background in the studio, when making either sketch or ordinary negatives, are the subject of a paragraph on page 469.

Enlarging retouched negatives, keeping flowers fresh, ferrotype developer, renewing focussing scales, and copyright in negatives are the subjects of brief replies to correspondents. (P. 484.)

Messrs. Amalgamated Photographic Manufacturers, Ltd., have announced the composition of their travelling staff in the various districts of the United Kingdom. (P. 483.)

When employing a flat-iron in the dry-mounting of prints, for example, in ordinary albums, continued cold pressure is often necessary for securing permanent adhesion. (P. 470.)

The effects, upon the permanence of the print, of using Farmer's reducer came up for discussion at the Croydon Camera Club. (P. 482.)

The advantage of dividing up the focussing screen by a series of cross-lines is experienced not only in the arrangement of landscapes, but when making copies of originals. (P. 470.)

EX CATHEDRA.

White Backgrounds. There are few studios in which a white background is not to be found, but it is not always that it is used intelligently. Many photographers find it difficult to prevent more or less veiling of their "sketch" negatives, and this can usually be traced to the flood of useless white light which is allowed to enter the camera, illuminating the bellows and woodwork, from which it is reflected upon the sensitive film. This trouble may be overcome by either of two methods. One is to have dark curtains which will cover up all parts of the background which are not to appear upon the negative; the other is to have a black cardboard mask fixed in the camera vignetter, so as to frame the subject to the desired size upon the ground glass. The latter device is the simplest, and has the additional advantage of being usable to cut off surplus light when making Rembrandt negatives. Care should be taken to keep a white background out of the way when not being used, as it acts as a powerful reflector, and causes flat results, if placed at the side or further end of the studio. It is hardly necessary to say that for sketch work the inside of the camera should have a perfectly dead-black surface.

* * *

Quality in Enlargements. It is not so very long ago that the photographer who contemplated enlarging had to pay due attention to the making of negatives exactly suited to the requirements of this particular process. Though we should be among the last to deny that for the production of perfect enlarged prints a negative of a certain character should be produced, this is the exception rather than the rule with most workers, since a negative may have to serve for several processes differing as widely in their requirements as enlarging and carbon printing. When an unsuitable negative has to be enlarged much may be done towards bringing about a passable result by a judicious selection from among the grades and varieties of bromide paper now available. In fact, if this point is given due attention, the making of perfect enlargements from negatives differing widely in character is more or less a simple matter. For an enlargement of medium size from a thin negative slow gaslight or "extra hard" bromide paper may be employed. Again, if a negative is made contrasty for P.O.P. or carbon printing, quite as satisfactory enlargement may often be obtained from it, if one of the most rapid bromide papers is chosen, a full exposure given, and the developer employed at double its usual strength. In this case, a stop bath or acid fixer is essential. Many workers do not realise what a power the different varieties of bromide papers place in their hands when enlarging from a batch of negatives of other than enlarging quality. Indeed, the excuse that used to be offered for poor enlargements by photographers, namely, that the negative was "not right for enlarging," no longer holds good.

Dry Mounting with a Flat Iron. Quite a large number of amateur photographers and not a few professional workers utilise the dry-mounting process for small prints, and in place of the ordinary dry-mounting press a domestic flat iron is employed. This is inclined to be rather too small, unless the prints are not larger than $3\frac{1}{2} \times 2\frac{1}{2}$, and it will be found worth while to obtain one of the larger heavier irons, such as are used by tailors. Another important point not often observed, is that the prints must be placed under heavy pressure immediately after being taken from under the heated iron; if this is not done the tissue may set out of perfect contact with either mount or print, in which case the print will lift within a few hours. In our experience this is the most common cause of trouble when dry-mounting in this manner. It is a good plan, after taking the print from under the iron, to place it under a heavy pile of books for an hour or two; or better still, it may be placed between the leaves of a book and pressed in an office copying press.

* * *

Ruling the Focussing Screen. Time was when nearly every photographer ruled off his focussing screen into a series of rectangles as a means of assisting the correct composition of his pictures ensuring that the principal lines and masses of the picture were placed where they make the strongest appeal. Though this plan is looked upon by some as a rather mechanical means of composing the picture, the idea is a good one, and tends to counteract the lack of balance that is often evident in out-of-door photographs, due to some principal object being placed too near the centre. The rectangular lines upon the screen entirely avoid this possibility. Some workers rule the focussing screen from corner to corner, the lines crossing at the centre. It is sometimes a great advantage to know the exact centre of the lens field, especially when very small objects are being photographed upon an enlarged scale, or when copying is being done with one of the older R.R. lenses, the definition of these instruments falling off very rapidly from the centre of the field. The centre lines allow the picture being composed so that the sharpest possible image is obtained. Of course, the lens itself must also be central.

* * *

Handling Small Film Negatives. Many professional photographers who undertake amateur work are often not aware how very delicate a film negative is even after it is dry, until some accident has occurred to its surface that might have been avoided had a little care been bestowed as the result of a warning previously given. The trade worker will certainly take care to see that no scraps of broken film from the edges are adhering to the negatives when they are pinned up to dry, and he will as far as possible try to dry celluloid films away from dust which will readily adhere to either side. But the amateur who develops his own films is not often as careful as he might be in ensuring that his negatives are free from imperfections of this kind. When these are brought in to be enlarged, no attempt should be made to get rid of dust particles, since the film is so delicate. As far as may be, such defects should be permitted in the negative and carefully worked out in the enlargement. Some workers advocate cleaning dirty films with a tuft of cotton wool moistened with methylated spirit, but we have found that with this there is serious risk of damaging or abrading the surface. Perhaps the most difficult among defects of this kind is the hard dry scum (formed by the washing water, imperfectly removed) that is often in evidence upon amateur films. If this is treated with spirit, as above suggested, there is a risk of the hard gritty particles comprising the defect abrading the film. In this case, the best way is to soak the film for an hour or so in clean water, gently rub off the scum with a piece of old chamois leather and pin up to dry.

MENTALITY IN THE PRINTING ROOM.

The best of printers will now and again turn out a batch of prints whose quality is very far removed from his usual standard. It is a curious feature of these occasional lapses that the producer will stoutly maintain that they *are* good prints, and no amount of argument will persuade him to the contrary. Experience teaches that this state of affairs is due to a kind of "staleness," which results from keeping people of certain temperaments too long at one particular kind of work. The bromide printer knows that the print he is developing will undergo a change when it passes to the hypo, and will further alter in depth on drying, according to whether it is a glossy or a matt paper. He may have also in mind that the print is for subsequent toning and may be developing accordingly. After a time the experienced printer makes the necessary allowances for these changes of appearance automatically, and without conscious effort. The action is there, however, and if the worker is of a sensitive or quick-brained disposition, and allows other matters to crowd his mind while he prints, relying on his subconscious mind for accuracy in his work, he must come to a stage when the consequent fatigue of mind interferes with co-ordination between eye and brain. When that stage is reached, the man cannot tell whether the print is a good or a bad one, and a worker who is of the nature described should not confine himself to one branch of work. The stolid type of person, on the other hand, may be relied upon to produce the same standard of work at an even rate indefinitely, and usually is found actually to prefer long runs of the same style or size, or even of the same subject. Such workers as these, however, rarely rise to emergencies, such as the production of large quantities in an unprecedented time, or the extraction of quality from negatives that appear to contain none.

There is another disease that frequently affects the worker who is kept, for whatever reason, at one particular branch, and is not confined to printers. There is a famous firm who advertise that they employ only specialists in each branch, and while the growth of their business is evidence of the commercial soundness of keeping each person at the work that he appears best suited for, yet it would be interesting to know whether they do not encounter the complaint referred to, and if so, how they deal with it.

The mental trouble in question has no definite name that we know of, nor has it been recognised as a disease by mental experts, although it has spread alarmingly in this country among the large army of civil servants which the war and its results have produced in our midst. Its symptoms are exemplified daily in newspaper descriptions of extraordinarily obtuse acts of bureaucratic red-tape. In photographic workshops it is found in all branches. It may be the retoucher who cannot understand why his work does not print so nicely as it looks, and cannot adapt methods of finishing negatives to suit subsequent operations. Or it may be that the gelatine of a plate presents some idiosyncrasy that makes opaque difficult of application, and the latter may have "gone wrong." At last, repeated efforts have succeeded in blocking out the subject, but the printer complains that

the extreme thickness of colour prevents sharp contact, and fine detail is blurred in the print. The retoucher puts the blame on the man who developed the plate and omitted to wash out the hypo. The printer blames the retoucher. They all forget that the prints are useless and the job must be done again.

In such a difficulty as that described, how much easier it would be if the workers would hob-nob and for the nonce sink their individual "dignity," to see if there is not a way out. They might even go so far as to consult the head of their firm or department, as there is always the possibility that he may have encountered such a "snag" before. In any case, he is almost sure to detect the fault and to know how the trouble could have been prevented. In the case in point he would decide whether if bad washing were the original cause it would not save time in the long run to wash and dry the plate again. If the "developer" were above taking such a suggestion, even in the form of a request from the retoucher, he could not well refuse the chief. The latter might point out that a more rapid cure might have been effected by varnishing the negative, or by the application of ox-gall, a supply of which would be obtainable (as a special favour, of course) from the finishing artist or from the print-glazing department. If none of these suggestions proved effective, he might direct the printer to make the prints through the enlarging lantern, and obtain sharp detail by that method.

The point of the argument is that it would be very much better for assistants in every branch to be mutually helpful, and not, in a case where difficulty occurs, merely carry out their individual part of the work in a hide-bound, quasi-conscientious manner, knowing that the results will be unsatisfactory, but prepared with an excuse which will seem to throw the responsibility on someone else; ignoring the fact that it is the photographs, and not the excuses, on which in the last resort their bread-and-butter depends.

SOME COMMERCIAL APPLICATIONS OF GASLIGHT PAPER.

THERE are two characteristics of the slow contrasty varieties of gaslight paper which hitherto appear to have escaped general notice, but which happen to be a combination of virtues of which I have been able to make considerable use in directions other than the making of ordinary prints from negatives. The properties referred to are, first, that a well-developed black upon a gaslight paper is a deposit that is actually opaque or sufficiently so to serve as a mask in printing on bromide paper, whereas a black on bromide paper is a very poor thing by transmitted light; and, secondly, that such blacks do not irradiate on to the adjacent white portions to the very slightest degree.

It becomes an easy matter, therefore, to obtain a very satisfactory line negative by contact from a tracing or similar translucent original, of sufficient brilliance to give with ease a bromide print that will very often surpass the original in quality. Unless the original has lines of absolute opacity, printing the negative requires care in getting reasonably correct exposure, in order that the gaslight paper may be developed long enough to get density without getting image over the lines. It is surprising what a slight amount of tint on the lines is enough to degrade them in the final prints; but then, again, with under-exposure a good solid black is not obtainable. It is better to make sure when working from a weak original that the lines remain clear, and trust to using a contrasty bromide paper to obtain brilliant prints. It is also essential to use plenty of fresh strong developer, and to avoid a suspicion of yellow stain. I do not think it is necessary to dwell any further on the technical procedure, and I will therefore proceed to describe some examples of the ways in which these paper negatives have proved useful in my work.

On more than one occasion a letter or other document has been brought to me on which the holder has set an extraordinary value, and has desired the negative to be made so that he may regain possession of the original while he waited. It has not required much experience to be able to decide quickly whether the paper of the original is sufficiently even in texture and translucent to permit of the method being used. Obviously, only originals having matter on one side are suitable, but it is quite surprising how some apparently rough papers will allow of satisfactory reproduction. The one thing that will prevent success is patchiness of density, especially if the irregularity inclines to yellowness, that colour being non-actinic in the extreme to gaslight paper. With a half-watt lamp in the printing-box, or a number of tungsten lamps, the exposures will average about a minute, so that it becomes easy to make a trial strip and then a full-size negative in the printing room in considerably less time than a glass negative can be made in the copying camera, and the annoyance often expressed as the result of putting pins through the corners will be avoided.

A letter in ordinary purple typewriting is rarely suitable for reproduction by this method, but black will turn out well

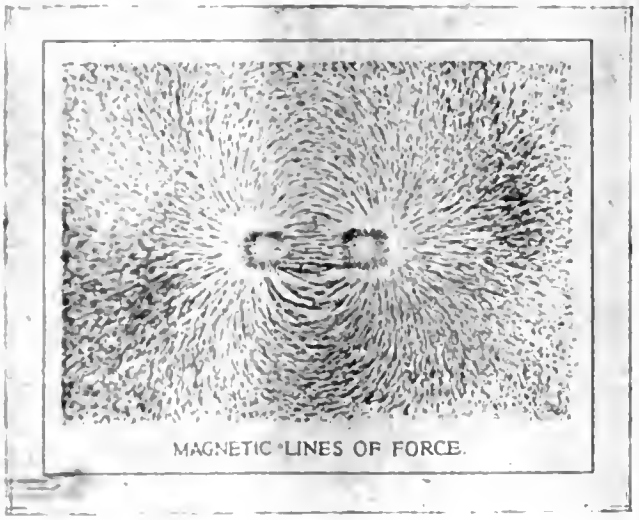


Fig. 1.

if the writing has been done with a fairly new ribbon and the paper is of good quality. Once a satisfactory negative has been obtained any number of bromide prints can be quickly and easily made from it. Using a light in the printing-box of a strength that normally would be employed for printing upon gaslight paper, the exposures from these paper negatives on bromide paper will be in the neighbourhood of five or six seconds.

Another occasion on which the method came in very handily was when I was asked to make a series of photographs of the "lines of force" produced by magnets of various kinds with

iron filings. The ordinary illustrations in books are from drawings, but it was desired to produce the "real thing." To do this it would have been necessary to arrange for vertical copying in the camera, but the use of gaslight paper produced a set of half a dozen different photographs in less than half an hour. They were made as follows:—The magnet (or magnets) was laid flat on the table or held between two blocks of wood, according to the result desired, and a waste negative rested upon it. A sheet of gaslight paper would then be laid upon the glass, and a sifting of iron filings be made over it as evenly as possible. On then giving the glass a slight tap the filings would spring into the lines desired, and a light was turned on to the paper. The characteristic properties of gaslight paper referred to at the beginning of this article resulted in the negative recording every detail of the filings to the very finest particles, and a bromide print from it needed holding only a very short distance away to present a perfect illusion of actual filings. One example is shown as an illustration, and the border line and title are introduced to show another application of the gaslight negative process.

I was asked at one time to make a considerable number of prints from whole-plate negatives masked out on to larger paper, and at the same time to introduce a simple border and title. About a dozen or two prints were required from each of a large number of negatives, and each border was to be of proportions to suit each individual subject, as was also the mask opening, so that each negative had to be treated individually. After some experimenting, the method was worked down to absolute simplicity; that is to say, that it was rendered so for any competent bromide printer, so long as each point of the procedure was carefully done. If, however, a less experienced person was given part of the work to do the results were unsatisfactory. It was found necessary to carry out the preliminary work by skilled and conscientious labour, although each operation is simple in the extreme, in order, first, that the paper negative should give a clean black line without the ground printing through and still permit of reasonable latitude in exposures; and, second, so that the registration of the title negative with the mask for the tone negative should be accurate, for nothing looks worse than a border which is neither square nor equi-distant with the edges of the subject. The pains taken in working out the method and in resolving it into a series of operations which were simple if carefully done, resulted in an enormous saving of

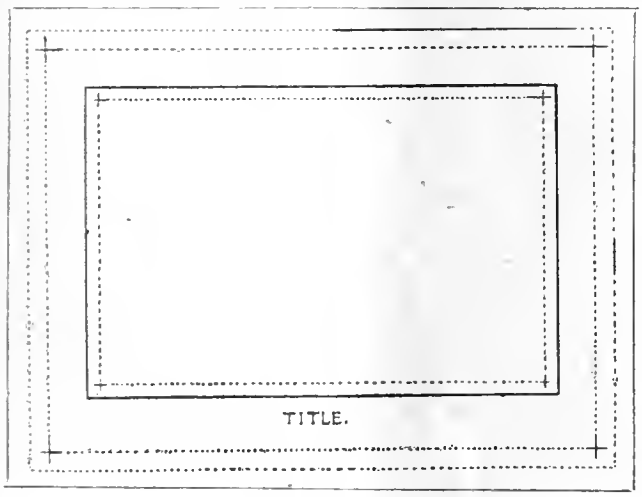


Fig. 2.

time and absence of trouble and waste in the final results, and permitted the titled prints to be produced with a very high-class appearance on "mass-production" lines.

The actual writing of the titles was done by a draughtsman, of course, who followed my instructions, as follows: Proof prints, trimmed to the dimensions in each case that should show on the finished result, were handed to him in batches, each one bearing on its back the wording of the title as well as the negative number. It was found that although various tracing papers gave excellent results, tracing-cloth resulted in cleaner lines, and the work was set out on sheets of this cut a little larger than the prints were to be. The negatives (mostly whole- and half-plate) were to be masked on to 10×8 paper, and the tracing cloth was cut to about 12×10. Figure 2 shows how the work was set out

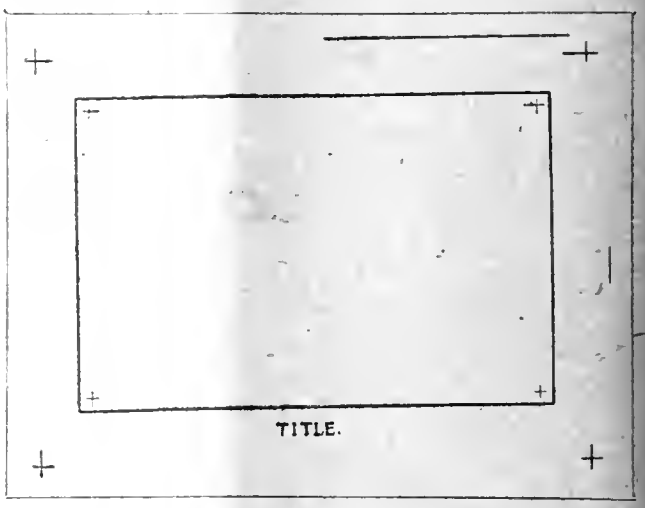


Fig. 3.

on each sheet, the dotted lines representing pencil, which was, of course, used first, and the essential lines inked in afterwards, when the remaining pencil lines were removed with a wad of cotton-wool and benzine. This was found to be another point where the cloth was better than most papers. The work was done with drawing ink, and when dry the tracing was placed in a retouching-desk with a strong light behind and weak places touched up with opaque. The outside line was drawn first, exactly 10×8, and inside that a line representing the size of the final print after trimming. The print was laid in correct position within this line, and the line drawn which obviously was to be the mask opening. Around this, at a suitable distance, was drawn the border line, and then the title was inserted. The pencil work finished, the tracing was *turned over*, and the negative number written on it *outside the* 10×8 *line*.

It will be understood that each batch was first done right through in pencil, then the ink work, after which the cleaning off, when the tracing appeared as in fig. 3, and finally the touching up with paint, and the other processes of negative-making, etc., were similarly done in batches on the "one operation-at-a-time" principle. There are several points in connection with the inking in that require mention, and the diagrams (which, in fact, are actual prints and negatives made in the manner described) will help to explain them. On the outside 10×8 line two ink lines are made, in the positions shown, a long one at the top right-hand and a quite short one in the right-hand centre. These are the registration lines. The next line has the corners inked in as shown, and these will show on the finished prints as "trimming guides" (see also fig. 1), which, if just cut off, will ensure that the print will be trimmed with equal and square margins, even if done by the most inexperienced. The mask also has its corners crossed, and all these lines should be made the very finest that a drawing pen will give (they are drawn coarsely here to ensure reproduction), but that end is not to be achieved by thinning the ink, or a translucent line will result, which is useless. If difficulty is experienced, a little burnt sienna water-colour, mixed in without any added water, will assist in making the line non-actinic. The border line itself, as well as the title, may be drawn any thickness desired, but for the rest the finer the better. The pencilled negative number is drawn in with less meticulous care than the other work, but it is essential that it should be of a bold character, and reasonably opaque also. The object of this is that the final

negative, which is a perfect black all over, will bear on it the corresponding negative number to which that particular title and border belong (see fig. 4). These negatives are therefore easily stored in files in numerical order, and can be got out just as easily as the subject negative when reprints are required. By reversing the number on the tracing, as described, it will read correctly on the negative.

Supposing, then, a batch of title-tracings is finished and cleaned off, it may be supposed that the next process is to print the negatives on gaslight paper as described before.

Fig. 4.

It isn't. The first thing the printer must do is to place each tracing on his printing-box and examine it carefully for weak places as regards density of ink and either correct these himself (soft pencil often is sufficient added density if done on the back of the tracing) or return them to the draughtsman. The most careful of the latter has sufficient of the artistic temperament in him to render him unreliable on this point unless kept up to scratch by more or less peaceful persuasion. Besides this one has the feeling when handing over a batch of fifty or so prints to have these tracings made that one would have less hesitation in asking a fellow-mortal to pick a quantity of oakum, so that one must expect human nature to show itself towards the end of a batch. However, having got our tracings done the negatives are made on gaslight paper of a size somewhat larger than the final prints, in the big order described 12 × 10 was used.

A trial or two will find an exposure that will permit the paper to be developed for a full minute, to obtain density, without clogging the lines. The old hand at gaslight will know, though the man who is used only to bromide paper will not, that the developer should in any case be not lower in temperature than 60 deg. F. It should be fresh and strong, and it will be found that these all-blacks take out the strength of the developer rapidly, so that it should not be stinted. By making sure of dense blacks and clear lines, which can be judged after very little practice as well on the surface as by transmitted light, not only will every negative require the same exposure in printing, but there will always be ample latitude, so that it will always be a matter of certainty that a black line will be on the final print without any fear of the ground showing, and whatever sort of development has to be given to suit the tone negative. Printing is done to suit the latter entirely, and the line stuff always comes up "merry and bright."

A number of tracings then, have had paper negatives made from them, the latter being well fixed, washed and dried in the usual way as though they were prints. They are preferably well "stroked," and then placed face to face under pressure, so as to get them nice and flat. The next thing is to make the masks, which is the part of the business that calls for most accuracy and conscientiousness. An equal number of sheets of paper, black or ruby, are required, which may be advantageously a little larger one way than the paper negative. The object of this extra inch or so is that the spare edge of the mask may be afterwards gummed to the negative so as to form a hinge, and allow of the two being kept together both in printing and in store, and thus avoid confusion and worry. The first thing to do is to place the masking paper on a sheet of cardboard, and to lay the paper negative face up upon it. A suitable masking paper, by the way, can be got in ruby from Messrs. Butcher and in black from Messrs. Kettle (fancy box manufacturers), of New Oxford Street, W.C. It is absolutely essential that during the next operation the two papers be not shifted in relation to one another, and if any fear be felt on that score it is advisable to fasten them together with a spot of adhesive in the centre, and in separating them afterwards it does not matter if a bit of the masking paper sticks to the negative.

All that is done while the papers are together is to pierce them in the following places with a fine, sharp needle:—Three pricks along the top registration line, well apart, but taking care to keep them in alignment: that is to say, if one does not quite hit the middle of the line the first time to keep the other holes on the same side of the line; then two near together on the short registration line, and one on each corner of the central mask line, that is to say, the absolute centre of each of the four little crosses. All that remains to be done after separating the two sheets again and gumming the two edges, so that they are now side by side instead of one on the other, is to cut out the mask by means of the four pin-pricks as guides, and to spot the negative by covering the small crosses now with bits of slide binder and with opaque for any dust spots, etc., and then to stick on a strip of stout light-coloured paper against the pin-pricks on the registration lines, on both negative and mask (figs. 4 and 5). It will be recognised that any inaccuracy in making these pricks or in sticking on the strips will be shown on the finished pictures by want of centralisation of the picture within the border line, but there is no real difficulty, only care is needed. If it is decided to dry-mount the registration-strips on, it is advisable to press both the masking paper and the negative in the hot-press before pricking the two points, as the amount of shrinkage in each may not coincide.

The procedure of printing from these borders is as follows: The standard exposure for the paper negative is first found,

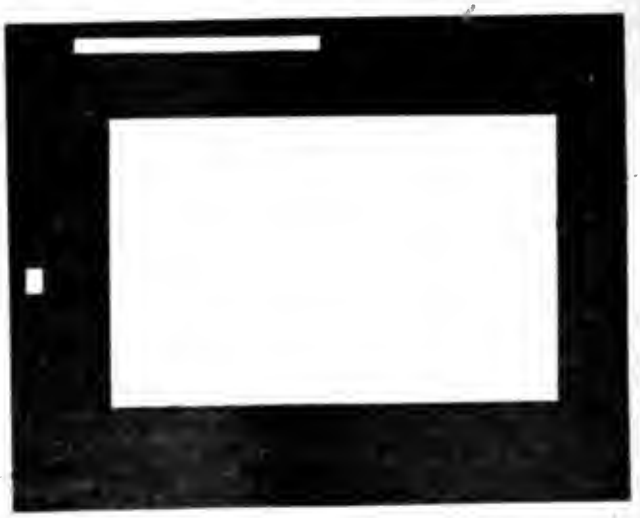


Fig. 5.

using preferably a powerful light for speed, and remembering to give plenty rather than to skimp the exposure. The tone negative is then laid in a cardboard carrier, so that it will not slip about on the printing-box, and the mask adjusted over it. Having determined the correct exposure, preferably *not* by guess, the requisite number of sheets are exposed, feeding each one against the registration strips. It will be seen that having one long one and the other being only a narrow stop piece, paper which happens to be cut not perfectly square will be just as correctly and easily fed. Having

exposed the required number of sheets on the masked negative, this is removed, and the sheets are fed and exposed to the line negative.

Probably many will consider it superfluous if I add that it is advisable to mark each sheet, so that there is no chance of reversing the prints between the two printings, but experience teaches that it is very necessary. A very good way is to cut off a very small corner of the whole pile of paper before printing each subject, and always keeping the cut corner at the top right hand in working. In practice also it will be found helpful to make a full-size trial in the following way of each subject. First of all, a full sheet is exposed on the line paper negative, and is laid on one side while the mask is arranged over the tone subject negative, which is then shaded if required, and the best exposure found by trial strips. This done, the previously printed sheet is exposed for the centre and is developed. This will not only act as a check on the accuracy of the masking work, but is rather desirable when first taking up this style of thing to give confidence. The description of the process, owing to the detail with which each operation has been described, may seem rather complicated and difficult, but, except for the fact that it is rarely worth while doing for a very small number and shows its advantages best when large quantities are required, it will yet be found very practical. For cases where one usually has letterpress printing done on mounts, with the alternatives of having more printed than one needs or being unable to supply reprints, this method will be found to have great advantages, because one can produce the actual number ordered without waste, and still be in a position to reprint at any time.

The same method of working is useful again when intricate machines are photographed and a display is required of lettering, describing the various parts with long arrows to each. Instead of setting out the wording on a large sheet of paper, in the centre of which is a print mounted, and subsequently copying the whole, one can produce a blocked out print with the matter inserted by double-printing without any loss of gradation in either the lettering or the subject, and can just as easily reprint at any time.

One more example of the utility of the gaslight-paper negative which has on several occasions saved time and money will conclude this article. A number of line blocks were required of diagrams of which the majority of the details were identical, but others, again, were to be different in each, and in some of them the wording was to be changed in part, and, again, was to be in one case in a totally different language. To draw the required number of copies of the complicated diagrams would have entailed many days' draughtsmanship. On being consulted I had the first one executed completely on a sheet of tracing cloth, and made a gaslight negative from it, the size being about 12×10. Then, with a bottle of mahogany varnish stain from the oilshop, the details that were required to be altered on the second block were painted over on the film side. As soon as dry a print was made on bromide paper on which the now missing details could be drawn in. The varnish stain dries very rapidly, so that it did not take long to make the whole series of prints, and in cases where a part that had been deleted was required in a subsequent copy the varnish came off with methylated spirit. The resulting bromide prints make admirable originals for the block-maker, and are easy to draw upon. Except in the case of glossy bromides which may not have been very well washed and have been dried off with spirit, there may be a little reluctance to take the drawing ink, and any trouble taken to overcome this does not cause less delay than blotting off the print as it comes from the washing-water and drying it as near a source of heat as may be safe. Matt prints, on the other hand, are better for taking colour if dried off, but will then take on a more obstinate curl, with the liability to crack on any attempt being made to straighten it out.

Many more instances could be given, but I think sufficient has been said to enable anyone to decide whether the process will prove useful to him, and, if so, how to carry it out to the best advantage.

D. CHARLES.

DEVELOPING AND PRINTING OF CINEMATOGRAPH FILMS.

To the photographer who has not had the good fortune to witness this part of the preparation of a film before it is shown on the screen, it has always seemed a huge and almost impossible proposition.

I should like to show my professional brethren the similarity to the preparing of the finished glass negative and prints to which they have so long been accustomed.

The length of film to be developed is usually anything up to 200 ft. and $1\frac{3}{8}$ in. wide. This, after having passed through the gate of the camera is now, we will assume, in the bottom box, or as is more generally known in the trade, the "take up" box, this being the one into which the film is wound after exposure.

The film is then conveyed to the dark room and there developed in either of the two ways which are in general use to-day. One is by means of what is known as the "pin frame" (fig. 1).

As one can see by fig. 1, this frame, diagonally and across the centre, has pins rivetted through the tubes. The size of a frame to take 100 ft. is 20 in. square; or 28 in. for taking 200 ft. of film.

To wind on to a pin frame of this description, one takes the roll of film and folding back a portion, viz., 1 in., a pin is inserted through both, thereby forming a loop which is put over one of the four centre pins, taking great care that the film is emulsion side outwards. The rest is then wound spirally and outwards, not missing any of the pins nor winding over the same pin twice and keeping the film moderately tight.

Having reached the other end of our film, we now make another loop as at first, and placing this over also, it is now ready for the developing dish or flat trough whichever

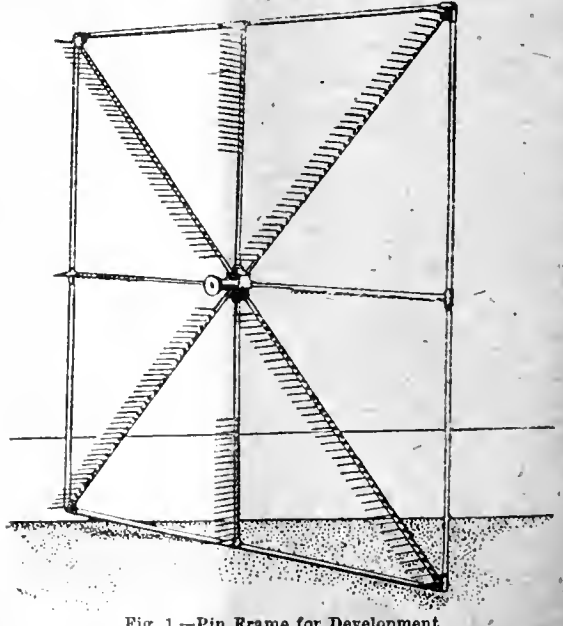


Fig. 1.—Pin Frame for Development.

is most suitable. The size of a pin frame dish holding 200 ft. is approximately 31 in. square and 3 in. deep. The

second method is by means of a flat wooden frame (fig. 2) over which the film is wound over and over up one side and down the other slightly on the slant. Pins placed top and bottom serve to keep the film from over-lapping.

Again the film is looped and pinned over the top edge, and assuming the wooden frame is on its winding stand, as the frame is rotated one can guide the roll into the grooves made by the staples fixed on the top and bottom. The size of a flat wooden frame to hold 100 ft. is 32½ in. square and 1½ in. wide.

Using a flat frame is simple and quick, but I would here utter a note of warning not to commence with a new film but to gain experience first with some old stock film which, if damaged, will not matter.

We are now ready for the developing and we can either use the flat trough or upright tank. For pin frames,

Fig. 2.—Frame for Winding Film for Development.

flat troughs are nearly always used. For flat frames, we can use both.

As regards developer, any good metol-hydroquinone formula suitable for Kodak film will do. An all-round developer for topicals, both negative and positive, is:—

Metol	3	ozs.
Hydroquinone	1	lb.
Potass metabisulphite	½	oz.
Citric acid	½	ozs.
Potass bromide	½	oz.
Soda sulphite, cryst	1	lbs.
Soda carbonate cryst	2	lbs.
Water	1,300	ozs.
	(8 gallons Imp. approx.)	

Sixty pints will be sufficient for a 200-ft. frame; for 100 ft. allow 25 pints. Be sure to take the temperature accurately

Fig. 3.—Wooden Developing Frame on its Winding Stand.

before placing the frame in the developer, the correct and best being 70 deg. F. Normally-exposed film will then develop fully in 5 to 7 mins. As to the raising of the temperature in winter, my reader will no doubt be in a position to supply the necessary appliances, but a good method is by means of a non-luminous electric radiator with variable resistance.

Two methods can be used for the development of film. It can be plunged into the trough and judged by inspection,

Fig. 4.—Frame in Developing Dish.

or by cutting off a portion of, say, six inches previous to winding on the frame and developing separately. By the latter method we can judge the best time to allow the remainder to secure the best result, especially if we have cut that six inches again into four and allowed each piece to remain in the developer for a longer time.

After the film has been developed it will be subjected to the same treatment as an ordinary plate—that is well washed

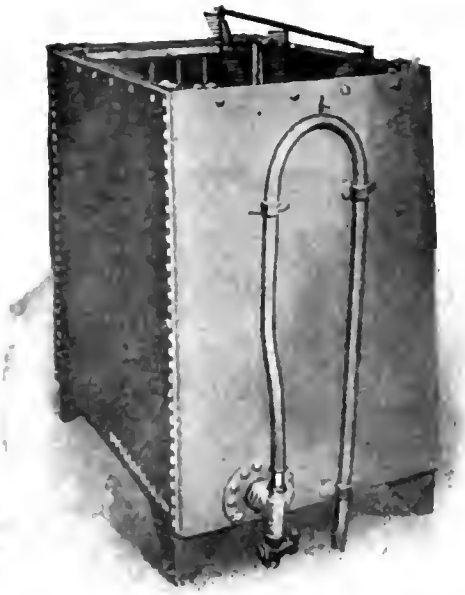


Fig. 5. Upright Developing Tank for Several Wooden Frames.

and transferred to the acid hypo bath. The Kodak formula for this latter is:

Hypo	20	lbs.
Hot water	57	pts.

When dissolved add the following solution:—

Crystallised soda sulphite	8	ozs.
Powdered alum	8	ozs.
Acetic acid	8	ozs.
Water	2½	pts.

B

It remains in this bath with occasional movement to prevent oxidation for 15 to 20 minutes, when it should be completely fixed, provided the bath is at full strength.

The film is then transferred to the washing tank and washed in running water for one hour. From this, the film can be then transferred back to the holder of the flat wooden frame and used for drying by keeping it spinning by hand, taking care that no damage results from the water thrown off; and care must be exercised to avoid dust.

This would not be much use commercially, so a motor-driven circular drum upon which the film is wound, emulsion side outwards, is arranged. It is a light cylindrical wooden cage revolving on a central shafting. To place the film upon it, one end is detached from the frame and securely pinned to one of the laths; again I must mention that caution—*emulsion side outwards*. Then, pushing the drum slowly away from you, guide the film which unwinds from the frame so that it spaces itself properly upon the drum slats without either undue tightness or slackness, and fasten the other end as at the beginning.

A drying drum capable of holding 500 ft., turned by an electric motor at 150 r.p.m., will dry in 25 minutes in a room of 80 degrees. After the film is dry it is then rewound by a re-winder and is ready for printing.

Printing.

The beginner in cinematography need not fear this part of the process any more than the taking and preparing of the negative.

Printing the cinematograph negative film is much the same as taking a print from an ordinary photographic negative, in that the emulsions of both must be in contact; but what we require is a series of continuous set of prints or positive films each showing or reproducing that difference of

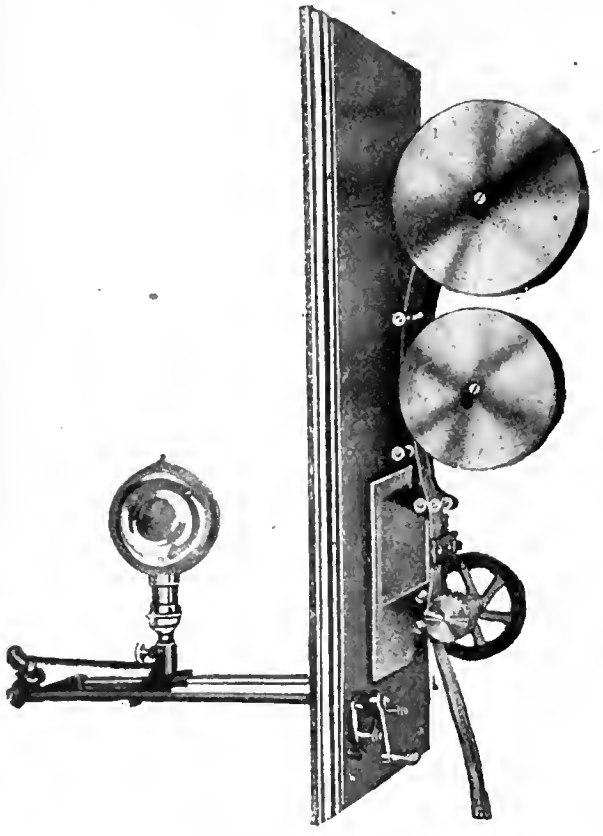


Fig. 6.—Continuous Printer.

action which we secured with the camera. There are two methods in use for this, one being by means of a continuous and the other by a step-by-step printer.

The continuous printer carries (fig. 6) a double arm for the negative and positive film, both of which pass in front of the exposure aperture to which is fastened a pressure gate keeping the two films in contact, and from there over a continuous moving sprocket and into a suitable receptacle such as a film bin. This machine is usually screwed to a partition wall or box in front of an aperture behind which a light

Fig. 7.—Step-by-Step Printer.

is placed. The light is adjustable as regards its distance from the film.

Need it be mentioned that the only bright light that should reach the film must be through the aperture gate, with the exception of the orange light used in front to work with. This is the most suitable form and preferable to ruby.

Cheap continuous printers are usually operated by hand, but for serious work a 1-16th h.p motor can be attached. Exposure can then be altered in three ways, viz., by the speed of motor, altering the candle power of lamp and shifting the distance of light-source from the film or gate aperture. Commercially the practice usually adopted is to keep the running rate and light the same, and adjust the exposure by shifting the light backwards and forwards only.

The step-by-step machine (fig. 7) is very similar in working to the cinematograph camera. The rolls of negative and positive are placed upon their respective rollers on the top. Then, threading them over the top sprocket with the perforations engaging the teeth of the same, we pass both with their emulsion sides in contact down through the gate, leaving a loop above and below the bottom sprocket and finally thread on to their respective rollers on the bottom for rewinding.

The printer is divided into two compartments. The lower contains the motor and a system of pulleys by which the different speeds may be obtained and also further controlled by another regulating switch. The upper compartment contains the lamp and is lined with asbestos. The latter is fitted on a slide controlled by a lever on a quadrant fixed in the front of the machine, and allows the lamp to be moved any distance from 2 in. to 10 in. from the printing window. This is further controlled by a regulating switch giving six variations of the light from 16 c.p. to 50 c.p. When the door is closed the compartment is light-tight and

perfectly ventilated. The gate aperture is of full size, viz., 1 in. and ¾ in., and the actual printing of each picture takes place while the film is stationary in the gate, as a rotating shutter placed between the lamp and film covers the aperture through which the light reaches the films at the time they are drawn downwards by the claw movement which is operating similar to that in the camera and uncovers again immediately the new section is in position.

This system is considered to be quicker, as by the combination of cone pulleys and regulating resistance, the speed of the film at the printing aperture may be varied from 80 to 500 pictures per minute. The machine may be run with perfect safety at this speed, at which the output of one machine is over 1,750 ft. per hour.

There is also a means for altering the masking of the picture, a necessity where one is printing different films that have been taken by several models of cameras. Having secured the print, the development of it is now the same as for the original negative.

P. KING.

USING BIRTH RECORDS TO HELP BUSINESS.

[In the following note, published in a recent issue of "American Photography" an American professional worker gives some hints on what we believe to be a novel plan of increasing business. All the ideas formulated in the note may not meet with the entire approval of workers on this side of the "herring pond," but there are some that may, nevertheless, the article is most interesting, showing as it does the way "boosting" is carried out by our brethren in the United States.—EDS. "B.J."]

EVERYBODY, very nearly, is interested in babies and in baby pictures, and there's nothing like a youngster or the photograph of one to arouse women and men, too, for that matter. Babies are the one big, universal, continuous interest of people in cities and in the country everywhere.

Because of this deep and abiding interest in the infants it generally needs merely a suggestion on the part of some person to induce the fond parents to take their offspring to a studio to have his picture taken. But, lacking this suggestion, the propitious time is passed by and some photographer loses trade that he should have, and also loses the opportunity of lining up the parents and relatives of the child for any future photographic business they may be in the market for. Now why shouldn't the photographer himself suggest to the parents that they secure photographs of their children? And why can't the photographer make such suggestions in a way that will inevitably secure the trade of a very large percentage of the people to whom the suggestions are made?

This sounds reasonable enough, but how is the photographer to go about making such suggestions? And, more important still, how can he so limit the suggestions made that he will not waste his time talking to a lot of folks who are not interested, because they have no children? If he uses newspaper advertising as the medium for suggesting to parents that they let him take photographs of their children, then the photographer will be spending money to reach a lot of folks who aren't in the market. Is there any way by which the photographer's efforts can be concentrated so that he will get at only interested people? There certainly is, and it is the purpose of this article to call attention to a method by which this can be done.

In every city and in every county vital statistics are kept by the proper city and county officers. Included in these statistics are complete birth records for the city and county. Generally it is the city or county health officer who keeps these statistics. Now suppose that the photographer goes to the proper office and looks over the birth records for one, two, three and four years previous. These records, of course, are public property and may be referred to by any person who desires to do so. Suppose that the photographer secures lists, from day to day, of the first, second, third and fourth birthdays of local children. Suppose that he has one of his employees find out by telephoning neighbours of the parents whether or not the children are still living. And then suppose that the photographer sends out to the parents some two or three weeks ahead of each child's birthday a circular letter, nicely spaced out and paragraphed, and reading something like this:—

"Congratulations on your son's second birthday! It will be an auspicious occasion when your son reaches the second milestone in his career on next Tuesday. And from then on, of course, it will seem as though his birthdays come faster and faster. Soon, all too soon, he will be in long trousers—will reach his majority. When your son is twenty-one, will you be able to remember the way he looks now? Children so quickly grow up! Mother's baby so soon becomes a full-grown man! Why not catch and retain for ever his present cuteness, winsomeness and sweetness? Why not celebrate your son's second birthday by having his picture taken at this studio now? Certainly there is no time like the present for taking the picture of a baby. Do it now! We are specialising in photographs of babies, and our friends tell us that we are securing splendid results. We're sure you will like the pictures we take of your son. Step round to our studio any time and look over our interesting collection of baby pictures, among whom you'll probably find the offspring of some of your friends or relatives. Or better, call us up and make an appointment. There isn't the slightest doubt in the world that if you have your baby's picture taken now you will be immensely glad of it in the years to come.—J. L. Smith, Blank Studio, etc."

Suppose that the photographer varies the letter appropriately if the child happens to be a girl, and suppose that every day he posts from twenty to fifty letters of this character. Would not the use of such an interesting, novel and attention riveting direct mail advertising stunt as this be calculated to make all parents sit up and take notice? And wouldn't such a stunt be certain to bring in a lot of additional business to the enterprising photographer who is engineering the proposition? As has been stated before, folks are always interested in babies, and, naturally, they are much more interested in their own children than in the children of other people. Consequently, when a letter of such a character as the foregoing is received by any parents, the natural thing for them to do would be to preserve the letter and to talk the matter over seriously.

One can imagine the sort of conversation that might occur between father and mother:—Father (with a pleased smile): "Well, our son must be getting to be pretty well known when a stranger knows all about the time when his birthday occurs." Mother: "I'm curious to learn how they found out about his birthday. Do you suppose some friend told them?" Father: "I haven't the slightest idea. But I tell you what I'll do—I'll drop in there and ask them." Mother (smiling): I know just exactly what you mean by that—you mean you'll go down there and talk about baby to the photographer, and end up by making an appointment to have baby's picture taken!" Father (unabashed): "Of course, that's what I intend to do! We surely ought to have a picture taken of him on his birthday." Mother: "But you know that when we talked about having the photograph taken we spoke of going to Brown,

who took our wedding picture.' Father: "We should fret about Brown. I like this man Smith's enterprise. He deserves something for reminding us that we ought to have the baby's picture taken. So we'll go there."

Wouldn't this be just about the sort of conversation occurring in the families of people receiving the letters? And wouldn't it be certain that many of the folks receiving the letters would make it a point to act on the suggestion conveyed to them and have their infants' pictures taken at once?

It wouldn't be a hard proposition, nor an expensive matter to put a promotion plan of this sort into effect. It would take only a small space of time each day to look up the right birth records for that day and to ascertain the present condition of the family by telephoning. As the letters would all be of the same form the actual work of mailing out the letters would be very small indeed. And whatever amount of time or work was involved in putting the scheme into work, wouldn't it all be very much worth while, in view of the increased business, the increased prestige and the great amount of word-of-mouth advertising which the photographer would secure through the operation of the plan? Try it and see.

FRANK H. WILLIAMS.

PHOTOGRAPHIC MATERIALS AND PROCESSES.

[The fifth annual volume of reports upon progress in the various branches of chemical manufacture, issued by the Society of Chemical Industry, includes, as did the preceding issues, a report on photographic materials and processes. This is again by Mr. R. E. Crowther, A.I.C., who (writing early in the present year) reviews the literature, published during the year 1920, representing original contributions to the technical improvement of processes of making negatives and positive prints, orthochromatics and colour photography, cinematography and photo-mechanical processes, and also the methods of research and measurement which are generally described as "sensitometry." Inasmuch as these reports are, so to speak, a series of annual stocktakings of what has been done during the twelve months preceding the issue of the volume, we have naturally wished to give them a place in our pages, since no other publication of the year so well reviews what has been done in reference to the current state of knowledge. As regards the references to original sources of publication, it should be explained that the contraction "J" denotes the fortnightly "Journal" of the Society of Chemical Industry in which are published abstracts of the chief papers relating to photography from the chemical standpoint.—EDS. "B.J."]

(*Continued from page* 462.)

Panchromatic and Colour Photography.

THE theoretical considerations which affect the orthochromatism of the results obtained on "self-screened" orthochromatic plates have been enumerated by Lüppo-Cramer.[28] It is pointed out that by suitable variation of the exposure and development of such plates, it is possible completely to reverse the photographic effects of blues and yellows. Inasmuch as "depth" development give the truest orthochromatic renderings on these plates, efficient anti-halation backing is a *sine quâ non* of correct technique. A fair amount of material has been published on the application of the isocyanines and allied dysetuffs as colour-sensitisers, and it is interesting to note that the property of conferring extra sensitiveness on an emulsion has been cited as evidence of chemical constitution.[29] W. J. Pope and W. H. Mills have given an account of their researches on the isocyanines,[30] which result from the alkali hydroxide condensation of quinoline alkiodides with quinaldine alkiodides, and on the carbocyanines,[31] prepared by the condensation of two molecules of a quinaldine alkiodide with one molecule of formaldehyde under the influence of alkalis. The original papers should be consulted for details as to the methods of preparation and examination of the dyes investigated. As far as the sensitising properties of the isocyanines are concerned, the following conclusions may be recorded:—1.1′-dimethylisocyanine iodide possesses powerful sensitising properties, and the maxima for the extra-sensitiveness conferred lie at 5850 and 5350; the positions of these maxima are only slightly affected by the introduction of other methyl groups. The whole spectrograph curve is rendered more uniform by the introduction of a methyl group in the 6-position and the maxima are depressed by introducing a third methyl group in the 6′-position or three methyl groups in the 2′.6.6′-positions. The total induced sensitiveness diminishes steadily as the molecular weight of the dye increases. The substitution of methyl by ethyl leads to a notable diminution in the sensitiveness for red and green light. The diethyl compound (1.1′) is affected similarly to the 1.1′-dimethyl derivative by the introduction of a methyl group into the 6-position or into the 2′-position, indicating a definite relation between the sensitising action and the chemical constitution. The introduction of a cyano or a phenyl radicle into the 2′-position practically annuls the strong sensitising action of the 1.1′-dialkylisocyanine iodide, a fact which, taken in conjunction with the modern views on the interaction of light waves with compounds consisting of two basis groups—one saturated and the other unsaturated—connected by a chain of conjugated ethylenic linkages, leads to the conclusion that all the 2′, 3′, and 4′-substituted isocyanines will prove to be feeble sensitisers.

In the carbocyanine series, the most important member of which is Sensitol Red (Pinacyanol), the derivatives generally exhibit a decrease in sensitising action as the size of the substituent group increases. It is suggested that the type distinction between the isocyanines and the carbocyanines lies in the coupling of two quinoline residues by the link :CH— in the former case, and by the conjugate chain :CH.CH:CH— in the latter. The multiplication of the number of units of the constitution :CH—, which occurs in the carbocyanine is accompanied by an extension of the extra-sensitisation far into the red region of the spectrum. Although for obvious reasons no variations in the method of applying the dyes to the plate were tried, it would no doubt greatly increase our knowledge of sensitisation mechanism if the opportunity afforded by the possession of what must constitute a unique range of homologous substances, were taken, and an investigation in such media as collodion, etc., carried out.

H. Barbier[32] has described the methods of preparation of dimethyl- and diethyl-amino derivatives of the condensation products of quinolines, quinaldines, and lepidines, all of which are stated to be of interest as photographic colour-sensitisers, and L. E. Wise and E. Q. Adams have been granted patents covering Pinaverdol[33] and the 1.1′.2′.6.6′-pentamethyl derivative of isocyanine.[34] The latter compound, however, does not appear to be of outstanding value (*vide* [35]).

The addition of Auramine to the dyes which are generally used for colour-sensitising has been found by F. F. Renwick and O. Bloch[35] to yield improved results by enhancing the

28. "Phot. Rund.," 1920, *57*, 129.
29. W. H. Mills and others. "Chem. Soc. Trans.," 1920, *117*, 579, 1035, 1550; "J.," 1920, 540A, 685A; 1921, 41A.
30. "Phot. J.," 1920, *60*, 183; "J.," 1920, 468A.
31. "Ibid.," 253; "J.," 1920, 802A.
32. "Bull. Soc. Chim.," 1920, *27*, 427; "J.," 1920, 528A.
33. U.S.P., 1,338,346; "J.," 1920, 502A.
34. U.S.P., 1,338,349; "J.," 1920, 502A.
35. "Phot. J.," 1920, *60*, 145; "J.," 1920, 428A.

sensitiveness in regions not sensitised by the Auramine alone, and by the suppression of the well-known tendency of the isocyanines to produce fog. The action of the Auramine may conceivably be chemically related to that of ammonia, which latter has been studied by S. M. Burka,[35] whose work has demonstrated that the so-called "hypersensitising" does not of necessity lead to the production of fog or to pronounced loss of keeping qualities.

The keeping qualities of even pre-war panchromatic plates have been found by L. T. Woods[36] to be of a very high order, and with the purer dyes which are now available, all modern panchromatic plates should show but very slight deterioration after prolonged storage.

Two hitherto unknown methods of imparting colour-sensitiveness to gelatino-bromide emulsions have been referred to during the past year. J. G. Capstaff and E. R. Bullock[37] have found that treatment of a plate with dilute sodium bisulphite or bicarbonate solution, followed by washing in distilled water, confers marked sensitiveness in regions of the spectrum to which the original emulsion was insensitive, and F. F. Renwick[38] has noticed a similar action of dilute solutions of potassium iodide and cyanide. He suggests that the fogging effect of the former salt, noticed by Sheppard and Meyer, and attributed by them to nuclear infection, was the result of such sensitisation and subsequent exposure to the red light of the dark-room. No theoretical explanation of this sensitisation by inorganic salts has been so far offered by Capstaff and Bullock; Renwick[38] on the other hand, suggests that the treatment with the sensitiser causes an alteration in the dispersive state of the solid solution of colloidal silver which he has previously referred to as the sensitive entity in ripened emulsions (*vide* [1]). It is perhaps noteworthy in this connection that whereas a dilute solution of potassium iodide (1:5000-1:50000) induces red-sensitiveness in an unexposed emulsion, stronger solutions (1:100) induce a sensitiveness in the latent image which is confined to the blue end of the spectrum.

Before passing to the year's work in colour photography it may be noted that A. Miethe and E. Stenger[39] have examined spectroscopically several dyes which can be used for the preparation of filters transparent to ultraviolet light, and K. S. Gibson, E. P. T. Tyndall, and H. J. McNicholas[40] have published curves showing the properties of the filters which have been found most useful in the detection of camouflage.

In colour photography the outstanding novelties are perhaps the processes of Katsujiro Kamei and W. V. D. Kelley, both of which are particularly applicable to cinematography. In the former process[41] a suitable arrangement of colour filters and prisms allows of each projected picture being a composite image of two simultaneously recorded colour images and successive pictures exhibit different regions of the spectrum. The sequence of colours is so chosen that not only is the combined effect truer to nature than is generally the case, but also eye irritation is largely eliminated. No attempt is made apparently to adjust the contrast of the colour-sensation negatives to compensate for the variation due to the wave-length of the light recorded on the negative. The variation of gradation due to wave-length differences has been investigated by A. Hnatek,[42] who finds that the curves obtained by plotting gradation against wave-length show in all cases an S-formation, rising from short wave-length up to a maximum for ordinary plates at about 4,500$\mu\mu$, falling to a minimum, and then rising again at about 4,900$\mu\mu$. Chromatic plates show some variation both as to position and height of the maximum. These results explain many of the seemingly contradictory statements which have been published on this subject. W. V. D. Kelley[43] has been granted a patent for a process of colour cinematography in which a double coated positive film is "ruled" by exposure under a symmetrical grating, so that the lines on one side correspond with the spaces on the other. By printing on this film from colour-sensation negatives and then toning the images (and rulings) to the complementary colours, a natural coloured additive picture is obtained when the film is viewed by transmission (projection). Provided that in successive pictures the screen pattern does not always occupy identical areas, the process should give excellent results.

The substitution of a blue filter for the green one during a portion of the exposure of the green sensation negative in two-colour cinematography—the more distant the object being photographed the greater is the proportion of the exposure through such blue filter—has been patented by L. F. Douglass[44]; whilst W. V. D. Kelley[45] has patented the expedient of giving an unscreened partial exposure when taking colour-sensation cinematograph negatives. Both these modifications, to carry out which will entail, unfortunately, complications in the apparatus, should lead to more harmonious renderings of the projected images. In additive colour work not primarily intended for cinematography, phenol-formaldehyde condensation products have been recommended as components of the "screen" by M. Wieland[46]; the ability to withstand somewhat rough usage, coupled with their insolubility, renders such products eminently suitable for the purpose. The use of fine transparent grains of magnesium carbonate as proposed by T. Silbermann,[47] does not appear so promising, as very efficient waterproofing protection would have to be applied over the grains in order to prevent their being attacked by the solutions which are used for reversal of the image in non-symmetrical screen-plate colour photography.

It is pointed out by P. R. Kögel[48] that many of the benzopyrilium (anthocyan) compounds occurring in flowers are sufficiently light sensitive for use in the bleach-out process. *o*-Anethol was found to sensitise several otherwise unsuitable colours of this class, and by reason of its sensitisation to light by thiosinamine it is concluded that Rhodamine S is constitutionally related to cyanidine chloride—a further instance of the application of photo-sensitiveness in the study of chemical constitution. The same worker[49] has detailed the conditions which it is necessary to observe in order to obtain prints in colour by the use of coloured enolic compounds. As the mordant dye process of producing coloured images is likely to become of increasing importance in natural colour positive work, it is of interest to note that F. E. Ives[50] has improved his method of bleach-mordanting the silver image so that a translucent or transparent result may be obtained at will.

Positive Processes and After-Treatments.

A method of measuring the gloss of photographic printing papers which depends upon the polarisation of reflected light has been described by K. Kieser,[51] and F. Formstecher[52] has modified the well-known crossed-wedge process in such a way as to make it of relatively easy application to the determination of the characteristic curve of printing-out papers. The last-named worker has also published[53] the results of his researches on the colour of the images given by printing-out papers. He confirms Chapman-Jones' contention that the colour is a function of the size of the precipitated silver particles, and finds that emulsions having a low citric acid content give blue images, whilst redder and softer results are obtained as the proportion of this acid increases. G. Staess[54] proposes to increase the steepness of gradation of the print when using printing-out paper by interposing between the negative and the paper a thin film of gelatino or collodion

35. "J. Franklin Inst.," 1920, *189*, 24; "J.," 1920, 207A.
36. "Brit. J. Phot.," 1920, 67, 663.
37. "Ibid.," 719; "J.," 1920, 834A.
38. "Phot. J.," 1921, *61*, 12; "J.," 1921, 99A.
39. "Brit. J. Phot.," 1920, 67, 743.
40. "Z. wiss. Phot.," 1919, *19*, 67; "J.," 1920, 313A.
41. "Brit. J. Phot.," 1920, 67, 9.
42. E.P. 143,979; "Brit. J. Phot., Col. Sup.," 1920, 27.
43. Z. wiss. Phot.," 1916, *16*, 271; "J.," 1920, 45A.
44. U.S.P. 1,337,775; "J.," 1920, 468A.
45. U.S.P., 1,325,200; "J.," 1920, 136A.
46. U.S.P., 1,322,794; "J.," 1920, 83A. U.S.P., 1,325,204; "J.," 1920, 136A.
47. E.P., 137,502; "J.," 1920, 248A.
48. G.P. 313,008; "J.," 1919, 878A.
49. "Phot. Korr.," 1920, 57, 86; "J.," 1920, 583A.
50. "Ibid.," 1919, 56, 332; "J.," 1920, 427A.
51. "Brit. J. Phot. Col. Sup.," 1920, 43.
52. "Z. angew. Chem.," 1919, 32, 307; "J.," 1920, 83A.
53. "Phot. Korr.," 1920, 57, 191; "J.," 1920, 640A.
54. "Deuts. Opt. Woch.," 1920, 33; "J.," 1920, 640A.
55. G.P. 316,087; "J.," 1920, 386A.

stained with ferric thiocyanate, the colour of which is bleached inversely in proportion to the opacities of the negative being printed. R. Namias[58] recommends the addition of small amounts of alkali to the sensitising bath used in the carbon process with the object of obtaining papers which exhibit enhanced keeping qualities. Before printing, the alkali is neutralised by fuming the paper in the vapour of a volatile acid, *e.g.*, acetic acid.

A prussiate paper which also exhibits pronounced resistance to deterioration on being stored in the dark, can be prepared, according to E. Bertsch,[59] by the addition of 10-20 per cent. of an alkali oxalate to an alkali ferric oxalate before treatment with ferricyanide. The colour of the image changes during printing through various shades of green and blue to a yellowish grey, and on washing it is claimed that pure white lines on an intense blue ground are obtained. The preparation of a duplicating stencil by photographic means has been patented by S. J. Walters.[60] The process, which is likely to find a fairly wide application provided a composition is used capable of withstanding the "handling" which the inking imposes, is virtually the transference of a carbon print to a support of fine texture through which the duplicating ink will pass when rolled up in the ordinary way.

A most important step in the sphere of practical photography has been made by the introduction of the so-called "dye impression process,"[60] which is the outcome of several years' experimental work by F. W. Donisthorpe. Briefly, the process consists in making a negative on any suitable base—either rigid, pliable, opaque, or transparent—treating this negative with a solution which induces selective absorption of dye, immersing thereafter in a suitable dye solution, and after a brief rinse, transferring the dye image to a gelatine- or baryta-coated support by a short time contact under slight pressure. The transferred print is then rapidly dried to prevent diffusion of the dye, with consequent loss of definition in the finer details. Apart from the obvious economy and convenience of such a process, it is evident that since only surface images are necessary, only the under-exposure portion of the characteristic curve of the sensitive negative material need be used, and thus an emulsion of ordinary speed (in the H. and D. sense) becomes one of extreme rapidity; the development process is shortened, and the positive results exhibit sufficient accuracy of tonal rendering to allow of the process being applied for most work. In addition, the range of colours of the positives is practically unlimited, being dependent only on the availability of suitable dyes.

Very little has been published relative to the toning of photographic images, but the papers of R. Namais[61] on combined selenium and sulphur toning, of J. Durbreton[62] on the combination of nickel and cobalt ferricyanide, and of J. M. Blaney,[63] who converts the silver image to a tin salt which acts as a mordant for dyes, are worthy of note.

J. W. Pilkington[64] advocates the use of barium sulphide in lieu of "liver" of sulphur in the so-called cold-toning process, which still finds much favour amongst professional photographers. It is claimed by C. Schleussner A.-G.[65] that the brown tones obtained by bleaching a developed print, either before or after fixing, with a solution containing mercuric chloride and potassium bromide and subsequently treating with a hypo bath containing a lead salt, are fast to light. The fastness to other influences is not stated, but previous experience of lead toning processes does not encourage one to place much reliance on the all-round permanence of the toned images.

RAYMOND E. CROWTHER, A.I.C.

(To be concluded.)

57. "Il Progressio Foto.," 1915, 208; "J.," 1920, 207A.
58. G.P. 320,891; "J.," 1920, 676A.
59. U.S.P. 1,327,931; "J.," 1920, 248A.
60. "Phot. J.," 1920, *60*, 119; "J.," 1920, 313A.
61. "Il Progressio Foto.," 1914; "J.," 1920, 136A.
62. "Bull. Soc. Franc. Phot.," 1916, *6*, 304; "J.," 1920, 136A.
63. U.S.P. 1,331,902; "J.," 1920, 314A.
64. "Brit. J. Phot.," 1920, 67, 14.
65. G.P. 318,503; "J.," 1920, 428A.

FOX TALBOT MEMORIAL FUND.

As recently announced in our columns, in a letter from the president, Dr. G. H. Rodman, the Royal Photographic Society is establishing a fund for the purpose of providing a memorial to William Henry Fox Talbot, from whose researches in the early part of the last century the present-day processes of photography have originated. It is proposed that the memorial should take the shape of a stained glass window, to be placed in the church of Lacock, Wiltshire. Lacock has been the home of the Talbots for many generations, and it was there that Fox Talbot carried out his work. The following donations have been received :—Alex. R. Hogg, Belfast, 10s. 6d.; A. E. Mayhew Chatham, 2s. 6d.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, July 25 to 30 :—

EMULSION COATING.—No. 19,955. Coating photographic films, paper, etc. Kino-Film Co. and C. Munch.

COLOUR PHOTOGRAPHY.—No. 20,436. Colour photography. Colour Photography, Ltd., and J. F. Shepherd.

COLOUR PHOTOGRAPHY.—No. 19,945. Colour photography. Sir C. S. Forbes.

STEREOSCOPY.—No. 20,175. Optical device to obtain stereoscopic images. A. J. Tonpillier.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

AERIAL CAMERAS.—No. 165,181 (March 19, 1920).—The invention comprises the combination with an ordinary aerial camera of

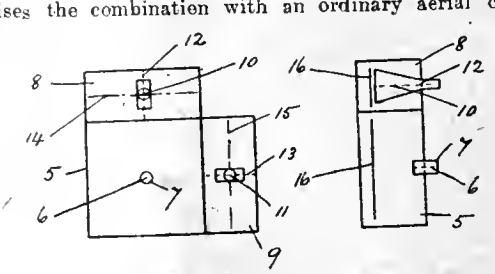


Fig. 2. Fig. 3.

two panoramic cameras having circular focal plnes and mounted so that their lenses swing in planes parallel to the optical axis of the aerial camera, and at right angles or other suitable angle

to one another, across the field which is being photographed, all the three cameras being exposed simultaneously.

If the aerial camera deviates from the vertical when the exposures are made distortion can be detected in the panoramic camera photographs by comparing them with the aerial camera photograph.

In the drawings, the numeral 5 indicates the aerial camera; 6 its optical axis; and 7 its lens. 8, 9 represent the panoramic

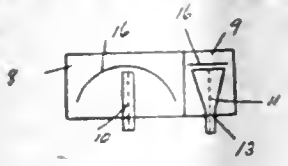
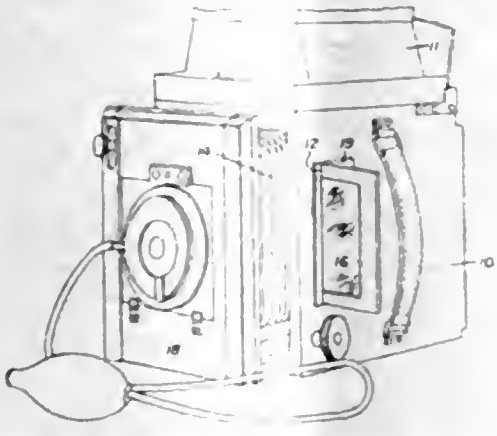


Fig. 2.

cameras; 10, 11 their respective optical axes; 12, 13 the pivots about which their axes swing; and 14, 15, the planes or paths of movement.

It will be seen that the pivots 12, 13, cross the optical axes, 10, 11, and that the planes 14, 15, are parallel to the optical axes, 6. 16 is the photographic film.—Arthur John Elliott, Instrument Design Establishment, Royal Air Force, Biggin Hill, Kent.

REFLEX CAMERAS.—No. 161,730 (January 29, 1920). By an oversight in the imposition of the pages of last week's issue the



accompanying illustration of the reflex camera patented by Kung-Che Chen, Shanghai, was omitted.

The following complete specifications are open to public inspection before acceptance.

DEVELOPING APPARATUS.—No. 166,697. Film-developing apparatus. H. C. F. Morant.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

S.X. (DEVICE).—No. 403,726. Photographic films and photographic plates, included in Class 1, and made in Essex. Samuel William Copley, Grange Works, The Broadway, Leigh-on-Sea, Essex, manufacturer of photographic appliances.

S.X. (DEVICE).—No. 403,727. Photographic cameras, lenses, and other photographic apparatus, included in Class 8, and all made in Essex. Samuel William Copley, Grange Works, The Broadway, Leigh-on-Sea, Essex, manufacturer of photographic appliances.

S.X. (DEVICE).—No. 401,479. Photographic paper made in Essex. Samuel William Copley, Grange Works, The Broadway, Leigh-on-Sea, Essex, manufacturer of photographic appliances.

STEREOPLASTIC.—No. 401,044. Cinematograph and lantern projection apparatus (included in Class 8), films for exhibition and lantern slides. George Anderson William Hepburn, 44, Chippenham Road, Maida Hill, London, W.9, cinematograph apparatus manufacturer.

NEVILLE AND NEVILLE (DEVICE).—No. 392,025. Photographic paper, photographs, photographic mounts, portraits, postcards and paintings, all being goods included in Class 39. Neville and Neville, 1, Tilley's Chambers, 22, Blackett Street, Newcastle-on-Tyne, art photographers and miniature painters.

SUNIC.—No. 403,331. Chemical substances used in manufactures, photography, or philosophical research. Watson and Sons (Electro-Medical), Ltd., Sunic House, 43, Parker Street, Kingsway, London, W.C.2, manufacturers.

LUMEX.—No. 404,987. Photographic plates, photographic films, and photographic chemicals. Lumex, Ltd., 31, Dame Street, Dublin, Ireland, manufacturers of and dealers in photographic, optical and scientific apparatus.

LUMEX.—No. 404,989. Photographic paper, photographic albums, and photographic mounts included in Class 39. Lumex, Ltd., 31, Dame Street, Dublin, Ireland, manufacturers of and dealers in photographic, optical and scientific apparatus.

ECLIPSE.—No. 413,815. Photographic plates and photographic films. The Imperial Dry Plate Co., Ltd., Ashford Road, Cricklewood, London, N.W.2, manufacturers of photographic materials.

APPLICATIONS FOR REGISTRATION.

TREFOIL DESIGN ("AS DE TRÈFLE").—No. 415,911. Photographic chemicals, plates and films. Grieshaber Frères & Cie., also trading as Société des Produits Photographiques "As de Trefle," 27, Rue du Quatre-Septembre, Paris, France, manufacturers. June 3, 1921.

TEDDY.—No. 415,931. Photographic cameras. Edmond Francis Stratton, 1, Cedar Street, South Norwalk, State of Connecticut, United States of America, manufacturer. June 8, 1921.

Commercial & Legal Intelligence.

LEGAL NOTICE.—Notice is given of the dissolution of the partnership between Charles Stuart, deceased, and Archie Stuart, carrying on business as photographers, at 47-49, Brompton Road, Kensington and 159, High Road, Balham, S.W., under the style of Stuart; at 191, Brompton Road, Kensington, under the style of Searle; and at 169, High Street, Kensington, under the style of Nandin. All debts due to and owing by the late firm will be received and paid by Archie Stuart, who will continue to carry on the business under the same names.

NEW COMPANIES.

CLUB PHOTOGRAPHER, LTD.—This private company was registered on July 30, with a capital of £500 in 500 "A" and 2,000 "B" shares of 1s. each and 1,500 "C" shares of 5s. each. Objects: To acquire the business of proprietors and publishers of the magazine known as the "Club Photographer," carried on at 9, Eberle Street, Liverpool. The first directors are:—G. E. Peachey (chairman and managing director), Beau Desert, Hightown; J. Rowatt, Clifton, Formby; W. H. Gleave, no address given; W. H. Marques, Highground, Heswall; W. G. Reed, 5, Falkland Road, Wallasey. No person is eligible as director unless he is a member of the Liverpool Amateur Photographic Association. Qualification, 100 shares. Remuneration as fixed by the company. Secretary: W. H. Gleave. Registered Office: 9, Eberle Street, Liverpool.

[We understand that the above company has been formed in order to put the business of publishing the "Club Photographer" on an independent basis. The Liverpool Amateur Photographic Association is, through its trustees, a shareholder in the company. —EDS., "B.J."]

MR. W. LANCELOT VINING, the writer of the series of articles, "Photography for the Newspapers," which have just appeared in our issues from July 8 to 29, recently resigned his position as art editor of the "Sunday Pictorial" to take up his residence in the United States, and has now been appointed art editor for the well-known newspaper proprietor, Mr. W. R. Hearst.

New Books.

STUDIO CONSTRUCTION.—In devoting an issue to the design, construction and equipment of photographic studios, the editor of the "Photo-Miniature" has had the good fortune to enlist the services of Mr. Drinkwater Butt, who, as a professional architect as well as a photographer, writes with an authority on this subject such as few may claim to possess. It is inevitable that the ground traversed by Mr. Butt should be much the same as that of the little manual, "The Portrait Studio," issued by our own publishers. The difference in treatment between the two, is, however, quite sufficient to justify the purchase of one manual by these who already have the other. The issue, which is No. 182, is published in this country by Messrs. Houghtons, price 1s. 8d.; in the United States by Messrs. Tennant and Ward, 103, Park Avenue, New York, price 40 cents.

PHOTOGRAPHIC ABSTRACTS.—The second issue of this quarterly publication of the Scientific and Technical Group of the Royal Photographic Society shows the compilers getting into their stride. The issue contains 260 abstracts (as compared with 97 in the first issue) of articles, communications, patent specifications, etc., relating to the various branches of photography, cinematography, radiography and photo-mechanical processes. A great deal more than painstaking industry is displayed in the preparation of this *résumé* of current progress in these widely scattered fields of work. Mr. B. V. Storr, M.Sc. F.I.C., who has been appointed editor, shows a refined sense of proportion in the space which he allots to the abridgments of the various items, and makes excellent use of variations of type-setting in pursuing this policy. Although the publication lays itself out to record the more recondite papers dealing with sensitometric methods and with the theory of photographic process, it must not be ignored that new devices and methods of practical photography occupy a considerable proportion of its pages. For example, the current issue traces, in a series of abstracts, the stages of the process of desensitising plates for development in white or bright light, from its initiation by Dr. Lüppo-Cramer during the course of last year. Other "practical" items relate to the toning of prints, and we are interested in noticing that a French patent has been taken out for the use of sulphoxy-phosphates as odourless substitutes for sulphide in the sepia toning process. It is scarcely too much to claim for the publication that it puts before the student in a compact form the subject matter of the photographic and scientific Press of the entire world which comes within the scope of "photography," employing that term in the widest possible sense. Moreover, the exact bibliographical form of the abstracts enables the student to consult the original sources of publication. The Scientific and Technical Group of the Royal Photographic Society need not point to any other work than that which it has accomplished in this publication in order to justify its formation, or to claim a still larger measure of support by members of the Society. Members of the Group receive "Photographic Abstracts" as one of their privileges of membership. Those who are not within its membership may obtain "Photographic Abstracts" post free for 10s. per annum, or for 2s. 8d., post free, per single issue.

PHOTO-ANALYSIS IN THE COMMERCIAL WORLD.—Employers advertising in the "situations vacant" columns of the daily Press appear now to be making it a rule to ask applicants to send their photographs. Years ago "Please send photo., which will be returned," was a request somewhat rare, but it is common enough to-day, as undoubtedly a photographic portrait gives an impression of personality which a letter alone cannot always give. A writer in the "Daily Chronicle," who calls attention to the growing demand for portraits, states that in the United States the alert business man has gone a step farther. He has a photograph filed with the correspondence of all members of his staff with whom he is in regular touch only by letter. So when the chief in New York writes to his traveller Smith in Arkansas he calls for Smith's photograph as well as Smith's last letter. From the photograph he sees again what manner of man Smith is, and tunes his communication according to Smith's enthusiastic features or—if it be Jones—in a sergeant-major vein.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, AUGUST 16.

Hackney P.S. "Snow Photography." W. Selfe.
Scottish C.W.S.C.C. (Glasgow). Lecturette.

WEDNESDAY, AUGUST 17.

Bradford Phot. Soc. Evening Excursion to Calverley or Rawdon Woods.

THURSDAY, AUGUST 18.

Hammersmith (Hampshire House) P.S. Pitfalls in Photography C. E. Altrop.
Kinning Park Co.-op. Soc. Open Night.
North Middlesex P.S. "Pictorial Ideals." M. O. Dell.

SATURDAY, AUGUST 20.

Kinning Park Co.-op. Soc. Outing to Possil Marsh and Cadder.
Manchester Amateur Phot. Soc. Ramble to Mobberley.
North Middlesex P.S. Outing—Wimbledon Common.
Scottish C.W.S.C.C. (Glasgow). Outing to Carmunnock and District.

CROYDON CAMERA CLUB.

MR. H. P. C. HARPUR trod the boards last week, the event being notified by a secretarial illustrated announcement in colours on the notice board. It is reproduced on a greatly reduced scale as a

typical example of Mr. Sellors' way of intimating future events, and also as an excellent likeness of the wizard depicted, albeit somewhat dwarfed as regards portions of his pictorial person.

Mr. Harpur chatted on several subjects, not consecutively in hackneyed fashion, but in interwoven manner, rendering it difficult at times to unravel the threads of coherence. One learnt at the start that he habitually uses tabloids to assist operations, and they certainly seemed to give uniformly good results. The word "tabloid," he was careful to point out, is the "patented" trademark of Messrs. Burroughs and Wellcome, and denotes a compressed preparation, which may be handed down as an heirloom without fear of deterioration.

He had recently tried their new sepia toner and found it very good, one tabloid being sufficient for at least six 10 by 8 prints, and possibly many more. The action is slow, enabling toning to be stopped at any required stage, and with subjects not presenting much contrast (when "double-tones" may be pronounced), very effective cold tones are possible, in addition to warm ones secured by full toning. The smell of the sulphide solution, he said, is but little apparent, provided the nose is not used as a stirring rod. He then toned some prints which were much admired, though the non-production of sample tabloid-toners damped appreciation somewhat.

He next showed the local reduction of bromide prints with ferricyanide, clearing away the background of a portrait taken by him. It was much admired by one person in the room.

In the discussion, referring to an observation of Mr. Harpur's that most professionals do not care a naughty word whether their prints last or not, Mr. Berry buried the allegation with a shovelful of indignant disclaimer. Mr. Walker had found that bromide prints, reduced with ferricyanide, had miserably perished. Disaster is invariably associated closely with Mr. Walker, who ever preserves a cheerful deportment under adversity. Mr. Salt had found prints locally reduced eventually yellow at the parts treated. In

all cases after reduction, it is, he said, a wise precaution to pass the prints through a clean fixing bath without preliminary washing. Mr. Purkis agreed. A most hearty vote of thanks was accorded Mr. Harpur for one of his inimitable expositions. Never does he afford a dull evening.

News and Notes.

MULTUM IN PARVO ADVERTISING. We clip the following advertisement from an American newspaper: "Want a camera? Then I've got it. You've got one? Then I want it." Then follows the name and address of the camera store.

STUDIO ARC LAMPS.—The General Electric Company is issuing a semi-enclosed type of arc lamp designed for studio portraiture. A circular containing a full specification of the lamp and accessories is obtainable from the company, 92-4, Queen Victoria Street, London, E.C.4.

VERASCOPE CAMERAS.—The City Sale and Exchange, 81, Aldersgate Street, London, E.C.1, inform us that they have made a 20 per cent. reduction in the prices of Verascope cameras, that is to say, in the goods listed on pages 4 to 8 of their 32-page price list of Richard manufactures.

STOLEN CAMERAS.—A well-dressed youth, described as a clerk, was remanded at the Guildhall last Saturday upon a charge of being a suspected person. It was stated that when searched at the police station there were found on him a Kodak camera, a gold and a silver wristlet watch, gold-rimmed eyeglasses, a gold albert, silver match-box, and a gold cigarette-box. Asked where he got them accused replied "Stole them." A detective stated that there was also a reflex camera among some other property accused had stolen.

THE CLUB PHOTOGRAPHER.—The August number of our Liverpool contemporary derives its literary and pictorial contents from members of the Leicester and Leicestershire Photographic Society. Mr. A. E. Baker writes on photographic record and survey; Mr. W. Bailey on elementary photographic optics; Mr. Frank W. Beck on the photography of stained glass; and Mr. H. R. Dickens on composition in landscape. Our contemporary is published at the headquarters of the Liverpool Amateur Photographic Association, 9, Eberle Street, Liverpool, price 3d. monthly.

HELPING THE MALE FORM.—It is now so long since we had any radical change in man's dress that efforts are being made by fashion moogers to revive the cloak, one of the reasons given being that it "photographs so well." Another writer says: "It (the cloak) is a most elegant garment, as all who go to that wonderful film play, "Dr. Jekyll and Mr. Hyde" can see. Notice how attractive Dr. Jekyll looks in his swinging cape. What a graceful swagger it gives him. Few men carry themselves as well as they did in the old days, and I believe the cape was responsible for much."

AERIAL PHOTOGRAPHY IN HYDROGRAPHY.—Attention is called to the importance of the paper submitted to the French Academy of Science by M. Volmat, in which he gives particulars of aerial photographic experiments carried out from a hydro-airplane, and emphasises the importance of such a method in drawing up sea charts, so as to obtain quickly and exactly particulars relating to the lay of the coast, the conformity of shoals discovered at low water, etc. In the tests carried out, 17 metres below zero on the chart was the greatest depth at which the bottom could be clearly seen. Great depths produce a characteristic surface movement of the waves. From the impression on a photographic plate of wave action it has been possible to discover a point of rock 8 metres below zero.

MISTAKES IN HAND CAMERA WORK.—The difference in the results obtained with a hand camera by a skilled user and those which commonly fall to the lot of the tyro is exceedingly well illustrated in a lengthy article in the current issue of "Conquest," by Mr. D. Charles. Selecting the subjects to be encountered on the Thames Embankment between Charing Cross and Westminster, he is at pains to show the difference in effects obtainable by correct observance of the ordinary elementary precautions in focussing, setting the shutter, choosing the view point and lighting, etc. In the notes which accompany the many reproductions of photographs, Mr. Charles has a good deal of useful advice to give to the tyro in hand-camera work. Beginners in photography will study this issue of "Conquest" (Wireless Press, Ltd., 12-13, Henrietta Street, price 1s. monthly) with a great deal of interest on account of this item alone, and will at the same time make the acquaintance of a magazine which deals in a popular but accurate way with many aspects of science and industry.

A.P.M. TRAVELLERS.—Messrs. Amalgamated Photographic Manufacturers, Ltd., 3, Soho Square, London, W.1, announce that from August 1 last the three component companies of Marion and Co., Paget Prize Plate Co., and the Rajar Co., will be represented by the following nineteen travellers allocated to the districts named. Those calling on professional photographers are:—London: A. Smith and G. E. Perry. South-East and East Coast and Channel Isles: F. E. Jones. South, South-West, and South Wales: H. Freckleton. Midlands and Lincs.: J. M. Dickinson. North-East, North-West, and Yorkshire: A. C. Freckleton; Lancs., North Wales, and Isle of Man: J. W. Freckleton. Scotland: R. Whaley. Ireland: O. C. Hackett. Those calling on photographic dealers are:—London: G. A. Heed, B. F. Crane, A. R. Shea, and J. H. Beavan. S.E. and E. Coast: A. D. Hunt. S. and S.W. and S. Wales: W. A. Lewis. Midlands and Lincs.: E. D. Jones. N.E., N.W. and Yorks., E. S. Rowbotham. Lancs. and N. Wales: A. W. Muncaster. Scotland: T. E. North. Ireland: O. C. Hackett.

AERIAL PHOTOGRAPHS FROM CRANE BUCKETS.—A correspondent, who a few days ago was asked (but refused) to ascend in one of the buckets attached to one of the largest cranes now working in London, was shown a cutting from an American magazine in which, he says, was an illustrated account of how New York photographers work from a crane hoist. Aerial photographs of ship's decks, and bird's-eye views of the whole construction plant, are, it appears, taken without the aid of airplanes or balloons. A board seat slung from the hooks of a big crane constitutes the photographer's base of operations, and in this small cockpit, armed with a camera, he is swung aloft to any altitudinous viewpoint he may select. In further resemblance to a flier, he is fastened in, the function of the stout rope around his body being not so much to increase his security as to afford him full and free use of his hands in focussing and making the exposure. Because the location may be studied, or changed on signal to the engineer, views are obtained this way that could not be taken even from a plane, and in the American magazine were reproduced many fine examples of "crane tripod" work.

Correspondence.

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

No notice is taken of communications unless the names and addresses of the writers are given.

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

MR. TILNEY.

To the Editors.

Gentlemen,—Thank you for your "Notes and News" paragraph of August 5. May I say to your kind correspondent that I have "been doing" nothing in Sydney. (How I should have enjoyed myself amongst the music, laughter, eats, drinks, and smokes of the soft folkers' evening!) My explanation of the inquiries of Messrs. Paton and Wakeford is that someone wanted to hand me conscience-money as bonus—*extra* fee for my course.—Yours faithfully,

F. C. TILNEY.

Art of Life Movement, 28, John Street, Bedford Row, London, W.C.1. August 5.

D-50 DEVELOPER.

To the Editors.

Gentlemen,—We have read with interest the report of the meeting of the Croydon Camera Club, at which Mr. E. A. Salt brought to the notice of the members our new developer D 50 (see page 466 of your issue of August 5).

Much as we should like to touch upon the many interesting points raised at the meeting, we feel a diffidence in encroaching on your valuable space.

Will you allow us, however, to refer to Mr. Salt's comment on our claim that D 50 "owes its unique properties not alone to the

careful blending of certain standard forms of reducing agents, but principally to the incorporation of agents *new to science.*"

We are much amused at Mr. Salt's suggestion that this wording would excite the envy of the vendor of a hair-restorer. We have not, so far, launched a new hair-restorer, but, if and when we do, we shall not scruple to emphasise the fact that it contains agents "now to science," if such be the case.

Strange as it may seem, it is nevertheless true that D 50 does contain such components.

Is not this fact substantiated by Mr. H. W. Berry's statements, mentioned in the last paragraph of your report, that "no other developer was capable of the feat illustrated by Mr. Salt's set of bromide prints"?—Yours faithfully,

For and on behalf of
THE COOPER LABORATORY
(Chemicals and By-Products, Ltd.).
H. E. LAWS, Managing Director.

Watford, August 9.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

H. P.—Usually it is not thought necessary to lead-line a teak tank; the wood itself is practically impermeable, and if the tank is well made it will keep watertight for as long as if lead-lined

R. H.—So far as we know there is no method which is really satisfactory in practice of using bromide or gaslight postcards in the same way that ferrotype cards or buttons are employed.

H. S.—The best way for the quick drying of negatives is by one or other of the methods mentioned in the Almanac, p. 433. Bromide paper requires to be handled by a deep orange or bright red light. It is not safe to handle it by white light like gaslight paper, nor even by very bright yellow light.

E. W.—If the room is of moderate size a single 1,000 c.p. lamp will suffice for head and shoulders or three-quarter length portraits, although we would sooner have 2,000 or 3,000 c.p. for greater ease of working. Yes, the light should be diffused. Usually a moveable head screen of muslin mounted on a hoop, and capable of being adjusted in position between the lamp and the sitter, is sufficient for single figures.

W. B.—We have little doubt that the severity of the speckled markings on the prints is due to the exceptionally hot weather. For avoidance of these markings it is advisable to wash the prints for the minimum of time after the hypo bath, or if this cannot be done on account of the size of the batches, to let prints dry and give them a soak in water only just long enough to make them limp before squegeeing on the glasses.

H. E. R.—If you wish the most effective means for minimising retouching marks in the enlargements you should discard the condenser and illuminate the negative entirely by reflected light. For this purpose a box of, say, semi-circular shape can be fitted up behind the negative and illuminated by, say, four 500 c.p lamps. The interior of the box should be painted matt white, and this coating renewed as it becomes discoloured.

M. E. T. W.—According to the "Pharmaceutical Journal," a method of keeping cut flowers fresh is as follows:—The flowers are first well sprinkled with fresh water and then placed in a vase filled with the following solution:—Hard white soap, 1 oz.: sodium chloride, 50 grs.; water, 34 ozs. The soap is shaved and dissolved in water, and the salt is then added, this causing a slight gelatinisation of the solution. Finally, a very little boric acid is dissolved in the liquid. The flowers are taken out every morning, the foliage washed, and then put back in the vase. The solution is renewed every three days. Flowers thus treated will keep in good condition for two weeks.

E. M.—A formula for a combined developer-fixer for ferrotype plates is as follows:—

Water, to make	40 ozs. fluid.
Hydroquinone	½ oz.
Soda sulphite	4 ozs.
Soda carbonate	4 ozs.
Hypo	8 ozs.
Liq. ammonia, .880	2 fl. ozs.

Addition of more ammonia to the developer gives more vigour. The plates develop (and partly fix) in two or three minutes. They can then be examined in daylight and fixed in plain hypo.

C. E. B.—For filling the marks of scales, such as those used on hand-cameras, etc., a very suitable material is a mixture of lamp-black and tallow. A little tallow is melted in a small tin or pot and, while fluid, thoroughly mixed with enough lamp-black to make a thick paste. This will set quite stiff, and will keep indefinitely. When required for restoring engraved scales, a little of the mixture is taken on a knife blade or small spatula and spread over the engraving, pressing it well into the cuts. It is then rubbed off with a piece of smooth rag, and the last of the grease finally cleaned off with a wet rag rubbed on a piece of soap. If the engraving is on metal or celluloid no other precaution is required, and if on wood there is no fear of smearing the surface unless the wood is rough and unpolished.

F. W.—(1) The sitter having accepted your invitation, the copyright in all negatives taken at the sitting belongs to you. (2) In the absence of any undertaking in writing, or in a verbal manner, which can be confirmed, the sitter cannot demand a fee for sitting in the event of Press reproduction. (3) Yes, it is a free sitting, and therefore the copyright is your property, and you are not deprived of it by afterwards supplying copies to the sitter for which she pays. (4) The sitter and the other photographer are equally liable in respect to infringement of your copyright. You can take action in a County Court for delivery of infringing copies and also for damages in respect to the infringement. We suggest that you would derive a good deal of information on these questions of copyright from the manual on "Photographic Copyright," which we issue.

H. R.—With a 4¾ f/4.8 lens you certainly ought to get sharp definition of a subject receding from the foreground into the distance at a much larger aperture than f/22, say, f/6 to f/11. We shouldn't expect sufficient depth at anything larger than f/6, and that is rather large for a subject of the particular kind you mention. Are you sure that it is diffused definition due to insufficient depth of focus? Your second question suggests that it may be due to shake of the camera. For such subjects we should focus at a distance of about 50 ft. away. No means of gauging such a distance, except by practice in "pacing it out." We are sorry we cannot think of any remedy for prevention of vibration in holding the camera. Small pinholes can be temporarily stopped out by applying rubber solution mixed with lamp black, but in the long run it is best to have a new blind fitted.

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THE BRITISH

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Contents.

SUMMARY

Mr. A. H. Hall, in a contributed article, shows the good use which can be made of a small camera for at-home domestic portraits of a kind which are secured only with great difficulty in any other way. (P. 487.)

An American worker has described a combined flash and electric lamp, which he has found of special value in the making of portraits of young children. (P. 488.)

In a leading article we refer to the means for avoiding sharply cut-out outlines in portraiture. In consequence of optical exigencies, such means will usually involve a certain amount of diffused definition. (P. 486.)

Thermit discusses the facts requiring to be faced as regards amateur competition in portraiture. (P. 489.)

A method of economising frames, used for the display of specimens, is described by a contributor to "Assistants' Notes." (P. 492.)

The young professional is cautioned against starting a portraiture business on a cut-price basis. (P. 486.)

A portable outfit ready for use at a moment's notice is a piece of photographic equipment of which profitable employment can be made. (P. 486.)

For the copying of sepia prints an orthochromatic or panchromatic plate and a large-aperture lens will go far towards securing satisfactory results. (P. 486.)

In the concluding part of his review of recent progress in photographic manufacture, Mr. Raymond E. Crowther deals with cinematography, and with methods of sensitometric measurement. (P. 490.)

A correspondent suggests a system of rating bromide paper for contrast which might be applied commercially. (P. 499.)

Mr. Julius Rheinberg has patented a sensitive collodion mixture containing an iron salt and employing methyl alcohol as the solvent of the pyroxyline. (P. 493.)

Mr. E. J. Wall quotes references to the early literature of photography with magnesium light, showing the English priority in this invention. (P. 497.)

The Eastman Kodak Company have declared 7½ per cent. on the common stock, in addition to the usual quarterly dividend of 2½ per cent. (P. 495.)

A canvasser, who took money for colouring photographs but did not supply the goods, was sentenced to hard labour at Canterbury Police Court last week. (P. 495.)

Methods of making screens for cinematograph projection in daylight have recently engaged the attention of several inventors. (P. 493.)

A new type of anastigmat lens is the subject of a recent patent specification. (P. 492.)

Looseness of the lens elements in their cells may be a cause of defective definition in hand-cameras fitted with large-aperture objectives. (P. 485.)

EX CATHEDRA.

Small Stand Cameras. Considering the excellent results that are obtained with cameras of the "snapshot" variety, it is rather surprising that comparatively few skilled workers employ small cameras for architectural and other work which calls for the use of adequate rising front and swing-back adjustments, together with a great range of focal lengths. A few years ago it was difficult to obtain either very short or very long focus lenses, of good quality, in sizes which could be adapted to quarter-plate cameras, but it is now possible to procure such lenses for even smaller-sized plates. One of the most celebrated explorers has pinned his faith on a quarter-plate long-extension camera, fitted with lenses ranging from three to thirteen inches focal length, with the addition of a telephoto attachment, and has secured, with the minimum of weight and expense, many hundreds of almost priceless negatives. Most small-stand cameras of the Una or Sanderson type are equally available for use in the hand, and if a film-pack adapter be carried, all classes of work can be dealt with. It is, of course, very necessary that a firm tripod be used, as the best of cameras and lenses are worthless if used upon a flimsy metal stand.

* * *

Cause of Unsharp Negatives. Those photographers who use hand cameras fitted with large-aperture anastigmat lenses should always make sure that the lens components are screwed well home into the mount or shutter casing after they have been taken out for cleaning. If this point is not attended to, negatives may be produced that are not quite as sharp as the lens is capable of producing. An instance of the necessity for care in this direction was brought under our notice recently. The trouble was one of unsharp negatives taken with a hand camera fitted with one of the best known unsymmetric anastigmats. The lack of sharpness was not very pronounced, and only detected after enlargements had been made, or the small negatives carefully compared with others taken previously, that were entirely satisfactory as regards sharpness. This pointed to inaccurate register, but a careful test showed that this was not the case. It was then noticed that the lens components fitted very loosely in their mount, and it was eventually shown that after the camera had been carried for some distance the components altered their positions slightly, which accounted for the loss of definition in the resulting negatives. Another point that needs to be kept in mind, when removing and replacing lenses of this type, is that the instrument, as a whole, is intended to be employed with its components inserted in a certain manner, and this should be rigidly adhered to. We have an unsymmetric anastigmat in our possession that is an example of this. Changing over the back combination to the front, the instrument requires

the front to be at least two inches further away from the ground glass than when the lens is assembled in the correct manner.

* * *

Fatal Cheapness. One of the most insidious pitfalls which beset the path of the young photographer is the idea that a successful business can be built up by charging prices which are lower than those of his established rivals. It should always be borne in mind that it is much more difficult to obtain decent prices after working for low ones than it is to do so from the beginning. We have had many opportunities of watching the starting and progress of young professionals, and can say with confidence that those who have adopted the highest scale prevalent in their neighbourhood have been more successful than those who have begun by "cutting." The reason is obvious. The established man has a larger clientele, and therefore his running expenses are not so heavy in proportion as those of the beginner, who is therefore tempted to economise in materials and labour to the detriment of his work. Naturally, the work offered must be worth the price asked for it, and therefore our beginner must choose a locality in which his productions will be up to the standard of the neighbourhood. In our experience, given a good class of work, customers do not take notice of even a substantial difference in price.

* * *

Copying Sepia Prints. It is much more difficult to copy sepia-toned bromide prints than black and white or P.O.P., there being usually much loss of detail in the shadows. This is due to the non-actinic colour of the image, which at a certain depth of deposit practically ceases to have any effect on the slow ordinary plates which are usually employed for copying. For this reason, orthochromatic or, if to hand, panchromatic plates should always be used for such subjects. As there are no colour contrasts, a light-filter is not usually needed, although it will minimise the effect of surface reflection. It is always desirable to use as large a lens-aperture as will give the desired definition, as a small stop always tends to give a more contrasty result. For the same reason, a strong light should be used to illuminate the original, even direct sunlight being suitable for very dark prints. Those who have had little experience in copying will find it instructive to make a strip exposure pulling out the slide an inch at the time, so as to give exposures in the ratio of 1, 2, 4, 8, and so on. A first-class result is then ensured upon a second plate exposed for a time equal to that given to the correctly-exposed strip.

* * *

Be Prepared. A common failing of many photographers who are mainly occupied with portrait work is a lack of readiness to undertake a "rush job" as a moment's notice. It sometimes happens that a record is required of an accident or, perhaps, a crime, when every moment is precious, and if there is any delay caused by having to collect the various items of an outfit, or by reason of the apparatus being too heavy or bulky to be transported with ease, the opportunity is lost, to the annoyance of the would-be customer and the pecuniary disadvantage of the photographer. To avoid such contingencies it is well to have a small camera, say, postcard of half-plate size, ready to pick up and carry out. Even the filling of slides causes needless delay, so that roll film or a film pack is to be preferred to plates, as film does not deteriorate so rapidly as plates do in many slides. A postcard-sized film camera is very suitable for this class of work, and it should be provided with a light tripod. Snapshotting should be avoided, the lens being well stopped down, and time exposures given, so as to get negatives which are well exposed and full of detail. The absence of a swing-back is a disadvantage, but it will be found that it is rarely required in this class of work.

DEPTH OF DEFINITION IN PORTRAITURE.

At first sight it may not appear that "depth" in portraiture differs in any way from that required by any other class of subject, and when sharply-defined negatives, printed upon glossy paper, were almost universally used, this idea would be fairly correct. But now that the technique of portraiture is so widely different from that of ordinary commercial work, any methods of obtaining soft, yet even, definition over several planes are worthy of consideration.

In the ordinary way, depth is obtained either by manipulation of the swing-back or by reducing the working aperture of the lens. By the first of these expedients there is, of course, no real gain in depth of definition. All that has been done, is to have accommodated the plane of the plate to the plane of the subject when this is not normal to the axis of the lens. It is usually employed upon sitting figures, where the knees or feet are much closer to the lens than is the head. It has the defect of introducing violent perspective; that is to say, the hands or feet, usually large enough in nature, are reproduced on a larger scale than the head. As a rule, the best results are obtained by using the old type of portrait lens, which has a curved field, as this will help to give good definition of the waist and bust. With a flat-field anastigmat of the same focal length and aperture, the knees or hands and the face will be well defined, but the intervening portions will lack definition. With large heads, where the neck or collar is unsharp when the eyes are focussed for, the swing-back is practically useless.

If we reduce the aperture of the lens we can obtain any required depth at the cost of prolonging the exposure, and that without interfering with the correct perspective from any given distance, but we now find that the definition of certain portions of the subject is too sharp for modern tastes. We must therefore seek a means by which it is possible to secure depth and softness at the same time. Probably the best way of doing this is to employ a lens which at full aperture will give very soft or even "fuzzy" definition, and to reduce the size of the diaphragm until a satisfactory result is obtained.

There is quite a variety of suitable lenses, some of which produce soft images, in consequence of the presence of spherical aberration alone, while others introduce chromatic aberration, as the well-known Bergheim lens and the French anachromats. Most photographers will probably choose one of the adjustable soft focus lenses, of which the Aldis *f*/3, the Cooke portrait lens, and the Dallmeyer "patent" portrait lenses, all of which have the advantage of being adaptable to sharp as well as to soft-focus work. One important point must not be overlooked; it is that by reducing the lens aperture the softness due to spherical aberration is also reduced, absolute sharpness being usually obtained at an aperture of *f*/16. So small an aperture is not likely to be used for portraiture except with very large heads, but care should be taken that the initial amount of spherical aberration should be large enough to leave a serviceable residue at *f*/11.

Simple uncorrected lenses, *e.g.*, the "spectacle" lens of the artistic landscape worker, are worth consideration

now that plates with a speed of 500 H and D are in daily use. As they are already of small diameter they will usually give the desired effect without a diaphragm, but it is necessary in most cases to make an allowance when focussing to eliminate some of the chromatic aberration.

Mechanical methods for softening the definition of a lens which gives uniformly sharp negative have received considerable attention when applied to enlarging, but have been neglected as far as the making of portrait negatives is concerned. It would be interesting to test the applicability of the diffusing discs, as supplied with the Eastman vertical enlarger, to portrait work, and even to use chiffon or bolting silk near the lens or in front of the plate. Many years ago we experimented with a black gauze screen midway between the lens and sitter, but the results were not satisfactory, doubtless owing to the choice of position.

We have lately seen some excellent results produced by the use of a cross-lined process screen, used in close proximity to the lens, and further experiments in this direction are being made by one of our most skilled technical workers. The texture of the screen has a considerable effect upon the degree of definition, and various rulings are being tried.

It may seem as if this article were devoted to obtaining soft focus effects, but that is not its object, which is to overcome the unpleasant "cut-out" appearance which results from stopping down to obtain sufficient depth throughout the whole composition.

THE POCKET CAMERA IN AT-HOME PHOTOGRAPHY.

In a recent issue reference was made to the possibilities of photography inside and out of a private dwelling as a means for increased business. The proposal made was for the production of a simple album of the customer's surroundings, and it is equally likely that intimate pictures of the inhabitants would be as acceptable.

If it is not considered presumptuous on the part of an amateur, who has specialised in his own home, it is thought that some of his experiences may be useful. Amongst other subjects, a series of prints, taken at intervals of roughly a fortnight, of a baby has given much pleasure, and many mothers, seeing prints of this nature, could not resist the suggestion that a series of her baby be taken, say, once a month. The baby is, perhaps, the most difficult subject likely to be encountered, and it may be well, therefore, to deal with the details.

A very young baby will permit of a time exposure, but after about three months the difficulties increase, and some of the portraits were taken out of doors. Latterly, however, it was decided to try what could be done with a hand camera in the house. It may be mentioned that none of the rooms had light surroundings, with the exception of a small bath room, which faces north. As in no case were any elaborate steps taken, the conditions described may be considered as representing about the average which would be likely to be encountered.

It was found with the extremely fast plates now available that with a lens working at *f* 4.5 in an ordinary room with one window, dark floor covering, and yellow wallpaper, an exposure of one-eighth of a second gave a fully exposed negative at mid-day in March, the subject being about 4 ft. from the window. At this exposure it was found that the number of failures due to movement were very few. Subjects which were particularly admired were taken in the evening when the ceremony of bathing the baby was in progress. The room faces north, but with the reflected light of an enamelled bath and light wallpaper, if the subject were facing the light, an exposure of one-eighth of a second, or one-quarter of a second against the light, gave good results at six in the evening in the early part of April, the full aperture *f*/4.5 of the lens being used.

The space in which to operate is extremely restricted in the average bathroom, and may be in other rooms, so that the advantages of a pocket camera with a good lens and a reliable shutter, are apparent, and all exposures of a quarter of a second or less were made with the camera held in the hand. Even if longer exposures are required for some subjects, a pocket camera permits of an easily devised support; and in the case of a baby in his bath speed of working is essential; even if the space permitted of a stand, it is likely that it would be in the way.

It will often be necessary to take the child within 4 ft. of the camera—more is not possible in the bath, and at such a distance accurate focussing is essential. The writer is not above the use of a knotted string to indicate distances in feet in these circumstances. It is unnecessary to enlarge on the possibilities of distortion with a camera as near the subject as this, unless due care is taken.

A further advantage of the small pocket camera is, of course, the depth of focus of the lens, and sharp negatives are obtained with ease in restricted corners of the house or garden, where, with a larger camera, this result would be obtained with difficulty.

In the writer's experience, much interest is taken in photographs of specimen plants in the garden, and the small camera permits of sufficient depth of focus with a stop of *f*/8 for near objects. This will, of course, permit a hand camera exposure in a good light with a fairly deep screen and a panchromatic plate.

It is advisable to carry a supplementary lens (often called a portrait attachment), so that small objects at about 2½ ft. distance can be taken.

Special reference has been made to the baby as possibly the most difficult subject. It is obvious, however, that the other inmates should provide further work.

It is suggested that proofs might be submitted on postcards, and if the writer's experience as an amateur is any criterion, many of the successful prints will not only be used for the portfolio or album, but a dozen copies on postcards for friends and relatives will be required; in fact, the popularity of some of the more intimate subjects has caused considerable embarrassment to a photographer with very limited time at his command.

Even where it is proposed to use a half-plate camera, a duplicate taken with the pocket camera may save a failure, and it is not uncommon to discard the larger negative in favour of an enlargement from the small one. In these days of high prices the saving in material is not unimportant.

As the small negatives will invariably be required for enlargements and a total absence of fog is most desirable, the writer uses Desensitol, which enables full examination of the tiny negative with safety. The possibilities of this work have only been broadly indicated, but many subjects will present themselves which are well worth the exposure of a tiny plate where some hesitation would be evinced in using larger plates.

A. H. Hall.

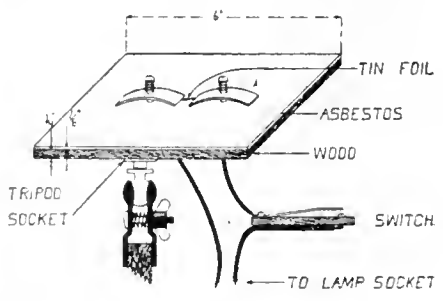
A COMBINED ARC AND FLASH LIGHT.

[In the current issue of "American Photography" a contributor, Mr. Perley H. Fuller, describes the construction of a portable artificial light outfit, in the use of which an electric flash is obtained simultaneously with the ignition of a charge of flash powder. The author appears to be satisfied with the safety of this appliance—at any rate, he makes no mention of danger attaching to its use—but it certainly seems as though the employment of ordinary house current for this purpose involves very great risk of blowing out the fuses, if nothing worse.—EDS. "B.J."]

ANYONE who has tried to get a set of good pictures, having as the principal subject a small baby, say, from a few months to two years old, will agree that it is not an easy thing to do. The professional photographer, using a fast lens and expensive equipment, may get a good picture at every exposure. But for the amateur, with a roll film camera and lens working at *f*/8, the average of good pictures would be nearer one in ten. Perhaps the picture is attempted in the house. It would probably be found that to give exposure enough to the negative, with the lens wide open, would require from 3 to 4 seconds, even near a window. An exposure of this length, on such an active subject as a baby, can have but one result, viz., movement in the picture nearly every time. If we take the baby out of doors, where the light is stronger, in order to shorten the exposure, indifferent results are secured because of the strong lighting on the face, which cannot be controlled.

The writer of this article, using a piece of home-built apparatus, costing less than $2 is able to take a baby picture in any room in a house, with a certainty of getting a picture ninety-nine out of one hundred times.

The apparatus to be described uses a light which is a combination of electric arc and magnesium flash. It is free from the troubles occasioned by using an ordinary flash, and will not scare the smallest child. The intense light of the arc, helped by the magnesium powder, gives in one one-



hundredth second the necessary light for full exposure. The subject can be caught in any pose, and the light is under perfect control.

The apparatus, as illustrated, consists of a piece of dry, hard wood board, 6 in. square and ¼ in. in thickness. The top of the board is covered with a piece of sheet asbestos ⅛ in. thick. This can be fastened to the board with narrow strips of sheet brass, drilled for screws and running around the edge of the sheet, held by small round head brass screws.

Two strips of springs, brass, ½ in. in width and 2 in. long, are drilled in the centre for the passage of a wood screw and curved as shown. The screws should be of brass, about 1½ in. long, and are used to attach the brass strips to the board. They come entirely through the board, and the wires leading to an ordinary lamp socket plug are soldered to them beneath the board. A short piece of coiled brass spring on each screw helps to hold the curved strips of brass firmly against the asbestos.

The under side of the board is fitted near one edge with a tripod socket, and into this socket is screwed a tripod attachment of the universal type. This allows for attaching the apparatus to almost anything, such as the back of a chair, edge of a shelf, etc.

A simple switch for firing the flash is built into one of the wires connecting with the electric light current of the house. This switch may be a piece of wood, some 3 in. in length; a small screw through one end serves as one contact and one wire is soldered to the point of the screw, where it comes through the wood. The whole thing is then wrapped with electrician's tape, exposing just the screw head, and binding the wire tightly to the wood.

A piece of spring brass is then fastened in place over the screw head, and the other terminal is soldered to it. A wrapping of tape applied loosely over the whole switch prevents the operator from getting a shock, and at the same time is flexible enough, so that the spring of the brass holds the circuit open, unless closed by the operator.

About 10 ft. of ordinary double lamp cord, such as is used in house wiring, for drop lights, is used to connect the flash to the 110 or 220-volt light circuit of the house, by means of the usual plug, to screw into a lamp socket. Any voltage works equally well. The switch should be wired in about midway of the lamp cord. In operation, a small strip of tin-foil, cut with the print trimmer from the foil used in wrapping roll films, is placed on the asbestos between the two curved brass strips, which clamp the foil under pressure to the asbestos. The separation of the strips is about ¾ of an inch. The foil should be a little less than ⅛ in. wide, and never more than a single thickness used.

In setting up the flash for an exposure, the plug attached to one end of the lamp cord is screwed into the nearest lamp socket, making sure that the current is turned on. The position of the subject is chosen, and the camera, which we will assume to be a roll film type, with *f*/8 lens, is placed about 8 ft. from the subject, focus set at 8 ft., stop between *f*/8 and *f*/11, and shutter at bulb. The flash apparatus, after being connected to the current, is clamped in position, perhaps to a stick tied to the back of a chair or any handy support. The tin-foil is put in place, and about half a teaspoonful of any good flash powder piled on the foil. Care should be used to tilt the flash board, so the light will not be shielded from the subject. (It should be mentioned here that the photographer admits full daylight to the room in which the picture is taken. This cuts down the apparent brightness of the flash, so that it is hardly noticeable, and prevents the staring look seen in some flash pictures). Taking the camera bulb in one hand and the flash switch in the other, the operator awaits a favourable time for the exposure. An assistant can place the baby, and as there is no hurry about making the exposure, the baby is allowed his time to fall into a pleasing and natural pose. At the proper instant the photographer presses the camera bulb with one hand, opening the shutter and holding it open, then presses the flash switch, held in his other hand. The flash fires instantly, and the shutter is then closed. Anyone used to the outfit would probably not have the shutter open over half a second in all, and for this reason—full daylight can be used in the room as mentioned.

The flash itself is caused by the current fusing the small strip of foil. An arc is formed where the foil breaks, and under its heat the foil is converted to a metallic vapour. This gives an intense light, and as the foil is consumed the arc blows itself out, the whole operation lasting perhaps 1-100

of a second. The flash powder piled on the foil is consumed by the arc, and furnishes the additional light necessary for the exposure. The writer has never seen a baby afraid of this flash when fired in a well-lighted room, and has on several occasions made eight or ten exposures of a subject in a few minutes.

Another thing should be mentioned. A screen of some sort should be used between the subject and the flash. Either muslin or a piece of draft-man's tracing cloth can be used. Tracing cloth is probably the best, and a piece about 3 ft. square should be suspended about 18 in. in front of the flash. A string stretched between two thumb tacks on opposite sides of the room will serve to suspend the screen in the proper position. This serves two purposes: the subject is protected from the glare of the light and the light is suitably diffused.

The catch light seen in the eye in all portraits is merely a reflection of the light-source. Where this is small, as in an unscreened flash, the light in the eye appears as a small and brilliant point of light, so that most flash pictures can be identified as such by this alone.

Again, an unscreened flash will often affect the eye so severely that reflex action will close the eye, so that it will show as closed in the picture. With the screen in place the light is toned down, so that one never gets a picture with the eyes closed.

PERLEY H. FULLER.

AMATEUR OPPOSITION.

THE ever-increasing practice of photography by amateur camera users is, in some parts at least, having a marked effect on studio business.

The time was when "amateur opposition" would have been taken to mean the backyard operations of quarter-plate enthusiasts who fancied themselves as spare-time professionals, and mention of it would have gained but little attention. It would never have been considered as a menace to business. To-day the situation is different.

The latest slump in portraiture synchronised with the coal strike, and was thought to be a natural result of the strike and its subsequent bad trade, but while professional portraiture slumped, amateur photography was on the increase; and this, combined with certain other facts, make it appear quite reasonable that the snapshot was as much responsible for the professionals' bad time as the coal strike.

That the above assertion is not readily acceptable I know. For years the average professional has been in the habit of pooh-poohing the photography of amateurs. It has been beneath his notice, and therefore quite out of the question as possible opposition. But the dimensins to which "amateur finishing" and "d. and p." have grown have convinced many that snapshotting is not such an insignificant thing after all; and thus it comes about that studio after studio has taken up amateur finishing as a sideline, and some have gone further and made it their main line, with portraiture a poor second.

Now for some facts on which I base the assumption that amateurs' actirities are worth consideration. A studio in a mining district recently took up amateur finishing, and towards the end of the strike the portrait business was practically *non est*. The side line, however, was going so well that there was no fear at all of having to close down or reduce the staff. Which tends to show that the trade slump did not prevent those most affected from spending money on photography, and also that amateur work is replacing professional.

In the course of a year I see many thousands, or probably millions, of snapshots. By far the greater number are atrocious; some bad; some good; a few really fine, and an odd one in a thousand retouched: from which it will probably be assumed that they are not to be compared with professional work. But they all mean money, and are undeniably popular.

Of course, much of the vast amount of snapping has momentary value only. The prints do not advertise anyone or bring re-orders. But this does not apply to the good work on which the amount of money spent with many a dealer would be acceptable as total income in a small studio.

And amateur work does not stop at portraits. That some amount of outdoor work which might otherwise fall to professionals is done by amateurs can be readily understood, but on this count I do not think it is generally realised what an enormous number of wedding groups are snapped instead of being taken by professionals. And beyond this, the amateur has penetrated even into the holy of holies of commercial photography. I have seen and handled vest-pocket negatives of interiors, home and architectural, machinery and furniture. Not in any quantity, but in each case meaning money. I have even been asked to block out such negatives and get professional results, and firms who have allowed such photographs to be taken, instead of sending for a professional, seem to be totally ignorant of the fact that it is unreasonable to expect such results.

If professionals are not going to "feel the draught" they must take measures to protect and popularise professional work. Professional and amateur photography differ, and it is this difference that gives us clues to the situation. Professional portraiture is conventional; amateur portraiture is real. The former may have suited our Victorian ancestors and is essential to theatrical artists, but the latter has the stronger hold on the masses of to-day. Studio portraits, natural in comparison with the plant-pot studies of the past, need even more naturalising, and it is quite possible that gardens would pay better than glass houses for modern studios. The ancient fetish of retouching needs proselytising. Panchromatic or non-filter emulsions with careful lighting, exposure and development, will not only minimise retouching, but give as natural and more pleasing results than the average "snappist" ever gets.

The "snappist" and the amateur proper should be cultivated instead of being scared away or belittled. When they can go to a professional for advice, they don't then proceed to attempt the impossible with furniture and machinery. The commercial specialist, if he is short of work, should advertise not only that he is a commercial specialist, but that his work cannot be very well done by anyone else. Factory owners, many of whom carry vest-pocket cameras, do not all know this.

Last, but most important, are truth and quality. It may be a matter of opinion whether these things are known and appreciated by mankind in general, but it is a fact that they will tell in the end, and the deliberate operations of a true artist can be neither excelled nor equalled in any eyes by haphazard snapshotting.

Professional work of truth and quality is not likely to interfere with or be interfered with by the quite legitimate practice of amateur photography or professional amateur finishing, and our first-class professionals should be the last to experience what I have termed "feeling the draught." But, perhaps, I ought to point out that by quality work I do not mean merely chin-cutting and waist-shaving. Such and more wonderful things can be done with the film negatives of "folding-pocket" sizes.

THERMIT.

PHOTOGRAPHIC MATERIALS AND PROCESSES.

[The fifth annual volume of reports upon progress in the various branches of chemical manufacture, issued by the Society of Chemical Industry, includes, as did the preceding issues, a report on photographic materials and processes. This is again by Mr. R. E. Crowther, A.I.C., who (writing early in the present year) reviews the literature, published during the year 1920, representing original contributions to the technical improvement of processes of making negatives and positive prints, orthochromatics and colour photography, cinematography and photo-mechanical processes, and also the methods of research and measurement which are generally described as "sensitometry." Inasmuch as these reports are, so to speak, a series of annual stocktakings of what has been done during the twelve months preceding the issue of the volume, we have naturally wished to give them a place in our pages, since no other publication of the year so well reviews what has been done in reference to the current state of knowledge. As regards the references to original sources of publication, it should be explained that the contraction "J" denotes the fortnightly "Journal" of the Society of Chemical Industry in which are published abstracts of the chief papers relating to photography from the chemical standpoint.—EDS. "B.J."]

(*Concluded from page* 480.)

Process Work.

On behalf of the British Photographic Research Association, R. E. Slade and G. I. Higson[66] have published the results of an investigation on the influence of grain size on the gradation which an emulsion is capable of giving. They conclude that the ideal process emulsion should contain grains of one size only, a fact which, although not unknown amongst emulsion makers, does not appear to have been published hitherto. The production of such an emulsion and its coating on a very thin film should place a power in the hands of some of our scientific workers who are using photography in the investigation of problems relating to the constitution of matter. It is conceivable, for example, that the work on the isotopes of the elements, which F. W. Aston[67] is conducting at Cambridge, might be made quantitative in character and afford valuable experimental evidence of the proportion of the isotopes present in the more complex elements.

J. H. Christensen[68] protects the use of anti-swelling agents similar to those patented by A. J. Agnew, F. F. Renwick, and Ilford, Ltd. (Ann. Repts., 1919, 515), for assisting the selective tanning induced by development. Coupled with suitable developing bases in dilute solution, their action has made possible such a degree of tanning in the developed areas that the undeveloped portions may be washed away and the remaining image used in transfer work. The substitution of dyes for the pigments usually added to the carbon tissue resists used in photogravure has been patented by A. C. Braham,[69] who claims that a finer, sharper screen image is secured as the result of such substitution. The blistering which occurs when transferring the carbon print to its metal support is avoided, according to the patent granted to Rotophot A.-G. für graphische Industrie,[70] by an electrolytic matte etching of the support before transferring the print, and a device for mounting the etched intaglio cylinders used in "Rotogravure," so that centring is automatic, and neither rocking nor longitudinal shift results from wear, is the subject of a patent granted to J. P. Bland.[71] The present very satisfactory state of affairs in the application of photography in connection with catalogue illustration and advertising generally is to be attributed in no small measure to the attention which has been given to the design of half-tone screens. The arrangement of the rulings has a considerable bearing on the quality of the finished illustration, and the complexity of suitable designs is exemplified in the patent granted to W. R. B. Larsen.[72]

Cinematography and X-Ray Work.

The efficiency of projection screens used in cinematography has been investigated by C. W. Gamble,[73] who, with a fixed condition of illumination, obtained the judgment of an audience on an experimental picture. Although no attempts seem to have been made to measure the reflecting power at different angles, the results are of practical value and uphold Nutting's recommendation of a face-etched (sand-blasted) back-silvered mirror. Hydrofluoric acid etching was found markedly to restrict the angle of high efficiency. For the projection of subjects exhibiting strong contrasts the placing of a neutral tinted glass screen of low optical density in front of the projection lens is advised as tending to give better tonal quality in the picture. Up to the present celluloid has not been displaced to any great extent as a cinematograph film base—a fact which is somewhat remarkable, for in spite of its general suitability by virtue of its flexibility, transparency, and durability, the fire risk with celluloid is objectionably high. The substitution of other esters of cellulose is being slowly effected, and the experience gained during the war in the manufacture of non-inflammable dopes should assist in the production of an efficient substitute for celluloid, although the qualifying properties are not the same for dope as for cinematograph film. Ability to withstand a relatively high temperature without disintegration is demanded for the latter purpose if the undesirable complication of apparatus which is at present necessary for the interposition of stationary pictures is to be avoided. It is to be regretted that but little attention is apparently being given to this matter, the only communication of any note bearing thereon during the past year being the patent of W. J. Stevenson,[74] which protects the addition to cellulose acetate of triacetin and triphenyl phosphate in about equal parts and in amount varying between 10 and 20 per cent. Benzyl chloride and tetrachloroethane are stated to be suitable solvents.

The Royal Photographic Society is to be congratulated upon its foresight in assisting in the formation of a technical and scientific section. Amongst its various activities, this section has arranged special meetings for the discussion of the latest advances in photographic science. At a joint meeting of this section and the Röntgen Society many matters of import in radiography were discussed.[75] The Presidential address to the Royal Photographic Society by G. H. Rodman[76] also constitutes a communication of importance to those interested in radiography, dealing, as it did, very fully with the evolution of the X-ray tube. As far as sensitive materials suitable for radiography are concerned, there seems to have been little attention paid to the actual increase of the sensitiveness to X-rays, the majority of workers concerning themselves in perfecting the process in which an intensifying screen is placed in contact with the sensitive surface during exposure. The success so far attained in this direction is gratifying; indeed, the results which it has been possible to produce by the use of two intensifying screens—one on either side of a film coated on both sides with emulsion—lead one to anticipate with confidence that perfect radiographs of any part of the human body will be readily secured by instantaneous exposures. The appearance of this so-called "duplitised" film marks the beginning of an epoch which will reveal in the near future a

66. "Phot. J.," 1919, *59*, 260; "J.," 1920, 135A.
67. "Nature," 1920, *105*, 8, 231, 617, 633.
68. E.P. 135,477; "J.," 1920, 428A.
69. E.P. 137,108.
70. G.P. 318,867; "J.," 1920, 428A
71. E.P. 131,842.
72. E.P. 129,265.
73. "Brit. J. Phot.," 1920, *67*, 553.
74. E.P. 138,379; "J.," 1920, 281A.
75. "Phot. J.," 1920, *60*, 57
76. "Ibid.," 311.

process in which the X-ray sensitiveness of the emulsion will be entirely ignored and the screen excitation be exclusively used to produce the latent image.

The factors which enter into the practice of radiography with intensifying screens are considered in a communication by R. Wilsey," from which it appears that the form of cassette in which the film is enclosed during the exposure has a considerable influence on the rendering of fine detail. It will be evident that the use of two intensifying screens will in some measure reduce the objectionable grain which frequently mars the detail when one screen only is employed, but a device has been protected by Siemens und Halske A.-G." which should practically eliminate such grain. A continuous metal screen is employed, and it is claimed that the characteristic radiation of the metal excited by the X-rays is most efficient in the formation of a latent image.

Sensitometry, etc.

Perhaps the outstanding event in this section during the year was the publication of the collected papers of Hurter and Driffield, the most important of which were communicated orignally to this Society. The value of the publication is materially enhanced by the inclusion of a very complete bibliography of work which has any bearing on the matter dealt with by Hurter and Driffield, and photographic workers throughout the world will appreciate the large amount of painstaking labour which W. B. Ferguson has expended in compiling the volume.

The question whether in sensitometric work the light intensity factor should be a constant and the time factor a variable, or *vice versâ*, has been but little discussed in the past, it having been generally assumed that the results obtained by either method were reliable. The work of H. J. Channon" makes it clear, however, that under certain conditions of low light intensity the time factor is relatively insignificant.

The intermittence error introduced when instruments of the sector wheel type are used has long been recognised, and various attempts have been made to design practical non-intermittent sensitometers. L. A. Jones" has described an apparatus of this type which gives results of precision: the measurements made with its aid indicate that both the speed and gamma of a plate are independent of the absolute exposure, not variable with it as is the case when intermittent exposures are investigated. A non-intermittent apparatus of a simpler design, in use in the laboratories of the British Photographic Research Association, has also been described by G. I. Higson.". Of the varying density scale sensitometers the Chapman-Jones "test plate" has been perhaps the most generally useful for approximate work hitherto available. A somewhat similar piece of apparatus has been put on the market by J. M. Eder, who, in describing its characteristics and the method of applying it in sensitometry, photometry, etc.," compares it with other apparatus much favoured by Continental experimenters. Lüppo-Cramer," in reviewing the instrument, points out that the "threshold value" for the determination of which sensitometers of this type are specially designed, is liable to be very misleading as an indication of the usefulness of a sensitive emulsion.

A contribution to the theory of tone reproduction has been made by L. A. Jones," who brings together all previous work on this subject and, after compiling a vocabulary of suitable terms and units, suggests a graphical method of solving the problems connected with the reproduction of tones by photographic processes. The question of the relationship of grain size to sensitiveness has been carefully investigated by T Svedberg," who, working with very thinly coated plates, shows that the curve obtained by plotting exposure against the number of grains made developable thereby is similar to the usual characteristic curve, and that the curve which results from plotting grain size against the number of grains made developable, is an exponential. All his results support the view that the larger grains are the more sensitive. It remains now to be settled whether the sensitiveness of the grain is a function of its size as such or whether the higher sensitiveness of the larger grains arises primarily, if not exclusively, from some other modification of the grain induced by treatment which simultaneously causes growth of the crystals. It seems probable, in view of the very recent introduction of exceedingly fast plates exhibiting low "graininess" which are prepared by a new ripening process, that grain size *ipso facto* and sensitiveness are not necessarily interdependent. Whilst dealing with the subject of grain, reference should be made to the important piece of research which has been conducted by L. A. Jones and N. Deisch" on the "graininess" of photographic deposits. The term "graininess" is applied to the characteristic which the practical photographer has hitherto referred to as "grain," and since much confusion has arisen in the past from the application of the latter term to both the original crystals in an emulsion and the aggregates or clumps of reduced silver in a developed image, it is high time that distinctive terms be adopted. Many factors which were reputed to influence graininess were examined quantitatively by means of novel and carefully standardised methods, and the results, which are of too varied a character to detail in a report of this nature, are of supreme interest to the "process" worker and the scientist who employs photography in work where images exhibiting maximum resolution are desirable.

The Hurter Memorial Lecture delivered before the Liverpool Section of this Society by F. F. Renwick (*vide* ') constitutes one of the most important items in the year's progress, not only on account of the fact that a new unifying theory of the latent image was advanced. In addition, an account of the novel experiments, the results of which support this theory, was presented, and a very full bibliography of work on the latent image bears testimony to the large amount of work which has been carried out in the pursuit of this elusive entity.

The above communication, like that of H. J. Channon," in which several more or less uncommon properties of the latent image are dealt with, cannot profitably be dissected for detailed discussion in this report, but their importance will be realised immediately they are consulted in the originals.

It may be noted with satisfaction that the experience in aerial surveying which was gained in the late war is likely to be turned to good account not only in mapping out inaccessible land areas but also in the charting of shoals and hidden reefs under the sea. A communication by W. T. Lee" deals especially with this latter work, and indicates that valuable information has already been secured.

Before concluding this report—which by reason of the manifold applications of photography in the arts and sciences must of necessity appear somewhat disconnected—reference should be made to the activities of the British Photographic Research Association, which appears, judging from the matter which has been published under its ægis,", ", ", to be getting to grips with the important theoretical problems connected with photography. The breadth of outlook indicated in the above communications inspires confidence that the Association will fully justify its existence, and augurs well for the future of the photographic industry in this country.

RAYMOND E. CROWTHER, A.I.C.

77. "Brit. J. Phot.," 1920, *67*, 285.
78. E.P. 143,261; "J.," 1920, 834A.
79. "Phot. J.," 1920, *60*, 164; "J.," 1920, 468A.
80. "Ibid.," 80; "J.," 1920, 313A.
81. "Ibid.," 236.
82. "Phot. Korr.," 1919, *56*, 244; 1920, *57*, 1, 41, 83; "J.," 1920, 803A.
83. "Phot. Rund.," 1920, *57*, 193.
84. "J. Franklin Inst.," 1920, *190*, 39; "J.," 1920, 676A.
85. "Z. wiss. Phot.," 1920, *20*, 36; "J.," 1920, 705A.
86. "Brit. J. Phot.," 1920, *67*, 689, 706; "J.," 1920, 834A.
87. "Geographical Review," *10*, [5].
88. "Phot. J.," 1920, *60*, 161.
89. "Proc. Roy. Soc.," 1920, *A 97*, 181.
90. "Ibid.," *A 98*, 154; "J.," 1921, 27A.

Assistants' Notes.

Notes by assistants suitable for this column will be considered and paid for on the first of the month following publication.

Specimen Frame Economy.

Frames for exhibiting specimens in showcases and windows may be improved, renewed and altered in size and shape in a very simple manner, and at a small cost by the use of common moulding used by builders for chair and picture rails, etc. Such moulding is not, of course, intended for picture framing, it having no rebate for the glass and picture; it is also of plain wood, but it is obtainable in many artistic patterns at 2d. or 3d. per foot. The plan is to make an overlay of this builder's moulding and to tack it to old existing and shabby frames by means of fine brads. The corners of the moulding frames are mitred in the usual way, and afterwards stained. A common form of frame for small specimens is the ½-in. oak shown in section in fig 1, the black por-

Fig. 1.

tions representing the frame, with glass and picture in position. Using wider moulding as an overlay (shown dotted in fig. 2), one

Fig. 2.

may, if desired, lessen the picture portion, *i.e.*, the visible portion, and thus broaden the frame considerably without altering the outside size (wall covering power) of the frame. I frequently use a 3-in. wide moulding on a ½-in. oak moulding with good results; much, however, depends upon the size of the original frame, it not being advisable in some cases to use an ornamental (beaded) overlay much, if any, wider than the original flat and narrow oak. If the frame is to be made larger without altering the picture area, a broad overlay is fitted as shown, in section, fig. 3. In

Fig. 3.

this case the overlay is laid flush with the inner side of the frame and made to overlap the outer edge. Shapes of frames may also be altered by suitably adjusting the overlay on the original frame. —L. T. W.

Rusty Plate Sheaths and Separators.

The metal plate-separators and the sheaths used in changing-boxes and magazines often become shabby and develop rust, the latter particles finding their way to sensitive surfaces and causing pinholes and spots. Metal used for such purposes should be kept very clean and free from rust, and it is a good plan to give it a coating of celluloid varnish, the latter, if clean, causing no ill-effects. The ordinary celluloid varnish of commerce may be used, or that made at home by cleaning the gelatine from a spoilt celluloid film and dissolving the latter in amyl acetate. Correct proportions for a really good varnish are 15 grs. of celluloid film or cuttings of the same, in 2 ozs. of amyl-acetate.—L.T.W.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, August 2 to 6.

Apparatus.—No. 20,750. Photographic apparatus. A. J. Elliott and H. B. Stringer.

Cameras.—No. 20,698 Photographic cameras. F. A. Ellis.

COMPLETE SPECIFICATIONS ACCEPTED.

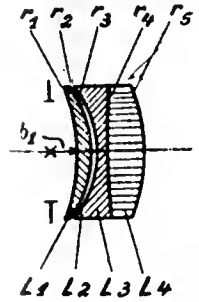
These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Triplet Anastigmat Lenses.—No. 158,902 (February 9, 1920). The invention relates to spherically, chromatically, and astigmatically corrected photographic lenses having the diaphragm in front, of the class comprising a collective meniscus and a cemented dispersive meniscus separated from the former by an air space having the shape of a collective meniscus, the cemented surface being collective and convex towards the incident light, and has for its object to produce specially favourable correction conditions, more particularly as regards the coma errors, in order to enable the objective to be used as an interchangeable element of a so-called "convertible" lens.

It has already been attempted in various ways to obtain the most favourable correction conditions in three-lens objectives with the diaphragm in front, and a collective meniscus next to the diaphragm, by making this meniscus uncemented, so that the air space situated between it and the cemented components could be utilised for correcting the errors. This was based on the assumption that it was desirable that the refractive index of the uncemented positive meniscus should be comparatively high—for instance, greater than the refractive index of the cemented single lens next to the air space on the other side thereof. Further investigation has, however, shown that the selection of such a comparatively high refractive index for the uncemented positive meniscus of the objective not only did not lead to the best possible correction conditions, but, on the contrary, precluded the possibility of satisfactory corrections.

According to the invention, a considerable improvement of the correction conditions is obtained by reducing the refractive index of the uncemented positive meniscus, for instance, by making this refractive index the same as that generally used for the



meniscus in the usual cemented three-lens systems of the well-known kind, the refractive index of the positive meniscus being smaller than that of the adjoining negative component.

The invention thus comprises a photographic lens of the above-mentioned class having a positive uncemented meniscus on the side towards the diaphragm, the refractive index of which is smaller than that of the next bi-concave lens.

An objective having these characteristics can be obtained which is distinguished by specially accurate correction of the coma with very small intermediate errors. Moreover, the zonal aberration, even when the relative aperture is very great, can be kept very small; there is also the possibility of a very thorough correction of the chromatic aberration.

Finally, a substantial manufacturing advantage, as well as an increase in the value in use of the new object-glass, results from

the fact that, owing to the reduction of the refractive index of the positive meniscus, the latter can be made of easily manufactured durable borosilicate crown glass, which is highly transparent.

The drawing illustrates diagrammatically a lens constructed according to the invention. L_1 indicates an uncemented collective meniscus, L_2 an air space in the form of a collective meniscus, L_3 is a dispersive lens cemented to a collective lens L_4.

In the following table of elements r_1 r_2—indicate the radii of curvature of the various surfaces from left to right in the drawing, d_1, d_2—indicate the thicknesses of the components L_1, L_2—, and n_D and nG^1 indicate the refractive indices for the D and G^1 lines of the spectrum respectively. b_1 is the distance between the plane of the diaphragm and the centre of the first surface. The dimensions are appropriate for an equivalent focal length of 100 units.

$$b_1 = -1.80$$

$r_1 = -15.00$	$d_1 = +1.17$
$r_2 = -9.00$	$d_2 = +0.33$
$r_3 = -8.38$	$d_3 = +0.73$
$r_4 = +63.33$	$d_4 = +3.00$
$r_5 = -14.42$	

L_1 — $n_D = 1.51220$, $nG^1 = 1.52221$
L_2 — (air)
L_3 — $n_D = 1.52320$, $nG^1 = 1.53083$
L_4 — $n_D = 1.62140$, $nG^1 = 1.63503$

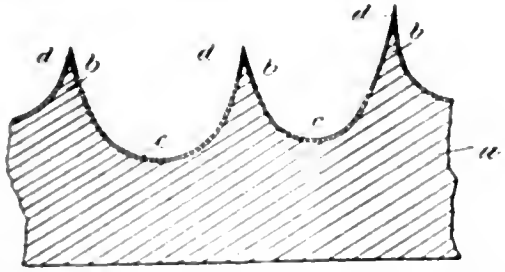
Diameter of full aperture = 8.00.

—Optische Anstalt C. P. Goerz Aktiengesellschaft, 45/46, Rheinstrasse, Friedenau, Berlin.

Lantern Screens.—No. 161,545 (April 10, 1920). According to the invention, dark coatings for the tips of the reflecting surface are formed. This results in that the projecting points or tips which are most liable to reflect the light (in projection in daylight) will be no longer able to reflect the same, but, on the contrary, absorb it, whilst the recesses, which are provided with a reflecting coating for the reflection of the projected image, remain effective.

Alternatively, the projecting screen itself may be made of a material which, on account of its colour or other reasons, is able to absorb the daylight, and in such a case a coating of the projecting tips with light-reflecting material need not be resorted to.

In the drawing, a is that part of the screen in which the surface is so shaped or roughened that projecting points to tips



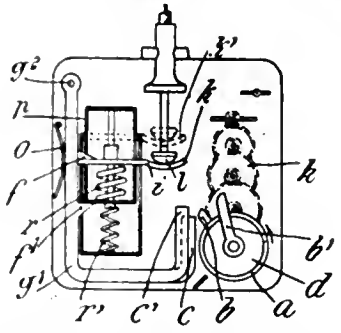
b and recesses c are formed. These tips, according to the invention, are provided with a dark coating d, whilst the recesses c have a covering of some highly light-reflecting material.—John Emlington-Darling, 5, Culmbacherstrasse, Wilmersdorf, Berlin, Germany, assignee of Carl Oskar Roehrich, 4, Augsburger Strasse, Charlottenburg, Berlin.

Self-Portrait Shutter Releases.—No. 141,331 (April 8, 1919). The invention relates to apparatus for operating photographic shutters in which the shutter trigger is actuated after a predetermined interval, and, after a further adjustable interval, is again actuated.

A uniformly rotating axis is provided with devices for successively operating, with an adjustable interval, spring-actuated members which respectively and in succession actuate and release the shutter trigger.

According to one design shown in the drawing, a drum a is driven by a clockwork movement provided with a barrel and also with a train of wheels, the rotation of which is regulated by a fly. This drum imparts a retarded rotary movement to a disc d, which carries two fingers a and b^1. The first finger b, by coming into contact with the upturned end c of an L-shaped lever causes the lever to turn on its pivot, and consequently releases a projection f on the lever from contact with a plate i provided with a support k for the release button l. The plate i and support k, under the action of a spring r, then rise to the position k^1, carrying along therewith the release button l, which movement produces the opening of the shutter.

The second finger b^1, which is adjustable at will relatively to the finger b, acts in its turn on the end c^1 of a second L-shaped lever g^1, causing the lever to turn on its pivot g^2 and liberate a projection f^1 on the lever g^1 from a casing p containing the spring r. The casing then descends under the action of a spring r^1 and that of the release button (and of the shutter), and



this second movement produces the closing of the shutter. The finger b^1 being adjustable with respect to the finger b, the interval between the two positions of fingers determines the duration of the time exposure. A small, flat spring o serves to maintain the two ends c and c^1 of the L-shaped levers in their normal position.—Société Anonyme pour l'Exploitation d' Inventions I.S.A., 53, Rue du Stand, Geneva, assignees of Jacques Bogopolsky, 53, Rue du Stand, Geneva.

Lantern Screens.—No. 166,893 (July 6, 1920). The invention relates to screens on which cinematograph pictures can be seen in daylight. It consists of a semi-opaque sheet or sheets of glass, celluloid, or other material, so roughened or indented upon one of its surfaces as to present protuberances, ridges, or nodules, which will cast shadows or will themselves be partly in shade when the rays of the sun are thrown obliquely or transversely upon them.

Thus a sheet of glass which is smooth on one side may be provided with parallel V-corrugations on the other, crossing one another at right angles so as to leave pyramidal nodules, formed by casting, moulding, or cutting the surface. The smooth face (or back) of the glass may be covered with white or light toned paper or fabric or coated with aluminium or other paint in order to render it semi-opaque, while white or light-tinted paint may be applied to the indented surface. Alternatively to the use of such covering and painting the glass may be of the kind known as opal or semi-opaque. When the daylight or sunlight falls upon such a screen at any angle except a right angle (which in practice would never be a probable angle), the high light will be broken up into lower lights or shadows by the evenly distributed nodules which are spread in close formation over the whole surface. Any picture projected from a lantern upon such a screen will be rendered visible because of its rays falling upon the innumerable shaded spots, which become illuminated by the picture instead of by the daylight.

In another form of the invention, the face of the screen may be ribbed in one direction only, and when this form is used, the daylight or sunlight may be caused to impinge upon it transversely on all occasions by providing means by which the screen can be adjusted to the most favourable angle. For instance, such a screen may be caused to revolve in its own plane upon an axis at right angles to itself, and for this purpose it may be mounted in a frame or upon a holder provided with the necessary gear by which the ribs on the screen will always be placed transverse to the rays of the sun, and such rays may be either direct or suitably deflected thereon by mirrors.—John Hill Coverdale, 128, Braybrook Road, Hastings, and Frederick Chetwynd Jessett, Bush Lane House, London, E.C.

Sensitive Collodion.—No. 166,063 (September 16, 1920). The patentee has discovered that collodion in which the solvent employed consists entirely or mainly of methyl alcohol enables him to introduce organic iron salts in the coating mixture or emulsion, whereby light-sensitive films which have distinctive properties are obtained. Moreover, such coating mixtures or emulsions have

other advantages, amongst which may be named that the mixtures flow more readily and easily than the ordinary collodion coating mixtures, and are far less liable to accumulate dust or specks than are water-soluble coating mixtures.

A collodion coating mixture or emulsion is prepared by making up collodion with methyl alcohol as the solvent, to which may, however, be added, either at the time of preparing the collodion or subsequently a proportion of some other solvent, for example, ethyl alcohol. The latter has the property of lessening the porosity and increasing the density and clearness of the collodion film, which can be controlled and regulated by the amount of ethyl alcohol in the coating mixture. The most useful results are obtained when the proportion of ethyl alcohol to methyl alcohol in the finished coating mixture is as 1:3 or 1:4. A trifling proportion, not exceeding 2 or 3 per cent. of water will, on the other hand, increase the porosity of the collodion film, and can be added to the collodion mixture, if desired.

A solution of the organic iron salt is made and added to the collodion. The salt preferred is ferric ammonium citrate, and the preferred solvent is methyl alcohol. If the salt, as in the case of ferric ammonium citrate, is not completely soluble in the methyl alcohol, then only the soluble portion is decanted and used in the mixture.

The mixture so prepared produces a light-sensitive film when coated on glass plates or other material, but in order to increase its sensitiveness the plates may be bathed in an alcoholic solution of other metallic salts, such as silver, gold, platinum or palladium salts, either singly or in combination. Some salts suitable for the purpose are silver nitrate, gold chloride, platinum chloride, or palladium chloride. It is preferred, however, in place of bathing the plates, to add the salts for obtaining increased light-sensitiveness to the mixture itself, preferably dissolving them in ethyl alcohol. The ethyl alcohol so used may be made to serve the double purpose of dissolving the added salt and of producing the desired degree of density of the collodion film, as referred to above.

A typical light-sensitive collodion coating mixture or emulsion would be composed as follows:—

6 per cent. celloidine dissolved in methyl alcohol, 2 parts by vol.
Ferric ammonium citrate saturated solution in methyl alcohol, 1 part by vol.
2 per cent. silver nitrate in ethyl alcohol (industrial spirits), 1 part by vol.

The main claim is: Light-sensitive coating mixtures or emulsions for photographic purposes, of collodion containing an organic iron salt, preferably ferric ammonium citrate, in which the solvent employed to produce the collodion consists wholly or mainly of methyl alcohol.—Julius Rheinberg, 57, Holborn Viaduct, London, E.C.1.

The following complete specifications are open to public inspection before acceptance:—

STEREOSCOPY.—No. 167,179 Optical devices adapted to obtain stereoscopic images. A. J. Toupillier.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

LION (DESIGN).—Nos. 387,634 and 387,635. Cinematograph films for exhibition. Lionel Phillips, 29a, Charing Cross Road, London, W.C.2, cinematograph manufacturer and dealer.

R. L. (PRISM DESIGN).—No. 399,184. Philosophical instruments, scientific instruments, and apparatus for useful purposes; instruments and apparatus for teaching. Ross, Ltd., Optical Works, 3, North Side, Clapham Common, London, S.W.4, manufacturers.

STAR IN CIRCLE (DESIGN).—No. 394,057. Chemicals for photographic purposes and synthetic dyes, all being goods included in Class 1. Gregory and Co., Bycars Laboratories, Hamil Road, Burslem, Stoke-on-Trent, manufacturing chemists.

AIRCO (DESIGN).—No. 398,894. Photographic cameras. The Aircraft Manufacturing Co., Ltd., 25 and 27, Old Queen Street, Westminster, London, S.W.1, and Edgware Road, The Hyde, Hendon, London, N.W.9, manufacturers.

SPLENDOL.—No. 398,351. Chemical photographic developers. Cutler Hill Colour and Chemical Co., Ashton Road East, Failsworth, Manchester, aniline dye and photographic chemical manufacturers.

SKEG-CARDS.—No. 400,579. Photographs on cards. Herbert John Jackson, 25, Ford Street, Coventry, photographer.

MONAL.—No. 399,892. Chemical substances used in photography. The Portsmouth Photo Co., Ltd., Pompey Works, 8, Arundel Street, Portsmouth, photographic manufacturers.

APTUS (DESIGN).—No. 402,531. All goods included in Class 1. Moore and Co., 101 and 103, Dale Street, Liverpool, photographic apparatus manufacturers.

PONTOPRINT.—No. 401,856. Pictures, prints, engravings and photogravures. G. and G. Ponton, 128, Renfield Street, Glasgow, die-sinkers and engravers.

PACTOL.—No. 402,193. Adhesives (mucilage paste, gum, labelling solution), prepared as articles of stationery. United Chemical Corporation, Ltd., 39, Victoria Street, Westminster, London, S.W.1, manufacturing chemists.

FORTEX.—No. 403,211. Philosophical instruments, scientific instruments and photographic apparatus, all being included in Class 8, but not including spectacle lenses and not including any goods of a like kind to spectacle lenses. Fred Walter Baxter, 17, Chryssell Road, Brixton, London, S.W.9, manufacturer of photographic apparatus.

WELLINGTON (CHILD DESIGN).—No. 412,402. Photographic plates, films and chemicals. Wellington and Ward, Shenley Road, Borcham Wood, Elstree, Hertfordshire, manufacturers.

DISTAR.—No. 362,971. Optical instruments. The firm trading as Carl Zeiss, 2, Carl Zeiss Strasse, Jena, Germany, manufacturers of optical and philosophical instruments.

New Materials.

Eclipse Ultra-rapid Plates. Made by the Imperial Dry Plate Co., Ltd., Cricklewood, London, N.W.2.

FOR many years the Imperial "Flashlight" plate has held an enviable position as regards speed and the other qualities which are demanded in a dry-plate emulsion of high quality, its great sensitiveness satisfying those who require a plate of extreme rapidity. With the demand for greater and still greater rapidity on the part of photographers of sporting events under often unfavourable conditions of lighting, the Imperial Company have perfected a plate of still higher sensitiveness, which they have recently issued as the "Eclipse." The plates sent for our trial are marked 650 H. & D., a number which indicates a speed more than 50 per cent. greater than that of the "Flashlight." While the H. & D. is not a full measure of the sensitiveness of a plate, comparative tests against a "Flashlight" show the difference between the two to be fairly indicated by this numerical rating. The many photographers who in the past have pledged their faith to "Imperial Flashlights" under conditions requiring the maximum light-action on a plate can hardly ask for a more emphatic testimony to the speed quality of the new introduction.

Moreover, with pyro-soda or metol-hydroquinone, the plates develop quickly and allow of any ordinary degree of vigour being readily obtained. An ultra-fast emulsion in some cases does not fix as quickly as one of medium speed, but we observe no sluggishness as regards fixing with the "Eclipse" plates. The makers, however, recommend that plates should remain at least seven minutes in a fixing bath containing 6½ ozs. of hypo in 20 ozs. of water. It is likewise deserving of notice that plates of this extreme rapidity call for more than the usual care in respect to exposure when loading and developing. Apart from other factors, fogging is a question of a certain time of exposure to even a "safe" light. The makers have to use part of that time in the manufacture and examination of the plates: the user needs to expose the plates as little as he can to what remains. A deep ruby safelight, such as the Imperial No. 4, is recommended. With these precautions taken, there will be no difficulty in obtaining negatives of fine gradation

and complete freedom from veil under the conditions of minimum exposure, such as frequently prevail in focal-plane and Press photography.

LUMIÈRE DESENSITISER.—Mr. Thomas K. Grant, 89, Great Russell Street, London, W.C.1, sends us a sample tube of the Lumière "Desensibilisateur" for the desensitising of Autochrome and ordinary plates for development in a bright yellow light. The contents of the tube are mixed with 35 ozs. of water to make the working bath, in which Autochrome plates are immersed for 30 seconds; ordinary plates for one minute.

RADIO-LUX ANTI-HALATION PLATES. — MM. R. Guilleminot. Boespflug & Cie. send us a sample of the anti-halation plate issued by them as "Radio-Lux," and described some months ago in these columns by M. L. P. Clerc. The special feature of the plate is a coating of brown manganese peroxide between the glass and the emulsion film. This supplies an intensely effective obstacle to the production of halation and, moreover, in the "Radio-Lux" plate is produced in such a degree of transparency that the plate can be developed as readily (by transmitted light) as one unprovided with backing. In an acid fixing bath the peroxide-layer is immediately decolourised and removed. Further particulars of the plates may be obtained from the London representative of MM. Guilleminot, M. Jules de Gottal, 7, Cecil Mansions, Marios Road, London, S.W.17.

PROFESSIONAL PASSE-PARTOUTS.—It has always been a matter of some surprise to us that professional photographers should make such comparatively little use of passe-partout framing, not only for the neat and artistic display of specimens in the window, but also for supply to customers. As regards the former, it is a very common sight to see soiled prints in a window, and also those which, as soon as the sun strikes the window, begin to curl up at the corners, presenting a very unsightly appearance. It would seem that many shirk the trouble of mounting specimens passe-partout fashion. Those who do so surely cannot have made the acquaintance of the ready-made passe partouts which are a specialty of Messrs. W. Butcher & Sons, Camera House, Farringdon Avenue, London, E.C.4. These passe-partout frames, supplied under the name of "Kwick-Mount," are available in a series of different patterns for prints from c. de v. to whole-plate size, at prices which run from 1s. to 3s. each. The mounted print has simply to be laid in contact with the glass and the binding flaps brought over it and secured by a gummed strip. These passe-partouts allow of prints being replaced by others, and their extremely neat and pleasing design recommend them both for window displays and supply to customers.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK

THURSDAY, AUGUST 25.

Hammersmith (Hampshire House) P.S. Debate—"Straight v. Faked Photography." Leaders: P. Chatterton and A. Hanson.
North Middlesex P.S. "Enlarged Negatives." W. Robinson.

SATURDAY, AUGUST 27.

Bradford Phot. Soc. Excursion to Hawksworth.
City of London and Cripplegate P.S. Outing to Hampton Court.
Kinning Park Co-op. Soc. Trades' Holiday Outing.

CROYDON CAMERA CLUB.

Recently the informal session has been living from hand-to-mouth, which seems to agree with its varied composition. Last week Mr. E. A. Salt filled a gap with a demonstration on "Palladiotype," hardly of a grandiose nature, as only modest half-plate prints were handled, but the metal palladium, like platinum, he explained, costs much good money. Also, he preferred carting about small dishes to large.

Introduced during the war, when platinum was almost unobtainable, Palladiotype, he said, has since been so improved and tuned up as to constitute practically a new product. Although the solutions employed are different, it may be regarded as a variant of Platinotype, being worked in exactly the same way.

After an outline of the theory of the process, he said that Palladiotypes are sensitised to give a beautiful warm black (some might consider it a brown) on matt papers, supplied in many grades. The natural surface of the paper is retained unchanged with the image right on top, and not embedded in gelatine or starch. The "vellum" (semi matt) papers give a warmer tone. Palladiotype is a cold-bath process, and affords a robust initial image enabling correct exposure to be judged after a trial or two. Development is best effected as soon after printing as feasible, and the prints do not deteriorate if left in the clearing baths long beyond the regulation time.

Very useful in the case of flat negatives, or when additional sparkle is required, is the addition of a small quantity of potass bichromate to the developer. Unless the salt be added in excess no injury to the quality of a Palladiotype picture occurs. So minute a dose as half a grain in 20 ozs. of developer gives slightly added contrast; it is not advisable to go beyond 4 or 5 grains to the pint. Printing must be carried further according to the amount of oxidant added.

In the discussion, Mr. J. M. Sellors, as an old Platinotype worker, paid tribute to the newer process, in so far as it resembled its prototype, which excelled in the beautiful gradation it gave in the lighter tones. Mr. A. F. Catharine preferred Palladiotype; the term "brown-black" might mean anything, but the particular colour or tone secured was just right and could not be bettered. Thanks to the absence of the usual colloids, the maximum of brilliancy was secured on a perfectly matt paper. Mr. H. P. C. Harpur said he had known palladium confused with peptonised milk and music halls. To his cost he had recently realised it was a very precious metal indeed. For direct work he always used Platinotype, as it lasted for ever and ever. Touching, too, upon the infinite, Mr. V. Jobling suggested coating on asbestos, for the last speaker's exclusive use.

Commercial & Legal Intelligence.

LEGAL NOTICE.—Notice is given, pursuant to Section 242 (5) of the Companies Consolidation Act, 1908, that the name of Park's Press Photographic Agency, Limited, has been struck off the register of Joint Stock Companies, and the company is dissolved.

EASTMAN KODAK COMPANY.—The directors have declared the following extra dividends:—2½ per cent. upon the common stock, payable on October 1, to stockholders of record on August 31; 5 per cent. upon the common stock, payable on November 1, to stockholders of record on September 30.

The ordinary quarterly dividends of 2½ per cent. upon the outstanding common stock, and of 1½ per cent. upon the outstanding preferred stock will be paid as usual on October 1 to stockholders of record on August 31.

CANVASSING PHOTO-COLOURING FRAUDS.—At the Canterbury Police Court last week, Ellen Elizabeth Vincent was charged with obtaining 2s. from Eva E. Hobbs on July 12 with intent to defraud and cheat.

Chief Constable Carlton stated that prisoner called at Mrs. Hobbs' residence at 37, New Town Street, at 11.30 a.m. on July 12, and asked if she had photographs which wanted colouring, saying that she did miniatures for 1s. 6d. and cabinets for 2s. 6d. Mrs. Hobbs gave prisoner four photographs, and, upon the woman asking for a deposit, 2s. for which a receipt was given. Prisoner said the photographs would be finished in a week, and also added that she was opening a business in St. George's Street on the following Monday—a statement since proved to be untrue. On July 25 Mrs. Hobbs went to 7, Blackfriars Street, Canterbury, the address on the receipt, and found that prisoner had left a week previously. The photographs, with several others, were recovered from that address. Prisoner was apprehended at Branksome, Dorset, and upon being received into custody by

P.S. Richardson, who charged her with the offence, the woman said, "That's quite right. I also had the photographs." At Canterbury, when charged, prisoner replied, "I certainly did not take the money under those conditions—to defraud."

Eva Elizabeth Hobbs and P.S. Richardson bore out this statement in evidence, the former adding that prisoner showed her a specimen photograph and asked for details as to the colour of the hair, eyes, etc

Prisoner, who pleaded "Not Guilty," said she fully intended getting an office and settling in Canterbury to colour photographs, as she had always done As money she had been expecting from home did not come, she could not complete the photographs in the time. She could not remain at her lodgings as she could not pay her landlady. She had intended going to Bournemouth—her home—but remained near by until Wednesday last. In about a week's time the photographs could be finished. She had a list of her various customers in Canterbury, with the amounts they had paid She had fully intended to complete the photographs, even had they been a little late. A remand was ordered.

When prisoner appeared again she was charged with two further offences on July 8 (*a*) of obtaining the sum of 2s. 6d. from Mildred Thatcher, of 40, Artillery Street, Canterbury; and (*b*) of obtaining the sum of 3s. from Emily Streeting, of 23, Artillery Street, Canterbury. No evidence was offered in a charge of obtaining the sum of 1s. 6d. from Violet Blissett, of 41, Artillery Street, Canterbury. The evidence given by the complainants showed that the circumstances were similar to those of the above case.

P.S. Richardson, in evidence, said that altogether he recovered 75 photographs from 7, Blackfriars Street, Canterbury. Prisoner, when charged, said she had nothing to add to her statement.

The Chief Constable informed the Bench that prisoner was bound over in the name of Nellie Simmonds at Bournemouth in 1917 for embezzlement, and was sentenced to three months' hard labour at Guildford Petty Sessions in February last for stealing money as bailiff. There was a further warrant out against her in the name of Nellie Lee for obtaining 5s. by a trick from Lilian Beatrice Houghton, at Eastbourne, which prisoner desired should be taken into consideration. There were ten other complaints of a similar nature from Eastbourne, which prisoner admitted were with regard to photographs. She was 36 years of age.

The Chairman said that having taken into consideration the Easthourne case, the sentence would be two months' hard labour in each of the three cases heard, the sentences to run concurrently

News and Notes.

Mr. R. Hume, to whom we recently sent the reply to a question, is asked to send a stamped envelope bearing his address, since that enclosed with his query has been returned by the postal autherities

Mr. William Bell, of Criterion, Ltd., is open to accept engagements for lectures and demonstrations in Lancashire from the following dates:—Monday, October 16, to Saturday, January 21, 1922, inclusive.

Mr. F. W. Speaight, we are informed, delivered a lecture to members of the Press on Tuesday evening last, describing his plans for the improvement of the Horse Guards' Parade, which, with certain modifications, have just been approved by Parliament.

A Rescuer's Camera Stolen.—Before jumping into the sea fully dressed to save a child from drowning at Southend a photographer left his camera in charge of a man on the Western Esplanade. After restoring the child to its mother, the rescuer found that the man had vanished with the camera.

Mr. William Field died suddenly from heart failure on the 6th instant while on holiday. He was for over 50 years in the service of the Autotyne Company, appreciated and esteemed by its successive principals and by his fellow servants. Many photographers who knew him will regret his decease.

Professional Field Cameras.—Messrs. Sands, Hunter & Co., 37, Bedford Street, Strand, London, W.C.2, have just issued a 32-page list almost exclusively occupied by specifications of the many field cameras for outdoor professional use of sizes from half-plate to 15 x 12. These include many examples of the lighter conical models as well as the heavier substantial patterns still largely in favour by many professionals. A copy of the list will be sent on application.

Mr. W. B. Ferguson, M.A., K.C., whose health, we are very sorry to hear, has lately been a matter of some concern, has this week left London for Baden, Aargau, Switzerland, where he expects to remain for several months, and may not return to England until the spring. While he is ordered to rest, immediate photographic friends are asked to note that his address in Baden is Hotel Bären. We join with many others in wishing Mr. Ferguson a complete restoration to health.

A French Chemical Congress.—The Société de Chimie Industrielle is holding an important congress of applied chemistry in Paris from October 9 to 12 next. The proceedings will be divided among numerous sections, including one relating to photographic manufacture. A series of visits to works is being arranged, and also an exhibition representing all branches of industrial chemistry, in which the majority of French firms will take part. Further information is obtainable from 49, Rue des Mathurins, Paris.

A New Poison Bottle Bill.—Last week there was introduced a Bill in the House of Commons proposing that every chemist when selling poisons must with every bottle state on the label the antidote to the poison, so that in case of any mistake a swift remedy may be applied. The penalty for failure to comply is put at £5. One criticism raised is that the vendor should be allowed to state the antidote in writing instead of print on the label. Another is that if such precautionary statement is made, it may prevent people from calling in a doctor in case of accidental poisoning. The introducer of the Bill is General Surtees, M.P., for Gateshead.

D. 50.—In response to a large request for this new developer in form ready for use, the Cooper Laboratory, Watford, have decided to supply the ingredients for the No. 2 solution in tablet form. Four tablets provide the chemicals necessary for use with 1 oz. of D. 50. Cartons of 8 and 16 tablets are being issued to retail at 6d. and 9d. each respectively, and the tablets will also be put up in boxes of 100 to retail at 3s. 6d. per box. A sample packet containing a small bottle of the D.50 concentrated solution, together with a tablet providing the solid chemicals for the No. 2 solution, is also being issued, price 9d. from any photographic dealer, or post free on application to the Cooper Laboratory, Watford.

A New Form of Educational Film is now being shown to English audiences, the pictures illustrating how the eye sees, how the ear hears, how the heart and lungs work, etc. The pictures are a development of the moving picture cartoon, and owe their origin to a Mr. G. R. Bray, of Chicago. The writer of the "films column" in the "Star," describing the new pictures, says that the heart is first photographed from a dark cardboard background, then a transparent plate is superimposed, showing the chambers of the heart, and the two are photographed together. After that several other plates, showing changes in the chambers, are superimposed. In fact, one background is often used with 20 or 30 transparent plates.

The Camera in Fiction.—All writers of fiction have not so good a grasp of photography as they might have, and many "howlers" have been recorded. Mr. E. V. Lucas, however, seems to be fully alive to modern methods, for in his "Listener's Lure" he makes one of his characters (Adelaide Fielding) write to a friend:—"I wish you would send me a photograph of yourself. . . It is quite useless to tell me that you never go to a photographer. That excuse is dead and buried. Photographers come to us now. I am as certain that Edith (another character figuring in the story) has a camera as that I have not." And the page from which this extract is made is headed: "To everyone a camera or two." Such free advertisements of photography are welcome.

Story of a Good Photograph.—An excellent piece of propaganda, which recently has been undertaken by the British Photographic Manufacturers' Association, is the circulation of a small booklet, entitled "The Story of a Good Photograph" which is being extensively advertised in the lay Press. The booklet, which is written by Mr. Arthur C. Brookes, very simply puts forward the ways in which anyone may take up photography, and usefully emphasises the simplicity of photography as a hobby as a result of the improvements in apparatus and materials. The booklet includes

advertisements by British manufacturers. Although it was intended that the booklet should be distributed solely as a result of advertisements in the Press, with the object of attracting those who at present do not number photography among their hobbies, applications from dealers for copies of the booklet have been so numerous that the B.P.M.A. has agreed to supply dealers with a limited number of copies for free distribution strictly to non-photographers at the nominal charges of 5s. for 50 copies; 10s. per 100 copies, in each case post free. Application for the booklet should be made to Sicilian House, Southampton Row, London, W.C.1, enclosing remittance, since it is not possible for the Association to open up a number of small accounts.

REMOVING STAINS, ETC., AND BLACK LETTERING FROM CANVAS BLINDS.—The following paragraph, which we clip from "Work," contains some information which may be of service to those of our readers who have their studios or shop fronts fitted with canvas blinds:—To remove mildew and stains from canvas, cut 1 lb. of good yellow soap into shavings and boil into a stiff paste with soft (preferably rain) water. Apply this to the stain by rubbing vigorously, and sprinkle with finely powdered potass carbonate. Spread the fabric on a grass plat and allow to remain there for twenty-four hours. When dry spray the canvas with rainwater and wash, when the stain will have disappeared. The black lettering on shop blinds is usually effected by stencilling or painting with an enamel or paint. If this is the case, it will be easily removed by vigorously sponging with any of the following solvents: Chloroform, carbon tetrachloride, ether, acetone, aniline, or nitrobenzene. Aniline is to be preferred since loss due to evaporation is least with this solvent. Should the lettering be printed with a carbon ink, however, it will be necessary to bleach the canvas. Therefore, if any of the above solvents fail to give satisfaction, proceed as follows: Boil the fabric for three hours in a solution containing 37 gr. of potassium cyanide (a powerful poison) per 1¾ pt. of water, wash and warm in a closed vessel containing a solution of 81½ gr. of chloride of lime per 1¾ pt. of water. As soon as the vessel is full the solution is allowed to cool and drawn off carbonic acid gas (carbon dioxide) is passed in. This operation of warming in the bleaching solution and treating with gas is pursued until all the lettering has been removed. In some cases a slight yellow tinge is retained by the fabric owing to traces of iron impurities in the bleaching agent. To remove this coloration the canvas is drawn through a bath of oxalic acid (about 70 gr. per gallon of water), washed with water and dried.

Correspondence.

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

*** *No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

EARLY PHOTOGRAPHY BY MAGNESIUM LIGHT.

To the Editors.

Gentlemen,—To borrow a phrase from the letter of your correspondent, "P. R. S.," in the issue of July 8, p. 406, "I do not propose, however, to write a history of flashlight work," merely to detail some facts, which may perhaps put a different complexion on the subject from that outlined by your correspondent.

H. Larkin (Eng. Pat. 2,786, 1865) patented the use of magnesium powder, which was supplied to a flame in a continuous stream from a funnel. The inventor points out that it is convenient to mix it with sand, ground flint or glass in the ratio of 1 magnesium to 3 sand, etc., and the use of ribbon or wire, burnt in a lamp, is also claimed. F. W. Hart ("Phot. News," 1864, 209) refers to the use of magnesium ribbon, and Johnson and Matthey announced that on April 1, 1865, the price would be reduced to one-half. Up to this time it was, I believe, from 100 to 150 shillings per pound.

At a meeting of the British Association, Section B, W. White ("Phot. News," 1865, 437) gives a very good sketch of the uses of magnesium generally and of the work of Piazzi Smyth, and says: "Magnesium filings.—It is a question whether magnesium in filings has met with due attention. It would not be difficult to deliver a stream of the metal, as sand from an hour-glass, into a jet of gas or other flame, and thus maintain a light with a certainty equal to that obtained by wire and clockwork."

At a meeting of the South London Photographic Society, November 9, 1865, reported in "Phot. News," 1865, 550, "Mr. J. T. Taylor ignited a portion of a powder consisting of antimony, magnesium, sulphur and potassium nitrate, which gave a momentary flash of very actinic light, with which, he stated, instantaneous photographs could be obtained." And this was not in the days of the fast gelatine plate. E. T. de Banzie (Eng. Pat. 5,462, 1881) patented a lantern for burning magnesium or other "heliopyre" compound.

In an editorial article ("B. J.," 1887, 530) reference is made to the Gaedicke and Miethe patent. Traill Taylor's experiment is recalled, and it is stated that an editorial article on the subject appeared in the following year. Appended to the above patent specification is the following note: ("We never like, where it can be avoided, to throw cold water upon a patent; but it is probable that the patentees in this case had never read an article in our issue of May 24, 1867, 'Photography by a Flash,' and from which we here make a brief extract: 'Mr. Skaife finds in magnesium powder, when mixed with other pyrotechnic compounds, the means of obtaining a flash of light of the desired intensity and brevity. At the meeting of the South London Society in November, 1865, we ignited a powder composed of magnesium, chlorate of potash and sulphur, by which we had been able a few evenings previously to obtain a sharp image of a print while it was being slowly moved.' This, we imagine, settles the fate of the foregoing patent.—EDS.")

G. A. Kenyon ("B. J.," 1883, 61) used magnesium ribbon burning in oxygen, and stated also that magnesium powder and chlorate could be used.

Eder Handbuch, 1905, 1, 1., 331, which deals with the history of photography, says: "Photography with magnesium powder in the form of 'flashlight,' as it was then called, *first obtained development by the work of J. Gaedicke and A. Miethe in Berlin, and soon thereafter the whole world was busy with the same*, since the explosive mixtures of magnesium powder (magnesium, chlorate of potash and antimony, and later other mixtures, see below) recommended by the same actually burnt as quick as a flash and gave instantaneous pictures of portraits and groups, etc., on gelatine plates. About the same time Meydenbauer became busy with the same subject. *After Gaedicke and Miethe had given the new impetus to magnesium flashlight photography*, the excellent properties of pure magnesium powder, blown through a flame, were learnt. T. N. Armstrong drew attention shortly after the publication of the Gaedicke-Miethe flash powder to the fact that pure magnesium powder blown through a flame gives an intense light ('B. J.,' 1887, 77). After which a large number of different 'flash powders' and magnesium flash lamps were given, which (as well as the experiments with aluminium flash light) are described in another volume of this work."

Thus is history made! The italics above are mine, and the actual truth is that the price of magnesium was dropped to one-fifth. See "Phot. News," 1887, 193.

Now for some other facts. As recorded above, White had suggested the use of pure magnesium twelve years prior to the Gaedicke-Miethe "epochmachenden" discovery. W. H. Harrison ("Phot. News," 1885, December 15; "B. J.," 1886, 81) described dropping magnesium powder, mixed with sand from a funnel, thus following Larkin. See above.

The Gaedicke-Miethe German patent is 42,966, April 27, 1887, for a mixture of magnesium 30 parts, potassium chlorate 60 parts, antimony sulphide 10 parts, with or without the addition of 10 per cent. of sodium, calcium, strontium, lithium or barium salts to give colour to the flame, and a lantern to burn the same in. Their English patent (7,035, May 13, 1887) patented magnesium 6 parts, potassium chlorate 12 parts, and potassium "prussiate" 1 part, or Mg, 12 parts, $KClO_3$ 24 parts, and amorphous phosphorus 1 part, with the other earthy salts, about 10 per cent. of the latter being claimed. In their book, "Praktische Anleitung zum Photographieren bei Magnesium Licht" (Berlin, 1887, reviewed "Phot. News," 1887, 350) the German patent and Traill Taylor are followed. H. W. Vogel, in his usual letter to the "Phot. News," 1887, 340, said the results were first shown in Berlin by Gaedicke

on March 11, but not explained till April 15, and stated that chlorate and nitrate were used.

A. Hemsley, U.S. Pat. 407,351, 1889, application date May 4, 1888, claims the same thing and the use of the earthy salts "to produce orthochromatic effects similar to that produced by a specially prepared plate with an interposed colour screen."

T. N. Armstrong's paper was read before the Glasgow Photographic Association (reported "B. J.," 1887, 777; "Phot. News," 1887, 773). Armstrong described Piffard's and Traill Taylor's experiments, and, referring to the German proposal, says that such compounds are not at all desirable on account of their explosive character, the sulphurous fumes and the antimony oxide, the latter being poisonous. His own plan was to use a chemical wash bottle with two tubes. He writes: "I consider the blowing through a gas flame of this powder to be a great stride in the right direction in the class of work we are considering to-night, especially as it solves the difficulty of being able to throw the light from any desired angle, which is easily done by a common movable gas bracket with universal joints." See also "B. J.," 1889 38.

Dr. H. G. Piffard's experiments were made before the Society of Amateur Photographers of New York ("Phot. News," 1887, 697, 720). He first used gunpowder in the ratio of 3 to 1 magnesium (cf. A. H. Elliott, "B. J. Almanac," 1888, 450), and later adopted nitro-cellulose, sprinkling this with twice its weight of magnesium (cf. F. C. Beach "B. J. Almanac," 1888, 439; "B. J.,' 1886, 114). W. J. Harrison ("B. J.," 1887, 790), in an article entitled "Magnesio-Cotton Light," refers to Piffard's work, and appends the following postscript: "I find that a mixture of lycopodium powder and magnesium triturated in a mortar and blown from a tube through a gas flame yields a very brilliant and momentary flash."

At a meeting of the North London Photographic Society of January 3, 1888, reported in "B. J.," 1888, p. 2, reference was made to Armstrong's work, and in "B. J. Almanac" this note is summarised as follows:—

"Here is a description of one of an excellent nature introduced by Mr. W. Bishop early in the year. A metallic spirit lamp, having a flat top, is fitted with two wicks, one in front of the other. Immediately behind this is a reservoir containing magnesium in powder into which dips a glass tube, the other end being carried up through the cork and bent towards the flames of the spirit lamp. A second short tube is passed through the cork, its outer end being connected with the rubber tube of a pneumatic ball. On giving this ball a quick, sharp squeeze a small quantity of the powder is suddenly ejected against the flame, this being attended by a dazzling flash. This is capable of being repeated as long as any powder remains in the reservoir.

"The lamp of Mr. H. M. Hastings is very simple. A plain glass tube has an ordinary 'thistle' as a terminus at one end (as readily procurable from every dealer in glass tubes), and a single turn or loop is formed in the tube in the middle by softening it in a spirit lamp and giving it a loop turn, leaving the main body of the tube in a straight length as before. Now, if the tube be charged with powder by pouring it in at the wide end, it stands to reason that none of it will get lost or spilt, as it will all be arrested at the turn of the tube, and when the puff of air from the pneumatic ball is subsequently sent through the tube, it performs its function so thoroughly as to eject the powder without leaving a trace of it behind. Of course, either end of the glass tube may be directed towards the flame; the larger one seems advantageous, as it may aid in spreading out the charge on the principle of the now extinct blunderbuss.

"On one end of the tube is sprung a piece of rubber tubing terminating in a pneumatic ball, and on the other end is 'shipped,' by means of a spiral wire, a split brass tube, a spring clip, or any other convenient mechanical appliance, a tube of wire gauze about three inches long and half an inch in diameter packed with asbestos. This tube, which constitutes the lamp, is dipped in a bottle of alcohol and thus becomes charged. It now only remains to light the spirit lamp, and press the ball when the flash follows.

"Mr. A. James has devised a lamp which, judging especially from the results obtained, appears to be eminently successful. An ordinary Argand gas burner is employed, the glass chimney being removed, and a stream of magnesium is ejected into the flame from the orifice of a tube in the middle and below the level of those through which the gas is emitted.

"On lines somewhat analogous, although differing in a material degree, is a lamp, the invention of Professor Redwood. In this there are two circular wicks (Argand fashion) rising from the top of a spirit lamp, and both are inclined towards each other, so that the two flames combine. To each is the magnesium powder supplied through a tube below, and both tubes are supplied from a small reservoir of the powder, over which, when charged, a lid fits tightly. The powder is ejected in the usual way, viz., by means of a pneumatic ball and rubber pipe, connected with a brass tube which is fixed in the reservoir. This angular arrangement of the burners ensures perfect combustion, and also distributes the flame over a larger area. The lantern in which it is enclosed is of japanned tin, bright on the inside, and bent in a cylindrical form. There is no glass in front, but a sheet of white blotting paper is fixed in front and held by a suitable clip, and when the powder is ignited it becomes powerfully illuminated by a soft light, like that from a white, luminous cloud. This prevents that glare which is so oppressive to the eyes of the sitter, softens the shadows, and harmonises with the conditions under which daylight portraits are taken, as the area of illuminated paper in front of the lantern is considerable, or about two feet square."

F. W. Hart and W. Bishop applied on January 1, 1888, for Eng. Pat. 356, and H. T. Redwood on January 13 for Eng. Pat. 582, 1888, and this lamp was placed on the market by Marion & Co., though the patent was abandoned.

A. James ("B. J.," 1889, 62) claims priority for the idea of blowing magnesium through a flame (ignorant, probably, of White's 1865 suggestion), and obtained Eng. Pat. 2,730, February 23, 1888, for a lamp, and Eng. Pat. 6,917 for trapping and removing the smoke (cf. "B. J.," 1888, 66, 69). A. L. Henderson ("B. J.," 1899, 60, 94; "B. J. Almanac," 1907, 659) suggested incorporating magnesium in cylindrical pencils of celluloid so that different lengths could be cut off and allowed to burn slowly, which was the first suggestion for a so-called "time-light cartridge," subsequently patented by others.

We now come to the Schirm patents; the German is 45,532, of April 4, 1888, and Eng. Pat. 5,974, April 21, 1888. Therefore we may justly claim that he was anticipated by Englishmen, and cannot be said to have "invented the plan of burning pure magnesium powder (not a mixture) by blowing it through a flame."

I am afraid that this letter has expanded beyond the usual limits, but it is, I think, as well to place some of the facts, at any rate, in due sequence.—Yours faithfully, E. J. WALL.

Wollaston, Mass.

D 50 AND METOL POISONING.

To the Editors.

Gentlemen,—I have been interested in the notices of the new developer D 50, as I have been using it since Mr. Gear's article upon it in the "B.J." I have found it an excellent developer, especially for portrait negatives, and I think that the claim that it enables a shorter exposure to be given is well founded, and its staying power is certainly remarkable. It will develop a surprising number of prints or negatives. I had some little difficulty in persuading my principal assistant to use it regularly at first, but he seems to prefer it now. He has found, however, that in developing bromide prints it has a tendency to softness, and has sometimes complained of difficulty in getting a sufficiently brilliant print from a soft negative; but he has found a remedy for that defect by adding to it a small proportion of the old hydroquinone and caustic soda developer, as used a good many years ago. This is a fine developer for negatives and prints of line subjects, especially for lantern slides of plans and such like. He found the combination of the two produced excellent results, and a few days ago he tried a rather daring experiment. Having some enlargements to make from thin negatives, he developed first with caustic soda and hydroquinone, and got a harsh, soot and white wash image, then transferred it to a dish of D 50 until the half-tones appeared. The resulting prints toned to an excellent sepia.

A similar plan was tried with plates that had been exposed too long, and the results were very good.

But one of the virtues of D 50 is that it contains no metol, and

this should be good news for those who suffer from metol poisoning. The same assistant some months ago was troubled with sores on his right hand, which were, I believe, caused by metol, especially as we had been using the Universal developer recommended in an article in your columns, containing hydroquinone, metol, and caustic soda. I have never suffered from metol poisoning myself, although I have used it ever since it was first introduced, so that I cannot be sure that my assistant was afflicted with it. His doctor had never seen a case either, and the only treatment suggested was poulticing. This seemed merely to relieve the irritation, which was not great, but it did not seem to effect any cure. But as soon as he began to use D 50, and rarely touched metol, the sores seemed to become less inflamed and began to heal. The cure was hastened by using Cooks' antiseptic soap, and the sores are now quite healed up, and the pits they caused gradually filling.

I would recommend anyone who suffers from any skin trouble to try this soap. There are two qualities—3 per cent., a green tablet, and 1 per cent., a white one. The 3 per cent. is the most effectual. Some people suffer in summer from small blisters on the back of the hands, causing terrible itching and irritation, but this soap will cure it almost at once, and if a little of the soap, diluted with glycerine and water, is rubbed over the hands every morning, none of the blisters will appear.

I would certainly recommend all who suffer from metol poisoning to use D 50 and the antiseptic soap. I need not say that I have not the slightest interest in either product, but I believe metol poisoning is so terrible to those who suffer from it that it is the duty of anyone who knows of a remedy to publish it.

BI-FOCAL

A CONTRAST RATING FOR BROMIDE PAPERS.

To the Editors.

Gentlemen,—The average printer of to-day has one very great advantage compared with the printer of 20 years ago. In 99 cases out of 100 he uses bromide or gaslight paper—or, more likely, one or more of those papers which have not yet had a really good name assigned to them, but are midway between bromide and gaslight for speed. He has, therefore, a very wide choice of surface, speed and contrast, and can suit his paper to almost any type of negative he may be called upon to print. Herein, however, lies one of the pitfalls of modern printing, as the young and inexperienced printer is often at a loss to know which make or grade of paper to use, with which to get the very best result from any particular negative, and is often tempted to continue the use of one grade of paper indefinitely, regardless of those negatives which differ from normal, and which the best of operators will occasionally favour us with. Again different batches of the same make of paper sometimes vary considerably as to contrast, though I am glad to say this does not happen so frequently now as during the war-time period, when manufacturers' difficulties were many.

What is wanted is a standardised method of marking batches of paper in the same way that plate speeds are standardised under the H. & D. system. The standardisation of contrast in papers, however, is a simpler process than the working out of plate speeds. All that has to be done is to find by trial the exposure needed to give the faintest indication of an image from a clear slit, and also that needed to give the deepest black that the paper will give. These can be called respectively the minimum exposure and the maximum exposure. Now the ratio $\frac{\text{min: exp:}}{\text{max: exp:}}$ indicates the contrast ratio of the paper. If, for convenience, this is multiplied by 1,000, we get a series of numbers which will show at a glance the contrast value of any batch of paper. For example, the ratio $\frac{\text{min: exp:}}{\text{max: exp:}}$ for a fairly soft paper might be 2/80. This, multiplied by 1,000, gives 25. On the other hand, a vigorous gaslight paper might give the result 3/20. This, when converted into our contrast number, would be 150.

One advantage of this system would be that a photographer who was particularly pleased with the results given on a particular batch of paper could state when giving his next order that he wanted so many gross "Vitura" paper, contrast 50. The manufacturers would then, no doubt, comply with this request, and the printer could then carry on, with the knowledge that the re-orders would stand every chance of being up to the standard of the previous prints sent out.—Yours faithfully, HUGH TAYLOR.

51, St. Anne's Road, Manchester.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad. Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

J. L.—As the photograph was ordered and you supplied it at a price, the person who gave you the order is the owner of the copyright. This is one of the most elementary facts of copyright law. We suggest that it would be to your advantage to have the little book, "Photograph Copyright" issued by our publishers, price 1s. 3d. post free.

RECEPTIONIST.—We think you may take it that the proof photograph was made to the order of the deceased sitter, and in those circumstances the copyright became his. While it may be uncertain as to what became of the copyright on the decease of your present customer's father, you will certainly be safe in assuming that you are not infringing anybody's copyright in supplying the prints.

A. REX.—We think that if you suffer severely from metol poisoning the substitution of potass carbonate for soda carbonate will not be of advantage. However, if this were the case it is not possible to tell, simply from the formula, what is the equivalent quantity of potass carbonate which should be used. The best thing you can do is to choose one or other of the formulæ which have been published for the use of metol with potass carbonate.

J. H.—The formula given by Mr. Jones in the "B.J." of February 25, 1921, was corrected by him in the issue of March 4 as follows:—

Metol	¼ lb.
Hydroquinone	½ lb.
Soda sulphite	4 lbs.
Caustic soda	1 lb.
Water to	2 gals.

D. N.—As you received the order, the copyright is the property of the Corporation, and in the absence of any special agreement in writing to the contrary you have no right to issue postcards from the negatives. On the other hand, the negative is your property, for use according to the directions of the Corporation. It is difficult to say what is a reasonable price for it if the Corporation wish to buy it, but in view of the fact that a copy negative can be so easily made, most photographers, in such circumstances, are ready to accept a price of from 10s. 6d. to £1 1s.

H. S.—So far as relates to the reproduction of the critical definition, *e.g.*, fine lines contained in an original in the copy negative, it is chiefly a question of using an anastigmat lens at a moderate aperture, say, not more than *f*/16, and of focal-length of considerable length compared with the plate. For a half-plate 10 inches would be about a correct length. The longer focus enables the more central part of the field only to be used. At the same time an anastigmat is not an absolute necessity. In many process studios one sees R.R. lenses in use, but always of long focus relatively to the plate.

S. AND C.—(1) The best form of lamp for enlarging from dense negatives is a small arc; a good pattern is the Westminster enclosed arc, which is made primarily for projection work. (2) It is better to have a separate lamp for each retouching desk, a 16 c.p. metallic filament bulb is quite strong enough. A piece of thin very pale blue paper should be placed below the negative

to diffuse the light. (3) The Barkay reflector is an excellent appliance, and practically doubles the light falling on the sitter. A 3,000 c.p. half-watt fitted with this reflector would meet all your requirements. As a side-light only you would probably be able to do without the reflector.

O. B.—We think that unless you have some experience in printing on metal and etching it will not be very easy for you to produce goods of the quality shown in the samples. These labels are made by one or other of the customary processes used in making photo-etched blocks, that is to say, sensitising the metal with fish-glue enamel and bichromate and etching the printed image with, usually, perchloride of iron. Printing may be done from a positive in order to obtain the imagine in intaglio. Full instructions appeared in the "B.J." of October 29, 1915. There is, or was, a firm specialising in the making of these labels, namely, Jee Metal Label Co., 79, Peckham Rye, London, S.E.15.

J. A.—The distances 74 yds. and 111 yds. (= 2,660 and 4.000 inches) are very long ones for getting an image of 1½ inches size of a man, say, 69 inches in height, and require focal-lengths, respectively, of 56 and 85 inches. We imagine that Mr. Vining had in mind a shorter length than 74 yds., and also probably enlargement of the largest image obtainable with a lens of the fixed-focus telephoto type which could be used at a reasonable camera extension. With a Ross "Telecentric" of 17 inches focus, requiring an extension of about 9 inches, the image would, therefore, be about one-third the size, say ½ inch, requiring enlargement 3 diameters. With an "Adon" you could get a greater focal-length, but at the cost of a smaller aperture. For this long focus work a reflex camera is the only type.

K. L.—So far as copyright is concerned, the only person who can take any objection to an enlargement being made is the sitter, that is to say, if he or she gave an order in the ordinary course. From this standpoint, neither you nor your employer have any right to have an enlargement made. Suppose that you obtain the sitter's permission, then it is rather doubtful whether you have the right, as an employee, to have an enlargement made. So far as we know, the law is by no means clear in the matter, but our view is that you have not such a right. The use of the negative would be a matter for arrangement between you and the proprietor. We think employers are very short-sighted in refusing to grant reasonable facilities for the obtaining of specimens, and have many times made representations on this matter in the "B.J."

Ben.—Convenient materials for the home manufacture of weights are the various sheet metals, of which the most suitable is lead, and particularly 9-lb. lead—that is metal which weighs 9 lbs. per square foot. A piece 4 ins. square thus weighs 1 lb. and 1 in. square 1 oz. This 9-lb. lead serves very well for the making of odd weights required in particular formulæ. For example, an 800-grain weight is made by calculating the area required—namely, 1 5-6 square inches. A piece measuring 1 in. by 1 5-6th will thus give as near as possible the exact weight. For smaller weights sheet lead weighing 1 lb. per square foot is a convenient material, the thinner gauges of lead being readily folded to reduce their bulk, or they can be cut into long strips, rolled up compactly, and the value of the weight and the purpose for which it is to be used marked with paint.

M. S.—(1) If the club consents to a free sitting, then, without any doubt at all, you have the right to dispose of the photographs in any way you like, and permit other people to do the same. That would apply to the group as a whole, and to individual persons, providing, of course, in each case that neither the club as a body nor individual members gave you any order to take the photograph, that is to say, such an order that they would be liable for payment. If you give them enlarged prints of any kind, then, of course, you confirm the free sitting arrangement, but such gift is not really necessary. (2) We are sorry we know nothing about royalties on sales of copies. We have never heard of clubs demanding to be remunerated in this way. (3) If you copy the photograph of anyone of note, it is more likely than not that it is the copyright of the other photographer. We imagine that it is this possibility of infringement from which your customer very naturally wishes to be protected.

A. M.—There is not very much choice among 12 x 10 cameras, but in this size a light model is advisable. You could not do better than a Watson's "Acme," expensive, but no doubt you could get one, or a similar one, second-hand. As regards lens, it will obviously be necessary to have one of fairly large aperture, say, not less than *f*/6, and of focal-length about 15 inches. Really we are of opinion that it is better to use a smaller size of camera for such indoor subjects, as you can then get the required depth with a lens of larger aperture, and if you must have 12 x 10 prints they can easily be obtained by enlargement of a very moderate degree. We think there is no very useful purpose in having the camera larger than whole-plate. The only type of camera for rapid sports subjects is the folding focal-plane, of the type formerly sold by Goerz, and now obtainable of British make from Messrs. Peeling and Van Neck, 4-6, Holborn Circus, London, E.C.1. A camera of this type is also made by Houghtons and Thornton-Pickard.

Focal-Plane Shutter.—(1) Does the exposure vary in equal proportion to width of slit, *i.e.*, does 1-in. slit give double exposure of ½-in. slit, and so on? (2) Which has most power of arresting motion, a wide slit at high tension or narrow slit at low tension, provided the exposure is the same? (3) I have lost my table of exposures, but I think I can recollect the top line. Providing this is correct, will the rest of the table be correct enough for practical purposes :—

Width of slit.	Tension. 1	5	10
1½ ins. ..	1/25 sec. ...	1/35 sec. ...	1/50 sec.
1¼ ,, ...	1/30 ,, ...	1/40 ,, ...	1/60 ,,
1 ,, ...	1/35 ,, ...	1/50 ,, ...	1/70 ,,
¾ ,, ...	1/50 ,, ...	1/75 ,, ...	1/100 ,,
½ ,, ...	1/70 ,, ...	1/100 ,, ...	1/140 ,,
¼ ,, ...	1/140 ,, ...	1/200 ,, ...	1/280 ,,
⅛ ,, ...	1/280 ,, ...	1/400 ,, ...	1/560 ,,
1/16 ,, ...	1/560 ,, ...	1/800 ,, ...	1/1120 ,,

R. F.

(1) Yes, the exposure is proportional to the width of the slit. (2) So far as arresting movement there is no appreciable difference, but on the ground of getting a greater degree of light action on the plate, a wide slit at high tension is better than a narrow slit at low tension (equivalent exposures), especially when a lens of large relative aperture (F. No.) is employed. (3) Presuming the first line of your table is correct the exposures calculated in accordance with the width of the slit will be also correct; that is to say, the exposures for a ½-in. slit would be one-third those of a 1½-in. slit.

THE BRITISH

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Contents.

SUMMARY.

Dr. B. T. J. Glover, in a contributed article on page 503, returns to the subject of factorial development of bromide paper, and, in the course of an introduction, examines the ability of a system of developing "by the look of the prints" to give the most correct rendering of the negative.

We owe to the courtesy of Dr. C. E. K. Mees the translation of a paper by a Russian physicist, M. G. V. Potapenko, on the theory and technique of light-filters, the first instalment of which appears on page 507.

The various uses which can be made of mirrors in portraiture and commercial photography are the subject of notes on page 505.

The professional or skilled amateur photographer, who is often inclined to underrate the capabilities of a folding film camera, is advised to make himself acquainted with the working of any given instrument of this type, particularly in regard to the points mentioned in a leading article on page 502.

At the Croydon Camera Club last week Mr. Vivian Jobling described how to make corrugated metal grooving, such as that required for draining racks. (P. 512.)

Mr. John A. Tennant sends us references to further information respecting the pioneer work in cinematography of the American inventor, C. F. Jenkins. (P. 514.)

Messrs. Kodak, Ltd., will no doubt cause surprise to many by their announcement that they have discontinued the manufacture of glass dry-plates, having converted this department of their Harrow works to the production of Eastman Portrait Film. (P. 514.)

Firelight portraits are always an attractive feature in showcases. A note on one respect in which they are often defective will be found on page 501.

The making of a copy-negative from a customer's original, which is sent for reproduction, should be the regular rule before any treatment whatever in the way of renovation is attempted. (P. 502.)

Processes of making projection screens of a kind suited for the exhibition of cinema pictures are the subjects of recent patent specifications. (P. 511.)

The styles of enlargement which can be offered to customers at prices which preclude comparison with those of the cheap enlargements widely offered, are the subject of a paragraph on page 501.

For those moderate degrees of intensification, which portrait negatives generally require, the single solution mercury-iodide intensifier can hardly be improved upon. (P. 502.)

A simple means of attaching the back end of the focussing cloth, so that it is prevented from flapping about in the wind, has recently been suggested in an American contemporary. (P. 502.)

EX CATHEDRA.

Firelight Portraits. The firelight effect in portrait work is perhaps regarded as meretricious by many high-class photographers, but to the more modest practitioner it affords a welcome variety in his specimens and is always attractive to the general public. The introduction of the half-watt lamp has rendered the production of these pictures very simple, and we advise all who use this illuminant to arrange one or more of their lamps for it. All that is needed is to arrange for the light to come down as low as the bars of an ordinary grate, to provide a screen or framework to give the effect of the jamb of a fireplace, and to screen the lamp itself from the lens. A common error in this class of work is failure to illuminate the figure so that its outline is not altogether lost. In a genuine firelight effect it is always possible to see the whole figure, but in many photographs we can only discern the face and hands and a few high-lights nearest the lamp. This can be avoided by using reflectors so placed as to catch the light from the lamp and throw it upon the figure in a natural way. Under-exposure and over-development are to be avoided, the use of a dilute developer being the best way to avoid hardness.

* * *

Saleable Enlargements. It should be the aim of every portraitist who is doing a good class of trade to endeavour to produce enlargements of distinctive character, which cannot be placed in competition with cheap work of the sort offered by canvassers and postcard studios. Much of this latter work is of fair technical quality, and the general public cannot see a great deal of difference between the picture offered at a guinea and that at five or ten times as much. It is therefore necessary for the good-class man to make his pictures look worth the money he asks for them. There are many ways in which this can be done. In the first place, genuine carbon or platinum prints with a guarantee of permanence may be pushed; or an actual life-sized head in toned bromide, framed close up in a heavy dark moulding, may prove attractive. Another attractive style is the oil-finished bromide in monochrome or colour, which gives the effect of a crayon drawing upon a tinted base. These framed in polished oak are very attractive, and the oil coating tends to preserve the image from fading. In all cases it is desirable to quote a price which includes the frame, otherwise the effect may be ruined by an injudicious choice on the part of the customer. There are also the opportunities for the supply of enlargements of comparatively moderate size, produced in a lighter and also less expensive style in platinum, carbon, or bromide. An enlargement from quite a small negative, or from part of a larger one, permits of very pleasing effects being obtained in the passe-partout style of mounting, and enables articles to be offered at a price suited to the most modest purse. More might still be made of these styles.

A Copying Note. The copying of old photographs is an important branch of our art, but it does not always receive the care which is due to it. As a rule, the originals are irreplaceable, and their loss or injury is a very serious matter to their owners. As a rule, no attempt should be made to clean or improve them until a negative has been made, this being in the nature of an insurance against accidents. If it then be thought desirable the surface may be washed with clean water, or bread crumbs may be used. There is, however, always a risk of removing the spotting or working up, and it is not easy to replace this upon a faded print. It is also likely, if the print is upon albumenised paper, that the surface will be cracked. The application of any liquid will wash the dirt into the cracks and make the appearance worse instead of better. The surface of a daguerreotype should never be touched by an inexperienced person, the only permissible cleaning being by means of a bellows to remove loose dust or fluff. Much trouble may be avoided by having a fixed storage place, preferably a safe, for customers' originals. These have a very annoying way of getting mislaid either before or after copying, and the photographer's reputation is not enhanced if this happens.

* * *

The Focussing Cloth. We cull from an American contemporary a useful idea for making a focussing cloth which is particularly effective in windy weather. The cloth, which must be of ample size, is fixed round the lens or front part of the camera in the usual way, and is, in addition, slit down the back so that the two ends may be brought over the shoulders and fastened round the photographer's neck with one of the snap fasteners commonly used upon ladies' garments. This effectually excludes light, and is a great help when focussing with lenses of small aperture. Such a cloth need not be heavy or bulky if thin mackintosh be used instead of the heavy velvet or cloth commonly used. Another advantage is found in the fact that such cloths are waterproof and will protect the camera during a heavy shower without becoming sodden. The material known as "single proof gossamer" is very suitable, as it is very thin and has one side dull, so that it is as non-reflecting as an ordinary cloth. It will also serve as a cape for the photographer during a shower, while the camera is safely stowed in its case. The only precaution necessary is to keep grease or oil of any kind from rendering it sticky and destroying the rubber coating.

* * *

Single Solution Intensifiers. The principal disadvantage of the most popular methods of intensification, such as mercuric chloride, followed by ammonia or ferrous oxalate, or the chromium formula of Welborne Piper, is that there is little control over the amount by which the light-resisting power of the image is decreased. It is true that by modifying the strength of the solutions and the proportions of the ingredients, more or less density can be obtained, but it remains that in any case, the intensification is done in what we may call one jump, and that the extent of this cannot be judged until the process is complete. For this reason it is much to be preferred to use a single solution with which the strengthening can be watched and stopped directly the desired stage is reached. In this category, the most useful agents are found in mercuric iodide and uranium. The latter, however, does not find much favour with professional workers, on account of its colour, which renders retouching difficult, and its fugitive character. Mercuric iodide is free from these objections, and has also the advantage that a trace of hypo in the film is not detrimental. By dilution the rapidity of its action can be controlled, and if the negative appear to be a little too dense, a short immersion in a weak bath will reduce it to the desired degree.

USING FILM CAMERAS.

An idea, common to many skilled photographers, both professional and amateur, is that cameras designed for the exclusive use of films are more or less of the nature of toys and quite unsuitable for serious work. While it must be allowed that the absence of many of the adjustments found in well-made ordinary cameras imposes certain limits upon the class of subjects which can be attempted, the simplicity and convenience of the film camera renders its use practicable where a more perfect instrument could not readily be brought into action.

To obtain the best results which any camera is capable of yielding, it is necessary to understand its working powers and limitations. A Brownie camera will give a much better percentage of successes to a skilled hand than it will to a careless "snapper," and this applies in a higher degree to such cameras as are fitted with rising and cross fronts, rapid lenses in carefully-speeded shutters, and focussing scales.

The absence of the focussing screen is the greatest trouble to the erstwhile stand camera worker, and many disappointments result from the operator not being upon good terms with his finder and focussing scale, which he must train himself to use in its place. Before attempting to use a camera of the Kodak type it is a good plan to remove the back and to fit a piece of ground glass so that it rests upon the two metal rollers over which the film passes. Having focussed the image upon this and noted the amount of subject included, a comparison should be made with the finder image, so as to ascertain whether the two are identical, and also to find out what allowance is necessary for the accurate centreing of the subject when working at close quarters. Then it is necessary to note the effect of the rising front. When this latter is used, the lens is de-centred upon the plate while the finder is not affected, a point to be observed being the amount of sky, if any, which appears upon the ground glass when the top of a building touches the top edge of the finder. This should be done with the camera in both vertical and horizontal positions. The depth of definition at various apertures and distances may be ascertained by calculation, but the majority of photographers will probably find it easier to do so by observation of the image upon the ground glass. This is, moreover, less costly than gaining the same knowledge by spoiling film.

Exposure is an all-important point. The stand camera worker is likely to fall into error in the opposite direction to that made by the ordinary snap shotter, that is to say, he is likely to refrain from working in a light with which it is possible to get fairly good results. Here, the exposure meter is a useful guide. Those who do not already possess a meter will find the Watkins Snipe meter, which costs only eighteenpence, quite effective, and simpler to use than the ordinary meters.

The correct judging of distance, especially at close quarters, is somewhat difficult to the beginner in hand camera work, and nothing but practice will enable this to be done with a reasonable degree of certainty. Here, the ground glass screen will be found very useful, as the pointer may be adjusted to the distance at which an object is supposed to be situated and the result

checked upon the ground glass. It is also a good plan to pace the distances until the eye is sufficiently trained to estimate them correctly.

When these preliminaries have been gone through the operator may test his skill by actual exposures, taking careful notes of the distances and exposures and checking the results by their aid for future guidance. The procedure we have indicated may appear somewhat tedious, but those who have the patience to carry it through will find themselves amply repaid.

It must be remembered that the usefulness of a film camera is greatly extended by using it upon a tripod, or even upon a clip, which may be affixed to a rail, tree, or chairback, in cases where a hand exposure is not possible, or where great depth of definition is desirable, and stopping down becomes necessary. Subjects which would normally require the use of a swing-back need not be passed by, as it is quite easy to correct a considerable amount of convergence of the perpendicular lines by tilting the negative and the bromide paper during the process of enlarging. Although rarely fitted to film cameras, a direct vision finder is an extremely useful adjunct. It allows of exposures being made from the eye level, which is often the only position possible when working in a crowd or over a high parapet. That such finders are almost exclusively used by Press photographers is sufficient evidence of their usefulness.

Where a dark room is available, it is more convenient and quicker to use a trough or deep dish with a roller to keep the film under the solution as it is drawn through, than to use a tank. This practice also eliminates the risk of bubbles adhering to the film.

Care should be taken to avoid over-development, for small pictures are easily spoiled by loss of detail in the high-lights. If there are one or two under-exposed subjects in a film, there is always a tendency to prolong the development to the detriment of the others, while as a matter of fact even the under-exposed sections would yield better prints if developed for the same time as if correctly exposed.

We have not referred to film packs, as these are usually fitted to cameras which are also adapted for use with plates, but in the case of some of the Premo cameras, which are constructed for film work only, the procedure of testing, and so forth, as recommended for roll film work, will, of course, be applicable.

THE CASE FOR FACTORIAL DEVELOPMENT OF BROMIDE PAPER.

THERE are many photographers who have read what has been written during the last twelve months in reference to the factorial method of developing bromide paper who can see no justification for the employment of a more or less mechanical system of producing prints. It appears to be fairly generally thought that as the picture can be so plainly seen during the development of the print it must, therefore, surely be a most simple matter to develop until the print has the appearance desired and stop development at that moment by removal from the developer and fixation in "hypo." This opinion, namely, that the visibility of the prints' progress during development renders precise guiding rules unnecessary, appears to be that of Dr. Luppo-Cramer, who wrote recently in "Photographische Rundschau" on the subject of factorial development, and referred to its employment in the development of "positive" images, of which bromide prints are examples.

In the course of this paper the author will deal with this matter under the following headings:—

(*a*) The failure of development by inspection, except in the hands of photographers of considerable experience, and the reasons which contribute to this failure.

(*b*) The exposure and development properties of bromide paper upon which a scheme of work by rule can be based.

(*c*) The choice of the factorial system of development in preference to other schemes as a complete and reliable guide to *both* exposure *and* development.

The Failure of Development by Inspection.

By the expression "development by inspection" is meant the procedure advised by all text-books and employed by practically every photographer who produces prints upon bromide paper. It involves the making of a series of trial exposures and the development thereof until one of the trial images yields an appearance considered desirable in the finished print, the repetition of the exposure which yielded the correct trial slip image when exposing the final print, and the development of the final print so exposed until once again the desired appearance of the picture is yielded. Development is then checked, and the print is fixed. As a sort of hint that development needs to be carried out fully, it is usually advised that it should be carried on until it appears to stop.

Let it be understood that by "beginners" are meant all those photographers who are in the very early stages of their career as bromide printers or those who have been printing on bromide paper without success. They are a very numerous class. By "expert" is meant any photographer who can produce a bromide print of the most perfect quality that the negative will yield.

Let us watch a beginner at work (as I have done), and note his procedure. A trial exposure is made, let us suppose, in a perfectly correct fashion, several exposures being included upon the same piece of paper, each successive strip being given twice the exposure of the one before it. Let us assume the very best condition for success, namely, that in the choice of the trial exposures one of them is absolutely correct, and that on each side of this correctly exposed strip there are under-exposed and over-exposed strips respectively. The trial strip so exposed is placed in the developer and the image makes its appearance. It is a universal rule in development that the most exposed image commences development first and develops most quickly. It is here that every beginner makes a fundamental mistake. *The beginner deliberately attempts to make one of the over-exposed trial images look right by removing the trial strip from the developer and plunging it into the fixing solution before the image grows too dark.* The image upon the finished trial strip chosen for imitation in the final print is therefore necessarily *over-exposed and underdeveloped*, and the repetition of that exposure in the case of the final print again necessitates under-development of the final print in order to prevent it also from becoming too dark.

Now let us inquire (as I have done on many occasions) into the reasoning on the part of the beginner which leads to this procedure in spite of the text-book warning that development should be allowed to proceed until action apparently stops. In answer to a question as to why the trial strip was removed from the developer, the reply is invariably "because if I did not do so it would become far too dark, and would be

spoiled." Instead of condemning this deduction as foolish, let us trace the line of thought which leads to it. Exposure makes no visible change in the printing paper. The beginner may know that there is a latent image created thereby, but it remains invisible, and is therefore not impressive. On the other hand, development appears to do everything. Does not the image both appear and grow during and by means of development? Does it not seem obvious that if during development the print is growing too dark then the remedy necessarily must be the curtailment of development? The fact that the undesirable darkness of the print is caused by *over-exposure* does not occur to the beginner, and no one teaches him with the necessary emphasis that it is so caused. His ultimate realisation of this is the factor which determines his transfer from the class "beginner" to the class "expert," and coincides with the disappearance of most of the troubles in bromide printing. In that answer, involving a conclusion which appears on the surface to be perfectly logical, we can detect what I believe to be the failure on the part of teachers of photography to convey clearly to those who are learning the respective parts played by exposure and development in the production of a bromide print, and to emphasise the primary importance of the former and the secondary importance of the latter. There is no text-book, so far as I know, which makes it clear in simple language that if during development a print grows too dark then the defect is due to *over-exposure*, and has nothing whatever to do with development, and hence implies that the remedy is to give less exposure and not to curtail development.

The development of bromide prints by inspection fails because it provides no satisfactory safeguard against *over-exposure and under-development*, both of them utterly destructive of good quality.

There are many photographers who consider that the advice to develop to "finality" should be sufficient to make clear to the beginner the nature of his error and prevent him from under-developing an over-exposed print and regarding the result as the best that the negative will yield. The advice to develop to finality has the same basis as the suggestion that development should be carried on until the action appears to cease, and is practically similar to the suggestion that if development be allowed to proceed in half the print for a short time and then the rest of the print be submerged in the developer, development is complete when the portion of the print submerged last has caught up to the portion which was allowed to commence development first. By far the most common variant is that "development should be allowed to proceed until its action appears to cease," and Amidol has a special reputation for exhibiting this appearance of cessation in development. The opinion has already been expressed that the beginner will not believe this and act upon it, because with him it yields prints which are more or less black all over. This advice, however, labours under the additional disadvantage of being inaccurate. If a series of prints be exposed behind the same negative, each print being given the same exposure, and each print be given a little longer development than the one before it, using fresh developer for each, then there will be a steady progressive darkening with every prolongation of development long after the time of correct development has passed. The following prints (Table I) were made from a step plate, whose densities are given. Each print was given the same exposure, the absolute measure of which does not matter. The developer was Amidol, made up according to the Kodak formula. The temperature of development was 62 deg. F. The reflection densities of the prints were measured in the manner described by Mees, Nutting and Jones, "B.J.", January 1, 8 and 15, 1915.

There is obviously a continuous growth of density from prints A to D. On other occasions it has been stated that the factor for Amidol of the Kodak formula is 12. It will be noted that we have only to carry development further to yield a much darker print (C or D) without any fog. When development is carried on to a factor of 12 it has by no means ceased, nor does it "appear" to have ceased. There have been correspondents in the "B.J." who have challenged factor 12 as being too high. Let us assume that a factor of 8 is suitable. Obviously the case is even worse, and development at that stage is even less complete. We are far from cessation, either apparent or real, and far from "finality." The advice to develop until the action appears to cease in order to obtain a correctly developed print is, firstly, not credited and, secondly, not true.

TABLE I.

Densities of Step Plate. D_H	Exposure for each print the same. Time of first appearance of the image, 5 seconds in each print.				
	Print.	A	B	C	D
	Development time.	40 seconds.	50 seconds.	75 seconds.	125 seconds.
.325	Reflection densities.	1.15	1.40	1.475	1.475
.700		.93	1.15	1.375	1.475
1.125		.45	.725	.925	1.10
1.675		.12	.20	.30	.35
2.150		.01	.025	.05	.10
	Watkins' factor	8	10	15	25
	Fog strip ..	.00	.00	.00	.00

It will subsequently transpire that the exposure given to a bromide print is closely related to the development required. Good quality depends upon this relationship being correct. Development by inspection takes no cognisance of this relationship and often fails accordingly.

B. T. J. GLOVER.

(To be continued.)

PHOTOGRAPHING AT POULTRY SHOWS.—Photographing some prize birds at a poultry show some time ago (writes a correspondent), I had a very difficult task because of the fowls, etc., being very agitated and frightened while I was focussing my half-plate camera. One of the exhibitors told me his birds, and possibly the others, were frightened because of the colour of my focussing cloth—dark blue velvet lined with red. I laughed at the idea of the fowls being frightened, though I found they became less agitated when I put away the cloth and used my coat instead. I now learn from a newspaper that a number of sedate domestic fowls were nearly terrified out of their lives the other day because a red and blue kitchen table-cloth had been hung out to dry near their run. A fox could not have caused more disturbance. So there may have been something in the old poultry-keeper's idea after all. It is quite possible, however, that when the present craze for cretonne dresses dies out poultry will have become so accustomed to vivid reds and blues as to take no notice of them. The hint I have given will I hope be of service to those who have to take photographs of poultry.

OPEN ARC LIGHTS IN STUDIOS.—A special committee appointed by the Minister of Health have issued a report dealing with the injuries to eyesight alleged to be due to the powerful arc lights used in film-producing studios. The committee trace the trouble to the use of open arc lights without diffusing screens. They find that some transient eye injuries have thus been caused, but that there is no evidence of permanent damage to sight. They state that the evidence given them is to the effect that unscreened arcs are not only unnecessary, but give less satisfactory photographic results, and the Incorporated Association of Kinematograph Manufacturers have given an undertaking to the Minister of Health that its members will not permit the use of open arc lights without filters in their studios.

MIRRORS IN PHOTOGRAPHY.

PERHAPS in no other business is a mirror used more frequently than in a photographic studio. Its first place of importance and its usual "home" is the dressing room. Here "my ladye faire" can arrange her golden tresses and make herself pretty by its aid. The mirror and the maid, have been allied for ages. It is not on this theme I wish to dwell, but on other uses of the mirror in connection with photography. Mirrors have been used in some studios for what may be described as "novelty portraits," which were produced by combining a number of mirrors, to give four or five "views" of a sitter at one exposure, but there are further advantages to be derived by including one or more mirrors in the equipment of the studio or in the "outdoor" apparatus.

Nervous Sitters.

A good size "glass" (such as used in tailors' fitting rooms) at the end of the studio, *behind* the camera, can be of great help when nervous sitters are to be contended with. By careful adjustment before the sitter enters the studio, the posing chair can be reflected. After posing and focussing, the operator may tactfully turn away and watch, by the "reflected sitter" for his opportunity to expose. Many sitters are very nervous and do not like to be looked at when being photographed, and the above suggestion has proved very useful in such cases. The type of mirror used was a ¾-length glass, with the usual swing arrangement: being so far away from the sitter, there was not the slightest suspicion of the mirror being "in action," in fact, the sitter could not have seen herself in the mirror from her position before the camera; the result being a natural expression which would have been far more difficult to obtain otherwise.

Theatrical Work.

Where a considerable amount of theatrical work is done, the sitters themselves greatly appreciate a mirror near at hand during the sitting. For character studies the sitters generally desire expressions to suit the particular character. Actors and actresses pay great attention to expression in their portraits, and rightly so. With the mirror at hand the expressions may be practised, or rehearsed just before exposure. Theatrical clients find this a great help, as they are able to get any desired expression to the best effect, by using the mirror, and can retain the expression without the least sign of consciousness of "being photographed." As strongly as this suggestion is recommended in the case of photographing "professionals" it is certainly condemned when taking photographs of private individuals, because (in ninety-nine cases out of a hundred) as soon as a sitter tries to assume a natural expression, it is fatal to good results.

Private Sitters.

In some exceptional cases a mirror may be used for private sitters, but for a different purpose from the one mentioned above for "professionals." In this case, for general effect, in the composition of the finished picture, the mirror is used more or less as a background, and must be in such a position as not to reflect the camera when viewed from the lens. The best results are obtained by placing a dark background so that it is the only thing reflected, when viewed from the lens, and this reflection (background) should completely fill the mirror; and so we shall have (reflected) a good solid background for a head study; full face with profile reflected, or any other positions desired. Some very pleasing results may be obtained with suitable types of sitters. Children often give excellent opportunities for studies of this kind and, unconsciously, pose well. These studies are worked with the sitter close up to the mirror, and even touching it.

Fashions.

Having dealt with the large stand type of mirror so far, one more use of this same type will be in order. Mannequins, wearing standard fashions in gowns, etc., are often photographed for commercial purposes, catalogues, etc., the idea being to show each detail of prevailing fashion. A full length front view of a model wearing a gown is greatly appreciated by the costumier if a back view of the same is included. Obviously our scheme of reflection is useful in such cases.

Studio Lighting.

A mirror of the smaller type (for example a hanging wall glass about 12 by 10) is useful for obtaining very beautiful effects of lighting for head studies, full face preferably, in the following manner:—First, pose and focus in the ordinary way with plenty of front top light (not necessarily all top), when this stage is reached place the mirror on a low table (in front of the sitter) and tilt it so as to throw a strong light upwards on to the face. This system is seldom used, but is well worth trying as a fancy lighting and the writer has proved it to be very successful.

So much for the mirror and its uses in the studio. We will now consider its value in connection with the taking of commercial photographs. As one instance of a mirror being of great advantage, the following is worth noting: Having been called out to photograph an interior, I found one of the chief items of furniture in the room (outfitter's showroom and fitting room) was a large fancy stand mirror, as mentioned early in this article. The mirror *had* to be included in the view so I decided to make full use of it. The room was small, and there was not much space for displaying the numerous lines to be advertised. After arranging the goods in the space available, I reflected a plain ground into the mirror in the manner mentioned under the heading of "private sitters" in studio work. In this case I used a plain three-fold screen. After being sure that the screen filled the mirror, when viewed from the camera, I was able to build up a special display of other goods before it, and though neither the screen nor the goods were within the angle of the lens view the goods were displayed in the resulting photograph by reflection—which was greatly appreciated by the client.

Commercial Lighting.

To return to the subject of lighting, one often wishes for more light in certain parts of an object or interior to be photographed. For instance, a piece of heavy furniture indoors is often under a strong side light, one extreme end being lost completely in shadow, and running into the background. It is possible to overcome this difficulty by throwing light from a mirror. This local lighting can be controlled as required, which is a great advantage. With long exposures the mirror may be set to *reflect* the rays of light to local parts otherwise lost in shadow, during part of the exposure, and then shut off if desired, which is a useful scheme to get detail inside cupboards and dark corners, etc. By the same process, much brilliancy and detail can be brought out when photographing carvings. In such cases of local lighting, the mirror should be slightly moved about during exposure, to avoid harsh lights. Altogether, we can often benefit by the aid of a mirror in the practice of both studio and commercial photography.

PALLADIA.

SOME PROBLEMS OF COMMERCIAL PHOTOGRAPHY.

The problems which it is proposed to discuss are not those connected with materials or manipulation, but with certain aspects of the business, as distinct from the technical, side of the work. Furthermore, the writer does not intend to raise up hypotheses only for the purpose of showing his skill at proving or demolishing them. He cannot even find a solution for some of the problems which he will raise. To diagnose a disease without professing any ability to cure it has quite a respectable precedent in another profession, so that the writer has no qualms in following it. He is also at the moment in a position which allows him to take a somewhat detached, and therefore a less biased, standpoint; that is to say, that his work stands or falls by its quality. Speed is at the same time a fairly insistent factor, although it may be added that a description of both the nature of the subjects and the conditions under which they are handled have caused quite experienced photographers visibly to shudder and to commiserate the writer on his fate. The point on which he is often congratulated, however, and which is in some measure the foundation of these notes, is that cost comes only third on the list of points by which his work is measured.

It will add strength to the points that he proposes to discuss that, although it was actually the size of their photographic account that induced a certain large engineering firm to employ a photographer on their staff, his services have been demanded in so many ways that were not thought of before that the consumption of photographs is many times what had been imagined, and the actual sum expended must be very much greater also. It is this position which enables the writer very often to carry through a job in ways that would not be "economic" from the ordinary business photographer's point of view, and the problems that rise to his mind are as to what a man whose bread-and-butter depends on the profit he makes of his work would do in the circumstances.

The reader is asked to reject from his mind any idea which the previous sentences may have produced that the work referred to is done in a wasteful manner. The low percentage of time or material "wasted" in trials, overs, and throw-outs would astonish many whose work covers a very much smaller range of subjects or problems. What is meant by reference to economics and profit is merely that in the first place many small jobs are carried through that at current prices would not only not be worth handling by an outside commercial firm, but would be considered a nuisance and a loss. On the other hand, there is many an occasion when a better result can be obtained by using some special material, or a certain amount of extra time, the doing which by the outside firm might again result in a loss.

Again, I will ask the reader to cast out any supposition that in pointing out these facts the writer wants to claim any superiority, or to create any impression that he writes as though reclining on a metaphorical bed of roses. The facts are the reverse. In dealing with the many heads of departments he finds that the general opinion of photography and photographers held by these highly technical and professional gentlemen is that photography consists of certain camera manipulations which may be learnt (thanks to Mr. George Eastman) in half an hour or so, and that, judging by their circulars (both many and frequent) and by the dress and address of their representatives, technical and commercial, photographers are a shabby, touting lot.

That description is not a pleasantly sounding one, but the words are not the writer's. They represent the outspoken opinion of a gentleman who has business with many of the profession, and there are many other experiences that emphasise the popular opinion regarding the man behind the camera. Not only is he the butt of every "street-boy," but the grins that greet a photographer wherever his work takes him can hardly be said to add to his "professional" dignity. The portraitist is familiar with the busy city gentleman who can only spare three minutes for a sitting (though he probably spends many a pleasant post-lunch half-hour with a glass and a cigar), as "he is already late for an appointment with his dentist," and is subsequently surprised to find that his expression in the photographs accords with those circumstances. The same attitude is frequently adopted towards the commercial photographer, who is handed, let us say, a complicated scientific instrument, and is asked to "Just *snap* this, will you?"

On the other hand, one occasionally meets people who recognise that photography is a craft calling for as much skill and time as any other, and that the craftsman is worthy of his hire. Just recently the writer was asked to photograph a stained-glass window which contained, perhaps, an unusual range of colour, from the palest tints of mauve and even white rolled glass to deep browns, reds, and purples, besides embodying a vast amount of exceptionally fine detailed hand-work; in short, a regular "teaser." Yet the designer was willing to pay any sum in reason for a print to be subsequently reproduced in a half-tone block. A straight proof from the whole-plate negative evoked astonishment as to amount of detail and gradation rendered, but a subsequent half-hour with matt-varnish, pencil, and scraper made a 50 per cent. improvement. Occasionally also a firm will pay one's expenses to travel many miles in preference to engaging a local photographer, although the latter's prices may be much lower. The inference is pretty obvious, but the trouble seems to be that those who have learnt the advantage of paying a good price are few, and have arrived at that result by reason of their own bitter experience, and not by reason of any activity on the part of photographers. Cutting of prices seems to be rapidly becoming a feature of business-fetching tactics among commercial photographers as it was, not so many years back, among the portrait artists. It will be recalled that commercial work was often regarded as a refuge from the impasse that resulted, but itself appears to be approaching the same state of affairs.

The writer has already explained that he is not immediately affected by the cutting of prices, or by the accompaniment of wage reduction, which are always two sides of a very vicious triangle. He has been, however, in the course of "keeping his own end up," to a certain degree successful in his immediate entourage in correcting the impression described at the commencement of this screed, that photography is little more than a button-pressing profession. One of the useful results of his efforts has been to prove that given a well-finished article and reasonable facilities for photographing it to advantage, the block from an untouched print will give a much more faithful and effective representation of the subject than one made from a photograph of an unfinished or soiled article just stuck up anywhere in the workshop and "snapped," and afterwards worked up by a process-artist. In addition to being better it is considerably cheaper as a rule.

In connection with this point it may be mentioned that the writer is informed that a well-known process firm is quoting an absurdly low price for making a whole-plate negative and print, probably relying on the necessity which will arise as a result of cheap work for a very great deal of highly priced artists' work to bring them a satisfactory profit. There are other interesting problems that concern the question of a fixed price per photograph, from the point of view of the operator. Frequently, probably more often than not, it happens that the price quoted is calculated on the time that should be taken normally in setting up the camera, taking the photograph, and in the return journey. In the writer's experience it happens, also more often than not, that to spend more time than would be "economic" as regards the price quoted would result in a better photograph. It may be a house, and a little waiting would bring the sun into a more favourable position. It may be a machine, on which the operator would like to spend some time with chalk or an oily

rag, or it may be desirable to have it moved about and some sort of background rigged up to make subsequent blocking-out easier. On the other hand, many mechanical subjects which usually are required with an absolutely white background are much better rendered if actually photographed against a fairly dark ground, with only just a bit of white paper to give a defined outline of some complicated portion, and afterwards blocked out with opaque, but the price quoted may not have included this operation. Just how to get the best results from each subject should always be a matter for the operator's skill and judgment, but what is he to do in such cases as those suggested, which are only examples of what frequently occur? If he studies time the client does not get the best possible photographs, which fact is bound, sooner or later, to react on the operator's wages and prospects, though that effect may arrive only gradually and indirectly. If, on the other hand, he goes all out for the best possible photographs, his employer will grumble at the time spent and the loss of immediate profits, and the customer will complain if the additional expense above the original quotation be passed on to him.

To the writer it seems far pleasanter and more profitable to aim at a satisfactory price for the best possible work. The customer appreciates the fact, *if it is made apparent to him*, that the cost of good photographs is not so much above that of inferior stuff that it will not be very quickly recovered many times over by its increased advertising power. It may also be shown, as has been suggested above, that the more expensive photograph may be actually cheaper, because it needs no working up. Better prices, as well as the increased business that well-satisfied customers usually induce, are not generally regarded as undesirable by photographic firms, nor is an increased wage, which such circumstances should permit, likely to be objected to by the operator.

The writer's aim in penning these remarks has been to show that good photography is regarded by a comparative few of the public as a skilled "profession," and as such worth a satisfactory fee. By the great majority it is regarded merely as little more than an easily learnt elaboration of a popular hobby. It is to the interest of all that public opinion should be educated up to the facts. Having attempted to describe some of the symptoms of the ailment from which the profession of commercial photography is suffering, and to suggest some of the causes, the writer hopes that someone may be able to devise a remedy.

D. CHARLES.

THE THEORY AND TECHNIQUE OF LIGHT-FILTERS.

[The following is an important paper on the principles of the action of light-filters and on the practice of their preparation and use. It is the work of a Russian physicist, M. G. V. Potapenko, and was first published in the Journal of the Russian Physical and Chemical Society (Chemical Section) 1916, vol. 43, p. 790. We owe the accessibility of the paper to Dr. C. E. K. Mees, by whom the translation from Russian has been made. Dr. Mees while rendering the text into English, does not thereby wish to imply his agreement with everything contained in it. He has refrained from exercising a translator's right of commentary except in one or two instances which particularly call for correction. The fact that he has made the translation and given us the opportunity of publishing it, may be taken as an indication that he regards the paper as a contribution to the literature of light-filters of exceptional value.—EDS. "B.J."]

THE use of light-filters for all scientific purposes has increased greatly of late years. Physicists, astronomers, chemists, doctors, all make use of them to obtain monochromatic rays of light. Botanists employ them to study the influence of light of various colours on plant light. For use in three-colour photography it is of the greatest importance to obtain a series of standard and permanent filters.

In spite of the widespread use of light-filters we have not up to the present time any definitely worked out directions for their preparation, the scattered articles on the subject, distributed as they are in specialist journals, often dealing in duplication with one and the same problem.

In foreign literature we may refer to two papers, those of Dr. Grebe[1] and of Von Hübl, but these contain only the most elementary directions for those who desire to make light-filters, and omit many technical details of the work, in which many difficulties are likely to occur in practice. It is our purpose therefore to deal first with the material accumulated up to the present time, and then to point out the simplest working methods suitable for those who wish to carry on investigations in this field. In spite of the small amount of work available regarding the preparation of light-filters, their history dates from the beginning of the 16th century, and since that time many references to them have appeared in the literature, these including a great number of formulæ, often repetitions of each other, relating to the various types of light-filters which the authors have used in their investigation. The first reference to light-filters is that of Leonardo da Vinci[2] (d. in 1519), who used coloured glasses for the study of his paints. Following this, coloured glasses, which were the only light-filters known at that time, were used for a long time in occasional scientific investigations relating to colour and colour-blending, but not until Becquerel's[3] time were they used generally.

Hunt and Abney[4] devoted much attention to the study of the absorption of light in coloured glasses, and these investigations have been continued up to the present time.

Maxwell[5] in 1861 first demonstrated in London the three-colour projection of photographic images, and thus laid the foundations for photography in natural colours in accordance with the Young-Helmholtz theory. At about the same time experiments were made on the preparation of liquid filters from organic and inorganic coloured substances, and also on light-filters prepared in the form of films. These latter for some time were made from dyes dissolved in collodion or celluloid, but towards the end of the last century these began to be replaced by the technically better gelatine films. Dr. Castracane, Zettnow, and Gifford[6] employed light-filters for microscopic and photomicrographic investigations. E. Pringsheim and Nagel[7] introduced them for biological and botanical work, and it may be said with full justification that at the present time there is no field where light-filters are not employed. At the beginning of the present century light-filters were so widely employed that Grebe[1] attempted to arrange them according to a definite system and to make an accurate classification of them. His classification could not be generally adopted in science, for he classified filters according to the field of investigation and the purposes for which they were used, so that the filters were designated as photographic, optical, bolometric, etc., and one and the same filter might have several names if it were used for various purposes. It is preferable to classify light-filters according to the form of their absorption curves, and it is this method which is adopted in the present discussion.

At the same period the first exact quantitative measurements of the absorption of light by filters were made by A. Callier[8] and Monpillard[9], thus establishing the first step towards the solution of the problems bearing on the theory of light-filters which exer-

1. Dr. Grebe, *Über Lichtfilter*, Phot. Korrespondenz, 1900, 612.
A. Von Hübl, *Die Photographischen Lichtfilter*, Encykl. der Phot. Heft, 74. Halle, A.S., 1910.
2. Leonardo da Vinci, *Trattato della pictura*, Paris, 1651, Chap. 71.
3. E. Becquerel, Ann. de Chem. et de Phys. IX., 1843.
4. Hunt, *Researches on Light*, 1854 (2nd Ed.), *Abney*, Phot. Corr., 1874, and other papers, see below.
5. Dr. Castracane, Nuovi Lincei, 1864, 6 (XVII.), *Zettnow*, Centralblatt f. Bakter, 188. II., 51, *Gifford, J.*, R.M.S., 1894, 164; 1896, 145.
6. Pringsheim, Ber. d. Deutsch. Bot. Ges. 1908, 26a, p. 556.
7. Nagel, *Über fluss Strahlenfilter*, Biol. Centr., 1898, p. 649.
8. A. Callier, *Ecrans Colorés*. Bull. de l'Ass. Belge de Phot., 1905, IV. Rev. des Sci. Phot. II., 1906, p. 289.
9. Monpillard, *Etudes et Recherches sur les Ecrans Colorés*. Rev. de Sci. Phot. II., 1906, p. 225.

cised a great influence on all further work; since the estimation of the absorption by such terms as "weak," "scarcely visible," etc., was considered unsatisfactory, and was replaced by numerical data obtained by the measurement of the filters spectrophotometrically, resulting in exact quantitative determinations of their absorption for light of definite wave-length.

In the preparation of dry filters in film form, gelatine solutions are often used for carrying the dye, but the precision of measurement is scarcely sufficient to enable a definite conclusion to be reached as to whether the gelatine acts towards the dye as an indifferent medium, is simply a "carrier" of the dye, or whether it exerts a definite influence on the shape of the absorption curves, thus producing what have been termed "shifted" curves, changing the resulting filter.[10]. The definite determination of the influence of the gelatine still requires further investigation.

Absorption of Light by Filters. Classification of Light-Filters.

By the term "light-filter" is understood any medium which exercises selective absorption, that is, which is able to absorb from the rays of light which fall on it those whose wave-lengths fall within certain definite limits; the term includes also those media which absorb rays of all wave-lengths, but not to the same extent: in practice we are concerned only with the latter type of absorption, since all bodies are capable of absorbing light-rays falling upon them, and none are perfectly transparent.

The reflection of light from the surface of a filter which is involved in the determination of its transparency follows for rays incident normally the formula of Fresnel.

$$I_d = \left(\frac{n-1}{n+1}\right)^2 I_0 \qquad (1)$$

where I_0 is the intensity of the light falling on the surface of the filter, and I_d that of the light transmitted, n is the refractive index of the medium of which the filter is made, and it is therefore evident that

$$I_d = f(\lambda).$$

Let us consider this in detail. In the simplest case consider the filter as a medium limited by a pair of parallel planes, and let R be the part of the light reflected from the surface of the filter according to equation (1). Then we have for the quantity of light entering the filter

$$I^1 = I_0 (1 - R).$$

from which some part A will be absorbed by the medium, and on the second surface of the filter there will be incident an intensity

$$I^1 (1 - A).$$

From the second surface there will also be reflected a quantity which it will easily be seen is also R, since the value given by equation (1) is not changed by the substitution of $1/n$ for n. The emergent beam has the intensity

$$I_1 = I_0 (1-R)^2 (1-A).$$

The light

$$I_0 (1-R) R (1-A)$$

reflected from the second surface of the filter returns to the first surface, which it reaches reduced to the intensity

$$I_0 (1-R) R (1-A)^2.$$

Here again reflection is undergone, part of it will pass on, and it is easily seen that after a second reflection from the second surface of the filter of rays of an intensity

$$I_0 (1-R) R^3 (1-A)^3$$

there emerges from the light-filter an additional quantity having the intensity

$$I_2 = I_0 (1-R)^2 R^2 (1-A)^3.$$

The reflected light

$$I_0 (1-R) R^3 (1-A)^3$$

will add to the beams I_1 and I_2 an amount I_3, and so on. Continuing this reasoning, we find that of the total incident light intensity I_0 there emerges the fraction,

$$I = \sum_1^{\infty} I_k$$

but since I_2 is already negligibly small we can retain the first term of the series only, and write

$$I = I_1 = I_0 (1-R)^2 (1-A).$$

And since in practice the surface of the filter is generally of glass, for which approximately $n = 1.5$, we have by formula (1)

$$R = \frac{I_d}{I_0} = 4\%$$

that is only 96 per cent. of the incident light can on the average enter the filter while the remainder will be lost.

The value of R can be measured spectrophotometrically instead of calculating it, or can be eliminated without measurement.

In the determination of the total absorption of the filter R is often neglected and the absorption is often expressed as the ratio

$$\frac{I_0 - I}{I_0}$$

while more correctly the value is

$$\frac{I_0 (1-R) - I}{I_0 (1-R)}$$

The absorption of light in a coloured solution, such as a liquid filter, is according to Beer's law

$$I_x = I_0 e^{-Kcx} \qquad (2)$$

where the co-efficient K is termed the absorption constant; c is the concentration and x the thickness of the layer; I_0 and I_x are the intensities of the incident and emergent light.

If a dry (film) filter be substituted for the liquid one the formula assumes a simpler form. In this case C will be the amount of dye per unit area and x will be included in the value of c. Thus I_x will be only an implicit function of x, and the formula becomes

$$I = I_0 e^{-Kc} \qquad (3)$$

A number of dyes are now known not to obey Beer's law (2), *i.e.*, for these dyes the value of K is not independent of c.

Few observations of light-filters in the form of films have been made and no departures from Formula 3 have been observed. On the contrary, the results obtained by Von Hübl[11] indicate that dyes in dry gelatine films obey Beer's law even when their solutions in water do not, acid rhodamine being an example of such a dye.

The absorption constant K is always a function of the wave-length of the light and the curves corresponding to the equation

$$K = f(\lambda) \qquad (4)$$

are continuous for all dyes which have been examined and show fairly regular, almost periodical waves.

If the values of the constant K be determined experimentally for a number of points in the spectrum it is possible to obtain the value for any desired wave-length by interpolation, since the function is continuous, this may be done algebraically if the function is known or graphically by plotting the measured values and joining them to form a continuous curve.

In future we shall call this curve the absorption curve of the dye considered.

The concentration of the dye c may be stated in any desired units. Monpillard[12] suggested that it should be expressed in grams per square centimetre of the surface of the filter, but the figures so obtained are inconveniently small, and Von Hübl therefore selected as a practical system of units grams per square metre of the surface. Eder[13] suggested that this unit, 1 gram per square metre, should be called Hübl's Unit, and designated by the symbol H, a suggestion which has been adopted by many workers and which we will follow.

In equation (3) we may substitute decimal for natural logarithms and write

$$I = I_0 10^{-ec} \qquad (5)$$

If $e = mk$ where m is the modulus, 0.4343. The quantity e determined spectrophotometrically enables the absorption of energy by a light-filter to be expressed in percentages. Plotnikoff suggested that to distinguish it from the first absorption constant it should be termed the absorption coefficient. (Bunsen termed this the extinction coefficient.)

Let I_0 represent 100 units of intensity, then in our notation

$$I_0 - I = A \qquad (5^1)$$

whence

$$A = 100 (1 - 10^{ec})\ \% \qquad (6)$$

and since e is a function of the wave-length

$$A = \phi(\lambda) \qquad (7)$$

The curve corresponding to this equation for any light filter is called the absorption curve, and expresses the same property as the curve corresponding to equation (4), like which it is continuous. It can easily be seen *a priori* what differences will exist

10. A. Hübl, *Die Gelatine für Phot. Lichtfilter*, Phot.-Rundschau, 1912 p. 9.

11. A. Hübl, *Die Phot.-Lichtfilter*, p. 18.
12. Monpillard, Rev. des Sc. Phot. II., 1906, p. 226.
13. Eder, Jahrb. 1913, p. 280.

between curves (4) and (7). If a light-filter is made from a single dye having a concentration $c = 1$ H, its absorption curve will be identical with the curve of the absorption constant of the dye, if we neglect the absorption of the gelatine, which is very small. Light-filters are generally made from a mixture of several dyes so that the values of the ordinates of the curve (7) will be functions of the ordinates of the corresponding curves (4) of the individual dyes.

In accordance with their absorption curves all filters can be classified into three groups.

1. Monochromatic filters selecting any narrow part of the spectrum, *i.e.*, transmitting a narrow bundle of rays of the same colour.

2. Compensating filters which are used to correct the colour rendering given by photographic materials.

3. Subtractive filters absorbing a small part of the spectrum, *i.e.*, having a curve exhibiting selective absorption.

As examples of all three groups let us examine their absorption curves, plotting as abscissæ the wave lengths λ and as ordinates the absorption coefficients ε and remembering that when $I_0 = 1$

$$E = -\log_{10} I$$

or

$$E = -\log_{10} (1 - A) \qquad (8)$$

as can be easily seen from formula (5) and (5¹) when $\varepsilon c = E$.

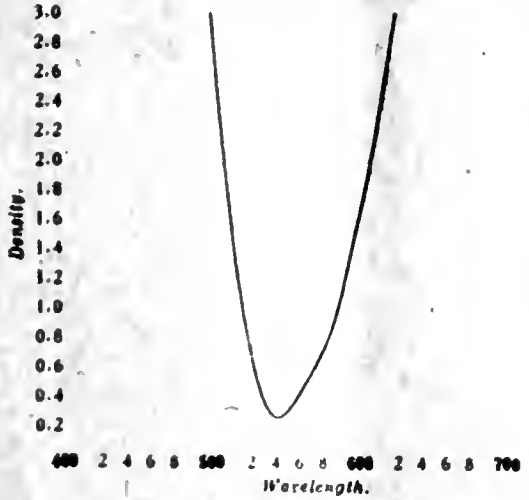


Fig. 1.—Three-colour green-filter.

In Fig. 1 is given the absorption curve of a green filter for tri-colour photography (König's Additive Filter);[14] the concentration of the dyes are

Patent Blue[15] ..... 0.4 H.
Tartrazine ..... 2.2 H.

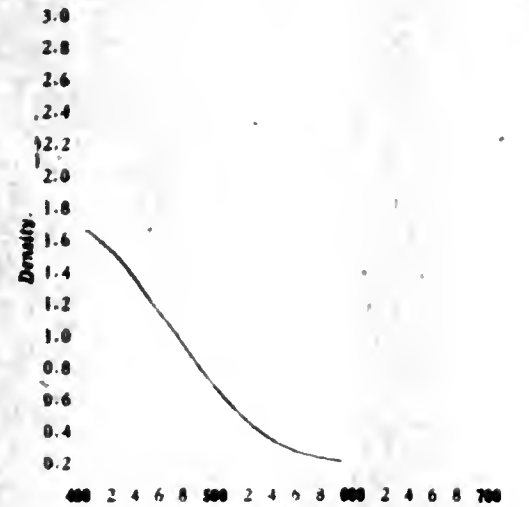


Fig. 2.—Yellow compensating light-filter.

14. König Phot. Korr., 1903, 663, Phot. Mitt., 1904, 67.
15. The names of the dyes are those given by the Höchst Dye Works, who supply them.

Fig. 2 shows the characteristic appearance of the absorption curve of a yellow compensating filter for orthochromatic emulsions.[16] And, finally, Fig. 3 gives the absorption curve of a subtractive filter prepared from

Rose Bengal ..... 0.2 H.

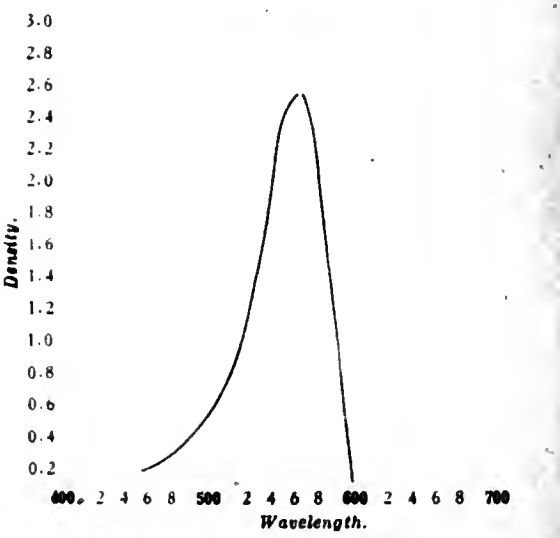


Fig 3.—Rose Bengal subtractive filter.

The curves of filters 1 and 3 are complementary to each other. A monochromatic filter transmits only a narrow part of the spectrum, while a subtractive filter absorbs an equally narrow part of the spectrum. Curve 2 for the compensating filter is seen to be intermediate between the 1st and 3rd.

Grebe[17] used at first a similar classification, but he added to the above-mentioned groups two others, protective filters and contrast filters, but the first (especially the red and green filters used with photographic emulsions) belong to the group of monochromatic filters since their absorption curves are of the same type, and the second group may be sub-divided into monochromatic and compensating filters.

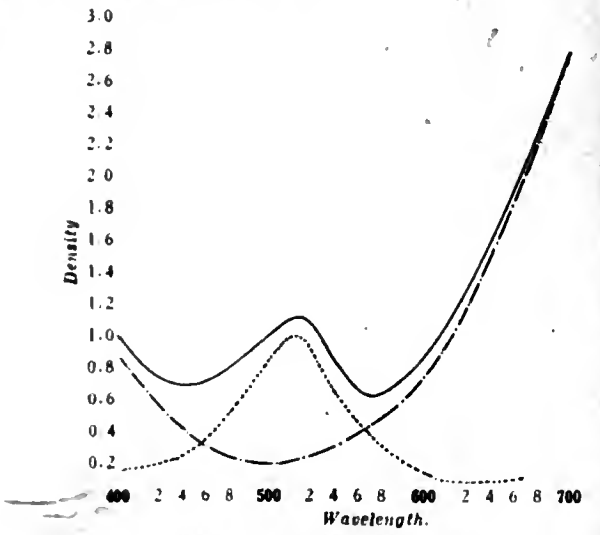


Fig. 4.—Nickel and cobalt filters.

Absorption curve of nickel chloride in concentration 2400 H. – – – – – –
Absorption curve of cobalt chloride in concentration 800 H. .....
Absorption curve of mixture ————

A special group includes those filters which transmit two regions of the spectrum of complementary colour, *i.e.*, those which, by transmitted light, appear neutral grey or faintly coloured; the light transmitted by them appears to be colourless. In 1890

16. Callier, Rev. des Sc. Phot., 1900, p. 612.
17. Grebe, Phot. Korr., 1900, p. 612.

Liesegang[18] showed that if we mix a solution of cobalt chloride $CoCl_2$, which has a red colour, with a solution of nickel chloride, $NiCl_2$, whose colour is bluish green, the light transmitted by the mixture appears colourless or, more exactly, a very weak yellow. Von Hübl[19] examined these solutions in detail, and from his absorption curves it is clear that with the concentration

$NiCl_2$	2400 H
$CoCl_2$	800 H

the orange and blue light is transmitted to a greater extent than other colours, and thus the filter appears neutral.

Since these colours are not exactly complementary the neutral grey obtained is of a yellowish shade. Gelatine films of similar neutral colour were prepared by Von Hübl from naphthol green and fast red D. Obviously other combinations of dyes can be found whose colours are complementary.

A difficult problem is presented by the selection of dyes for monochromatic filters; since only those are satisfactory whose absorption curves are steep otherwise the filters will be insufficiently transparent for the rays which they transmit. The firm of Wratten and Wainwright issue from their laboratory a series of narrow monochromatic filters, but all these display the above-mentioned defect.[20]

Many dyes cannot be used for the preparation of dry filters since frequently they crystallise out on the surface of the filter in drying, and the use of liquid monochromatic filters would appear, therefore, to offer advantages. Landolt and Nagel[21] give a series of such filters. A very complete investigation of liquid monochromatic filters was made by Pretzl[22], following whom Popowitzky[23] gave a series. Dry monochromatic filters were made by Tikhoff.[24]

G. V. Potapenko.

(*To be continued.*)

RELATIVITY IN PHOTOGRAPHY.

The Einstein theories, over which the scientific world continues to flutter itself, may not, perhaps, be accepted in their entirety by everybody. They involve, however, a fundamental truth too often neglected, namely, that all phenomena should be examined and analysed from every possible point of view, instead of being, as it were, classified, pigeon-holed, and dealt with from a single limited aspect. We receive, also, a useful reminder that even long-established laws are not necessarily absolute and infallible, but are often found to break down, or to fail in exactness, through neglect of some unknown or overlooked factor. The photographer, in company with the astronomer and physicist, may profitably examine his daily practice, in search of any omission on his own part to recollect the relativity or inter-relationship, of things.

The importance of psychology, which is simply a mental adjustment of relativity in its personal outlook, in attracting sitters to the studio and intelligently handling them when there, has already been pointed out, and need not here be referred to.

The relativity of the operator's own view-point, as compared with the position of the camera lens, often receives insufficient attention. Whatever he may fancy, an upside-down image on the ground glass affords but little guidance, while the facts gained by an actual inspection of the subject may be quite misleading, since the operator generally steps out a foot or so to one side of the camera, and his head is also usually higher than the lens. This not only interferes with a really accurate judgment of the pose, but even subtly modifies the lighting and expression. As the sprightly young Barnacle says, in "Little Dorrit": "You don't regard it from the right point of view. It is the point of view that is the essential thing."

Much of that vague disappointment so frequently felt by the photographer at the discrepancies between his results and his anticipations is really due to the foregoing cause alone. Practically speaking, the uncertainty and disparity can only be overcome by the use of a reflex camera. The portraitist of Daguerreotype days, when the sitter was perched on a raised platform to bring him nearer the skylight, appears to have realised the difficulty, as far as height is concerned, since old engravings show that the steps on which the operator himself mounted were always lower than the platform.

The focal length of the lens is another important factor. An unduly short-focus lens used for portraiture will introduce apparent distortion in the nearer parts of the subject, owing to the close view-point. This, again, is an effect of relativity rather than unreality, since the results so obtained would appear correct if held at a distance from the eye equal to the focal length of the lens, or if taken with a pair of identical lenses and inspected in the stereoscope.

The relativity of the shutter, too, needs consideration. A press photographer, for instance, caused surprise lately among his coterie of friends by expressing a preference for a fast type of diaphragm shutter over the focal-plane, on the somewhat novel ground that it gave better definition. This was hotly disputed, but a little reflection should have shown the perfect correctness of the statement, since the diaphragm shutter, for an appreciable part of the exposure, acts as a small stop. The curious diversity sometimes met with in different focal-plane photographs of the same subject, according to the direction in which the blind was travelling, and the occasional travesties of possibility seen in projected cinematograph films, such as cab-wheels moving backwards if they happened to be running at a certain speed when taken, are further examples of shutter relativity.

Then there is the relativity of the exposure to the correct rendering of contrast and tone values. Every operator knows how under-exposure increases contrast and diminishes the shadow detail, while over-exposure reduces contrast and has a general flattening effect. What is not always so fully grasped is, how vitally the features and expression in a portrait may thereby be affected, so that the result ceases to be truthful. The lines, wrinkles and hollows in a somewhat strongly-marked face are hideously and exaggeratedly emphasised in under-exposure; whereas, in over-exposure, the tendency is the other way, and what little character may already be present in rather inane features is tamed down and extinguished. Obviously, the hint is not without its value, since it enables us to give more firmness to a flabby, vapid face by slight under-exposure, or to soften undue asperities in a stronger one by over-exposing a trifle.

The relativitiy of orthochromatism to a faithful and convincing record need scarcely be insisted on. The use of orthochromatic plates and films in studios is, as might be expected, steadily on the increase. The employment of a screen is not always practicable, on account of the lengthened exposure, but even without one the results are distinctly superior to those on ordinary plates.

A faithful depiction of the orginal light and shade in the subject depends not only on reasonably correct exposure, within the latitude of the plate, but on the duration of development, since this will affect the contrast. Yet the amount of contrast desirable is, to some extent, a matter of relativity, as it will vary in the final result according to the printing process. A negative not contrasty enough for a bromide print may still give an excellent result with a vigorous gaslight paper. Indeed, there is now such a wide range of rapidities and surfaces to choose from, capable of so greatly modifying the ultimate effect, that it becomes rather a bold venture to declare too dogmatically whether the negative of any given print was good or bad.

Relativity is even more startlingly evident in the mutual opposition of mount and print. The self-same photograph may be made to seem darker or lighter, warmer or colder in tone, by mere variation in the depth and tint of the mount. An amusing tale is being told by a well-known worker of a lady who brought back all her photographs, alleging that they were far too dark and heavy. Not wishing to have them printed afresh, and noticing that the mounts were comparatively light, the astute proprietor had the pictures detached and placed on mounts darker than themselves. This time the photographs gave every satisfaction, the fair sitter declaring how much better they were than "those other things!"

It will be seen that relativity plays a much larger part in photography than many might imagine, influencing, qualifying, or radic-

18. Liesegang, Phot. Archiv., 1890, p. 122.
19. Hübl, Atelier der Phot., 1911, p. 35.
20. Calmel's *Ecrans colorés de Wratten de Wainwright.* Bull. Soc. Franc. Phot., 1908, p. 340.
21. Landolt, Ber., 1890, p. 2879.
Nagel, Biol. Centr., 1898, p. 649.
22. Pretzl, Engl. Mechanic, 1897, p. 358.
23. Popowitzky, Phot. Korr., 1899, p. 127.
24. Tikhoff, Mitt. der Nikolai Observat. Pulkovo, Bd. II., 1908, No. 21.

ally changing the work at almost every stage, and frequently in a quite unsuspected way. So much for the facts we know. It is equally certain that numerous uncharted depths still remain to be sounded.

A. LOCKETT.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Latest day for entries August 31. Particulars and entry form from the Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Latest date for entries August 26 (carrier), August 27 (hand). Particulars and entry forms from the Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, August 8 to 13

PHOTOGRAPHY.—No. 21,278. Photography. W. P. Carpmael.

REPRODUCTION METHOD.—No. 21,383. Photographic reproduction of pictures, etc. W. E. Masson and N. S. H. Sitwell.

REFLEX CAMERAS.—No. 21,000. Device for a folding reflex photographic camera. S. S. Roberts.

FINDERS.—No. 21,366. Focussing devices and distance-finders for photographic cameras. J. H. Whitehead.

STEREOSCOPY.—No. 21,572. Camera for taking stereoscopic pictures. J. C. Wichmann.

APPARATUS.—No. 21,006. Photographic apparatus. F. E. Hoffman.

COLOUR PHOTOGRAPHY.—No. 21,554. Colour photography. W. van D. Kelley.

CINEMATOGRAPHY.—No. 21,275. Method of manufacturing non-inflammable cinematograph films. R. A. McJunkin.

CINEMATOGRAPHY.—No. 21,074. Cinematograph films and methods of making pictures thereon. J. E. Thornton.

CINEMATOGRAPHY.—No. 21,077. Printing cinematograph films, etc. J. E. Thornton.

COLOUR PRINTING.—No. 21,075. Colour printing. J. E. Thornton.

COLOUR CINEMATOGRAPHY.—No. 21,076. Multi-colour cinematograph films and methods of printing and manufacturing same. J. E. Thornton.

CINEMATOGRAPH-PHONOGRAPH.—No. 21,243. Apparatus for producing synchronous cinematograph and gramaphone records. A. J. D. and J. W. Spark.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

VACUUM STORAGE OF PLATES OR FILMS.—No. 163,661 (January 7, 1920). The invention relates to a method of (and container for) preserving sensitive plates or films, and consists in placing the films or plates within a container and sealing the container under a vacuum.

For example, a film spool may be placed in a container which is sealed while under a vacuum. Plates may be similarly stored. —Francis Patridge McColl, Ridgewood, New Jersey, United States.

LANTERN SCREENS.—No. 166,015 (May 19, 1920). The invention consists of a cinematograph screen constructed of a sheet of polished plate glass coated on its rear side with a white pigment applied direct to the glass to act as a reflector.

The screen is constructed of plate glass, preferably having the greenish tinge which plate glass usually has, and the glass should, of course, be free from blemishes, and perfectly plane.

The glass, after having been carefully polished, is provided on its rear side with pigment, e.g., zinc sulphide mixed with a solution of sodium or potassium silicate, of a strength of not less than 30 deg. B., is found to yield the best results. In order to prepare the screen, the glass is suitably supported, and the pigment flowed on to it, and the mixture allowed to dry, the action of the alkaline silicate being to bind the pigment to the glass, the whole mass becoming like a hard enamel, securely attached to the back of the glass. Other white pigments, not acted on by the atmosphere, can also be employed mixed with the alkaline silicates referred to, such as, for example, finely ground glass or white precipitated calcium sulphate. When the pigment has completely set, the plate is preferably mounted in a frame of wood, metal, or the like, and the back covered with any suitable moisture-proof protective covering, such as moisture-proof paper, varnish, or the like.

The pictures are projected on to the uncovered side of the glass plate. It is found that the greenish tinge usually present in plate glass produces a restful and soft effect to the eye, whilst the glass itself has the effect of bending the light towards the observer, so that where a screen of this type is used, the picture can be equally well seen from practically all angles in front of the screen, whereas with the ordinary type of screen, those observers sitting in the centre of the room or hall obtain the best view of the picture, which latter is apt to be distorted when viewed from the sides.—Robert Gilpin, 22, Homewood Villas, Gander Green Lane, Sutton, Surrey.

LANTERN SCREENS.—No. 166,067 (October 8, 1920). The fabric is covered by priming coats of starch and liquid glue, and by subsequent successive coats of paint, the first of which consists of old linseed oil, zinc white, oil of turpentine, and driers, and the second coat of which consists of zinc white, ultramarine, ivory black, linseed oil, oil of turpentine, and driers, each of the coats being flatted with glass paper when dry, and the last coat being treated with a gilding mixture, which is likewise flatted, and, when dry, is padded over with a mixture of metallic powders.

A method of preparing a fabric screen is:—1. The fabric is primed with a coat of liquid starch, applied with a sponge. 2. When dry, this coat of starch is covered—also by means of a sponge—with a coat of glue, melted in a water bath.

The object of these two operations is to prevent the subsequent coats, which have a basis of linseed oil, from penetrating into the fabric.

3. After drying, a first coat of paint is applied, composed of zinc white, matured linseed oil, oil of turpentine, and driers. When this coat is quite dry it is smoothed with glass paper. 4. After this flatting process, a second coat of paint is applied, composed of zinc white, ultramarine, ivory black, linseed oil, oil of turpentine, and driers. This coat, which is pearl-grey in colour, also forms a dull ground, and is likewise flatted with glass paper when dry.

The resulting surface is smooth and uniform.

5. A metallising coat is next applied, composed of gold size, to which 100 grammes of aluminium powder and 50 grammes of silver powder have been added per litre of the mixture. 6. When dry, which takes about 24 hours, the surface is padded with a mixture of 80 per cent. of aluminium powder and 20 per cent. of silver powder, applied dry with a pad of cottonwool. The resulting surface is perfectly bright, free from spots or streaks, and the adhesion of the metallised coat is absolute.—Joseph Coutelier, 23, Rue Jolly, Brussels.

METAL BINDING FOR PHOTOGRAPHS.—No. 166,858 (December 23, 1920). A strip of metal having a series of serrations or scollops along both edges is used. This strip is adapted to be folded over upon itself so as to embrace the edges of the photograph or other card to be framed. Owing to the serrated edges, the strip may be readily bent round corners or along the edges of round, oval, or other curved cards, whilst the serrated edges also provide a decorative effect.

The serrations along the edges of the strip preferably extend to within a short distance of its centre, a thin strip down the centre being left quite plain. This strip may conveniently be of

a width about equal to the thickness of the average card to be framed.

The photograph or other card to be framed is provided with a transparent cover, which may be readily cut to the outline of the card. The metal strip is then applied, and bent over the edge and pressed down upon the back and front thereof; so as to securely clamp the cover in position.—Siegfried Henry Kaufmann, 42, Tottenham Street, Tottenham Court Road, London, W.1.

Cinematograph Colour Printing.—No. 130,603 (July 26, 1917). The machine comprises step by step feeding means, and registering pins, independent of the feeding means, one of which passes through and completely fills one perforation in the positive and a corresponding perforation in the negative.

The registering pin means is mounted so as to be reversible whereby in printing on opposite sides of a positive from different negatives the shrinkage of the latter is taken up relatively to the same perforation or perforations in the positive.

The feeding means is bodily movable to effect the feeding of the strips, and is operable to engage the negative strip only, or both the negative and positive strips, during successive movements.—William Van Dorn Kelley, 1586, East 17th Street, Brooklyn, New York State, and Joseph Mason, 712, East 175th Street, New York.

Substratum for Emulsion on Metal.—No. 14,344 (June 15, 1914).—A coating is applied to the metal surface of a mixture of gelatine and potassium silicate or sodium silicate (soluble glass).

To harden the coating, formaldehyde or alum may be added to the substratum mixture.—Michael Werthen, 5, Germaniastrasse, Munich, Germany.

Waxed Paper Emulsion Stripping Base.—No. 166,686 (April 19, 1920). The invention relates to photographic transfer processes in which a photographic image is transferred from a paper support on which it is originally made to any desired surface such as, for example, a special paper or a surface of wood, porcelain, glass, fabric.

A paper support is employed, impregnated with a solution of paraffin wax, such solution being so weak as to leave the paper surface apparently free of any continuous layer of wax, and the emulsion is then applied directly to the surface of the paper so treated. It will be found that while the emulsion adheres sufficiently to the paper support to allow of the usual photographic manipulations, it is readily separated therefrom when applied to the surface of the final support.

It is essential that a very small amount of paraffin wax should be employed and a weak solution is therefore necessary, *e.g.*, about four or five grains of paraffin wax in one ounce of benzol or other solvent. Such a solution sufficiently impregnates the paper with wax, the amount of which may be varied according to the texture of the paper employed, and enables it to carry a photographic image which leaves the waxed paper temporary support upon transfer to any suitable substance.

The paper is either dipped in or passed through the weak wax solution. The emulsion is then applied thereto in the usual manner after evaporation of the wax solvent. The transfer of the print on to the paper, wood, glass, or other surface is then effected in the ordinary way, and the transfer image or print then separated from the original waxed paper temporary support.—Thomas Albert Mills, 72, Manor St., Clapham, London, S.W.4

Colouring Carbon Prints.—No. 146,134 (January 31, 1919). The invention relates to a process for the colouring of carbon prints by painting them with albuminous glaze colours, and subsequently applying a strong solution of asphalt in any suitable medium. The solution has a dark brown colour and gives a coating of the same colour, which is, however, transparent. Then the bright or lighter portions of the picture are wiped out in successive stages. When the initial tinting is being done, the tone values must be made to appear much more intense than in the original, as they are reduced to their proper values partly by the tone values of the carbon print and partly by subsequent treatment.

In pictures not containing large portions showing one and the same colour the colouring with albumen-glazing colours and the subsequent coating with asphalt is sufficient. Before, however, colouring an adjacent portion, the portion already painted with albumen colour must be protected in order not to destroy it in the subsequent wiping operation. This is effected by spraying on to the large portions painted with albumen glazing colour a solution of resin or mastic in alcohol, after which, in order to connect the several portions of the picture with each other well, the solution of asphalt and resin in oil of turpentine is applied, the colour depth of the solution being so selected as to be equal to the darkest part of the original. Then the lights, *e.g.*, as clouds, are wiped out and smoothed down with the softening or shading brush, and then again the brightest of the remaining parts are wiped out, and so on, until through this continuous brightening or setting off the impression of the shaded original is attained.

Larger surfaces, especially those strongly coloured in the original, which are fairly uniform, that is to say, poor in detail, after the initial colouring with transparent albuminous colours as previously described, may require an additional colouring, which is done with oil colour. As the transparent colour has combined with the bichromated gelatine layer the translucent or transparent oil-colour layer or coat remains thereon. The corresponding oil colour is applied as a glazing colour without exact observance of the outlines, and is uniformly distributed with the softening brush, whereupon the outline is wiped out with a rag and again treated with the softening brush. The oil colours employed are varnish colours in contradistinction to opaque colours. In this way the relief effect of the original is more fully apparent and gives the appearance of a freshly painted picture, without the reproduction having the undesired character of a coloured photograph. After drying, an alcoholic shellac or mastic solution is sprayed on, leaving a transparent resin coating behind. Finally an asphalt layer is applied to the whole, prior to the drying of which the softening down and wiping out of the brightest points or parts is effected in the manner already described.

The finished picture is varnished for the purpose of increasing the brilliancy of the colours, and in order to prevent soaking in and dulling due to careless drying. Too strong a gloss or lustre is removed by brushing or by means of petroleum.—Ulf Seidl, 9, Weihburg Strasse, Vienna.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Sunday, August 28.

Hammersmith Hampshire House P.S. Outing to The Chess Valley.

Tuesday, August 30.

Hackney Phot. Soc. "Garden Flowers." A. C. Fort.
Scottish C.W.S.C.C. (Glasgow). Criticism of Holiday Prints.

Thursday, September 1.

Kinning Park Co-op. Soc. Open Night.
North Middlesex P.S. Competitions: Prints and Slides, General.

Saturday, September 3.

Kinning Park Co-op. Soc. Outing to Fereneze and Gleniffer Braes.
Scottish C.W.S.C.C. (Glasgow). Outing to Langbank.

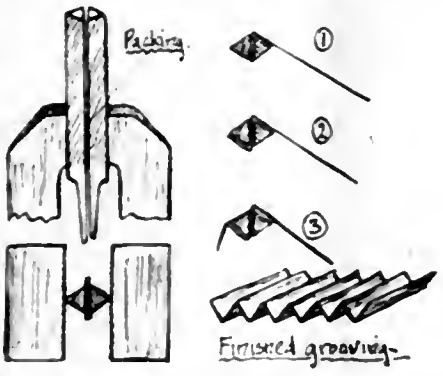
CROYDON CAMERA CLUB.

Out of the trials and tribulations of Mr. J. Walker arose last week a topping tip. It happens that he is possessed of a washing tank and contained corrugated rack. It also happened, indeed it was inevitable, that either the plates were too small for the rack or the rack was too large for the plates, which were of special proportions. So the owner hied himself unto a London dealer of repute and attempted to place an order for a superior rack made to measure. He was courteously informed this was out of the question, as the racks are made by a special machine, and to carry out his wishes a new one would have to be made, and possibly a new factory erected to hold it. Whereupon Mr. Walker returned to Croydon, invoking a Calvinistic version of the "H—— and D—— doctrine" more understandable than the one recently expounded in this journal.

However, there is a practice in the club to consult either "Vivian" or "Rose" when in difficulties of this nature. Mr. V. Jobling happened to be handy and his services were secured. "Why, the thing is as easy as drinking," he observed, and last week, by request, the procedure was explained.

To make the corrugations, either in sheet zinc, tinplate or brass,

two triangular files are taken, and a strip of metal about an inch long, and a little thicker than the metal to be operated upon, is sandwiched between them, as shown in the sketch in side elevation and plan. The files are preferably gripped between the jaws of a vice, or they may be bound together with wire. One end of the strip to be corrugated is inserted between the files and bent over, as indicated at 1. The strip is then reversed between the files and bent as shown at 2. It is again reversed and bent as shown at 3: these operations being repeated until the required length is corrugated. The form of the corrugations (indicated in the sketch) is



better adapted, he said, for securely holding dry-plates than the usual commercial pattern, and any length of metal can be treated speedily and easily.

A convenient way of making a plate rack is to take a strip of metal of the requisite length, remembering to allow for the corrugations, and bend it at the corners to rectangular shape, the corrugations being made where required. It can then be attached to a wooden framework by household brass pins, or soldered, if preferred, to a metal support. Mr Jobling spoke highly of wood for the purpose, provided it is treated with paraffin wax. Some paraffin wax (candles will do well) is kept melted in a shallow metal tray, all sides of the framework being successively immersed until they have absorbed a fair amount of the wax. It was unanimously agreed that the method demonstrated of making plate-racks was extremely neat, and likely to prove useful on many occasions. Divers other matters also received consideration during the evening.

Commercial & Legal Intelligence.

Legal Notices.—The partnership between Ernest Hill and Emil Schou, carrying on business as photographers, enlargers and artists, at 12, Custom House Street, Cardiff, under the style of Hill & Schou, has been dissolved by mutual consent. All debts due to and owing by the late firm will be received and paid by Ernest Hill.

NEW COMPANIES.

D. O. S. Associates, Ltd.—Registered August 17. Capital, £80,000 in £1 shares. Objects: To take over all the shares in the Drawing Office Supplies Ltd. of 51, Cheapside, E.C., and to carry on the business of lithographers, photographers, photo and photo-mechanical plan printers, map and plan mounters, draughtsmen and tracers, manufacturers of and dealers in photographic papers, chemicals, instruments, etc. The first directors are:—W. Monkhouse, 10, Augustus Road, Wimbledon Park, S.W.19; B. J. Hall, Fieldens, Eastcote, Middlesex, and J. S. Walker, 64, Sellons Avenue, Harlesden, N.W.10. Private company.

A Houghton Clearance List.—Messrs. Houghtons have just issued a 12-page list of clearance bargains in mounts, albums, and photographic accessories, chief among which are a great variety of plate and print washers, commercial teak developing tanks, and printing frames and negative boxes. The list is sent free on application.

News and Notes.

Lost Rollex Camera.—Messrs. Robbins, Manistre and Co., 2, Poultry, Cheapside, London, E.C.2, ask us to mention that the loser of a quarter-plate Rollex camera (N. and G. Sibyl pattern), fitted with Zeiss lens, may be able to recover his apparatus if he will communicate with them. Description of the camera and serial number of the lens should, if possible, be stated.

Picture Postcards and Postal Rates.—The regulation as to the five words of greeting allowed on a postcard for a penny, instead of the full rate of 1½d., will not be altered. But early next year the Postmaster-General believes that the financial situation of the Post Office will be bettered, so that the extra rates on cards and letters now imposed may then be taken off.

Messrs. Dallmeyer inform us that the cinematograph film obtained of the Carpentier v. Dempsey fight was taken with one of their No. 12 cinematograph lenses having an equivalent focal-length of 17 ins., and working at the aperture of *f*/5.6, requiring a back extension of only 8½ ins. This lens is identical with the No. 4 Ser. VI. Dallon tele-photo lenses, which are listed for use on half-plate cameras.

Death of Mrs. E. J. Humphery.—We are exceedingly sorry to hear of the death, on Saturday last, August 20, of Mrs. E. J. Humphery. With her husband, Mrs. Humphery regularly took part in the meetings of the Photographic Convention, and was greatly esteemed by those attending these annual gatherings. Conventioners will, we are sure, join with us in extending sympathy to Mr Humphery in his bereavement.

Messrs. Houghtons, in the current issue of the "Ensign Messenger," publish some reproductions of the enlargements which won prizes ranging from £50 in the Ensign enlargement competition. Particulars are also given of the £100 competition for photographs on "Ensign" film. A new size of camera is announced, namely, the No. 4 "Popular Ensign Klito," for 8 × 12 cm. plates. This is the size recommended by the British Photographic Manufacturers' Association to replace the quarter-plate in course of time.

Seltona Demonstrations.—The Leto Co. inform us that the popular Seltona demonstration sets will be issued from the commencement of October to the end of April. Club secretaries wishing to arrange for an interesting evening during their winter session should write to the firm (Roman Wall House, London, E.C.3) for full particulars. The lecturette issued with the demonstration set enables a member to act as lecturer, but it is advisable for club secretaries when writing to mention the proposed date and approximate number expected to be present.

Sales Development.—In the current issue of "System" is an article, "Making More Sales for Manufacturer and Retailer," by Mr R. Crane, advertisement manager of Messrs. W. Butcher and Son. Mr Crane dwells upon the help organised by Messrs. Butcher for the sale of goods by retailers in the shape of showcards and window displays, catalogues for retail customers, and is able to show the beneficial effect of these measures. In the same issue is a paper by Mr. S. W. Copley who writes on his experience in banking and assurance. Among the many interests which Mr. Copley has in business is that of the photographic firm of Photex Papers, Ltd.

Care of Old Furniture.—Many of the studios owned by our best and well-known workers being furnished with genuine old chests and other artistic articles of value, it is deserving of note that such pieces are liable to suffer from cracking during excessively hot weather. Mr. Oliver Brackett, of the department of woodwork at the Victoria and Albert Museum, after consulting with expert workmen who have the furniture in the Museum under constant care, agreed that the recent heat has not been particularly favourable for old "pieces." "So far as this museum is concerned," he explained to a "Daily Chronicle" reporter, "we do not note any particular effect on the furniture. But, then this building has particularly thick walls, which would not be found in the majority of private houses, and fans are kept constantly in motion, so that the temperature may be regulated as desired. But even so, there is always anxiety attached to the care of Boule and other inlaid work. Variations in temperature are at once reflected in the condition of this type of furniture into the making of which glue enters so largely." Asked for suggestions for collectors who are anxious about their treasures, Mr. Brackett advised the use of beeswax and turpentine, except for veneered and

polished woods, which should be wiped over with an oiled rag. Cracks are due to the heat extracting from the wood any moisture which it holds. Fissures should be filled and glue replaced where necessary.

IDEAL HOMES EXHIBITION.—In the photographic section of this exhibition, which opens at Glasgow on September 19 next, the judges will be Messrs. J. Craig Annan of Glasgow, Arch. Cochrane of Barrhead, and Professor D. Forrester Wilson of the Glasgow School of Art. Exhibits are accepted in five classes, allotted respectively to landscape and seascape, portraiture and figure studies, architecture, contact prints of any subjects, and prints illustrating a happy holiday. Prizes ranging from £10 10s. are awarded in each of these classes. The entry form must reach the General Manager of the Exhibition, Kelvin Hall, Glasgow, not later than Thursday, September 8, and exhibits must be despatched to arrive on the same day.

MESSRS. F. BRODRICK, LTD., who for some years past have been in business in High Street, Bloomsbury, as manufacturers of tanks, printing machines, and many other photographic accessories, have recently built and equipped a factory in the outskirts of South-West London, adequate for the increased demand for their goods. We recently had the pleasure of visiting this factory at the time when Messrs. Brodrick were completing apparatus in the shape of tanks, boxes, and other accessories for the Shackleton expedition. It was evident that the equipment of wood-working machinery provides ample facilities for the making of the many pieces of photographers' outfits, which hitherto have been staple products of the firm, *e.g.*, printing cabinets, enlarging easels, drying cupboards and racks, and hard wood tanks for development, fixing, etc., in a wide range of sizes. Moreover, the larger accommodation gives Messrs. Brodrick greater scope for their business in the complete building and furnishing of studios, design and supply of exhibition stands, etc., a department which of late has become of increased importance. The factory is staffed throughout with ex-Service men, and Messrs. Brodrick may be congratulated upon their enterprise in having fitted up a factory which will enable them to keep pace with the demand for their goods.

KODAK, LTD., DISCONTINUE DRY-PLATE MANUFACTURE.—A sensational announcement is made by Messrs. Kodak, Ltd., on an advertisement page of this issue to the effect that they have discontinued the manufacture of gelatine dry plates. The department of the Harrow Works, hitherto employed for the manufacture of plates, has been converted to the making of Eastman Portrait Film and the other grades of sensitive cut film. The firm's dry plates will disappear from the market. The step is a significant one in the manufacturing policy of the Kodak Company; and its significance becomes more striking when it is remembered that the immense business of the Company began with the manufacture of dry plates upon a very small scale, by Mr. George Eastman, no longer ago than the year 1880. Nine years later the Eastman transparent roll-film was placed on the market; and since then the Kodak Company has never looked back in its production of flexible sensitive material, an immense demand for which has been created by the rapid rise of the cinematograph industry. By now cutting itself adrift from the manufacture of dry plates, Messrs. Kodak, Ltd., no doubt, wish to signify, as no other act could do, their profound confidence in a stiff celluloid film as a sensitive material superior to dry plates for all the ordinary purposes of photography. Putting aside quality of emulsion, the lightness, unbreakability and facility of cutting any piece of film to a required size are positive advantages, which have been not unduly emphasised in their advertisement programme of Eastman Portrait Film. The step of discontinuing the manufacture of dry plates is, of course, a logical outcome of confidence in the qualities of Portrait Film, and would scarcely have been taken were it not felt that the company will benefit by staking this department of its trade upon those qualities. Nevertheless, we cannot help thinking that this Cortes-like policy will come as a surprise to many users of the dry plates hitherto made by the Company. It must be presumed that the deliberate resignation of a certain amount of trade in dry plates is to be interpreted as a sign of the company's belief in the wisdom of concentrating its manufacture upon Portrait Film.

PHOTOGRAPHING THE AURORA BOREALIS.—In the "Scientific American Monthly" for July last appears reproductions of a remarkable series of photographs of the aurora borealis taken by Prof. Carl Stormer, of Christiania, who, in an interesting article describing them, says that in March of last year there appeared over the greater part of the earth a display of northern lights, the form and beauty of colouring of which were unique, and which aroused the keenest attention among all investigators. This display appeared in great splendour in Europe, where it was observed by the professor and his assistants from a number of stations in Southern Norway. These stations were connected with each other by telephone, and provided with cameras so that many hundred successful photographs were taken in the course of the night. As they were taken simultaneously at several stations, the height and situation of the northern lights can be calculated with accuracy. It appeared that on that night the rays of the northern lights reached quite exceptional heights, between 500 and 600 km. above the earth. As all usual observations of the northern lights are more or less subjective and unreliable, it is of the greatest importance to obtain an objective method, and the only reliable one is in the present case photographic. For many years the problem of photographing the northern lights resisted all efforts. It was not until 1892 that Brendel succeeded in obtaining a fairly serviceable picture by an exposure of seven seconds during a stay at Bossekop in the north of Norway. More pictures with short exposures were not published, until in 1909, when Prof. Stormer commenced systematic investigations in order to solve the problem. By the use of a small cinematograph lens with a 25 mm. aperture and a focal length of 50 mm. and Lumière violet label plates, he succeeded in obtaining serviceable pictures with exposures of a few seconds, and in consequence he undertook two northern lights expeditions in 1910 and 1913 to Bossekop, in order to apply photography to the study and measurement of altitude of the northern lights. Bossekop, 80 kilometres south of Hammerfest, is a classical spot for the investigation of the northern lights, and in the course of time has been visited by many scientists. One of the pictures in the article shows one of the cameras used on the expedition of 1913. Fitted to it is an arrangement whereby the image of an illuminated watch can be photographed on the plate simultaneously with the northern lights. It was thereby possible to read the time direct on the plate, and it was unnecessary to take time observations during the work. This arrangement was particularly useful when the northern lights developed in great beauty. The pictures could then be taken quickly one after the other with registration of time for each picture. A cinematograph was also employed and the operator obtained series in which each picture was illuminated for about four seconds.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

AMERICA'S FIRST "MOVIE SHOW."

To the Editors.

Gentlemen,—Referring to the letter of J. W. Dickerson, on page 455 of your issue of July 29, in *re* C. Francis Jenkins and the beginnings of motion picture photography in America, may I point out that all the information given in "The New York Tribune" and "The Literary Digest," to which Mr. Dickerson refers, with further particulars and illustrations, can be found on pages 37-54 of Homer Croy's "How Motion Pictures are Made," published by Harper and Brothers, New York, 1918.

Another reference to Jenkins and his "Phantascope" may be found in that entertaining brochure, "The Story of the Motion Picture, 65 B.C. to 1920 A.D.," by Ben J. Lubschez, New York, 1920, this Lubschez, by the way, being a brother of N. E. Luboshez, who so often enlivens the meetings of your photographic societies.

A portrait of Jenkins, with illustrations of his motion-picture apparatus, may be seen in his book, "Picture Ribbons: An Exposition of the Methods and Apparatus Employed in the Manufacture of the Picture Ribbons Used in Projecting Lanterns to Give the Appearance of Objects in Motion," published by the author at Washington, D.C., in 1897. See also many references in Appendix II., years 1894-1898, in "Living Pictures," by Hopwood and Foster, London, 1915.—Yours faithfully,

JOHN A. TENNANT,
Editor of "The Photo-Miniature."

103, Park Avenue, New York.
August 12, 1921.

THE LATITUDE AND DEVELOPMENT OF DRY PLATES.

To the Editors.

Gentlemen,—The latitude of most modern plates (I have experimented with five different makes) is truly remarkable, the word "latitude" being defined, of course, as "the range of length of exposure which may be given to a plate under any given conditions of stop and subject to produce a good negative." Experimenters, as a rule, devote their attention to the remedying of over-exposure, or, rather, to the point to which one may over-expose, yet get a really good print from the overdone negative.

My own rather rough experiments were with plates of what one may term average over-exposure, such as any practical worker may meet with. I saw no object in purposely over-exposing enormously and then, in some special way, getting the best printable negatives possible from such exposures. It was everyday work I had in mind, and in everyday work one does not over-expose "enormously." An over-exposure of three or four times is, I think, all an average worker makes accidentally, and although I have in front of me passable—I may even say good—results from plates over-exposed twenty to thirty times, I do not consider them to be of much interest to practical workers, except, of course, as curiosities. Such exposures were known over-exposures, and were treated as such in developing, a process differing materially from that of the treatment of unknown over-exposures, since most of us are not aware of over-timing until the developer starts its work.

My principal experiments were carried out with five different makes of plates, having speeds of between 260 and 350 H & D, medium speeds, such as I believe the average worker uses. The accurate exposures given were the result of many years' experience, such exposures being endorsed by three exposure meters, and when there were differences—as there were at times—between the readings of the meters, the mean was taken. The subjects, it may be said, were a still-life set-piece and an architectural subject opposite my place of business, the camera being set in an upper window during the July spell of cloudless days, when the light at midday was as constant as it could possibly be in England.

I found that I might over-expose six times, and by using a normal developer, could get negatives which gave perfect prints on self-toning paper, and that by altering the developer to suit the extent of over-exposure, I could get really good printable negatives from plates over-exposed as much as eighteen times. To my way of thinking, the task of over-exposing enormously and making up the developer to counteract the over-exposures, is one for the laboratory alone, whereas that of getting the best negative from an unknown over-exposure when using a normal developer is one all average workers may have put before them, and it is interesting to know what can be done under such circumstances. A studio or out-of-doors operator must be very inexperienced to so misjudge light or subject as to over-expose more than six times, though I have known experienced workers to do it by calculating an exposure for a small stop and forgetting to insert it, thus using the lens in error at its largest (and focussing) aperture.

Present-day methods of developing a plate found to be over-exposed, I believe, vary considerably, but in days gone by it was the custom to add a good dose of bromide, or to increase the amount of the density-giver, usually labelled "No. 1," the "No. 2" solution being the accelerator. Increase of the density-giver after the developer has started work may have some beneficial effect, but the practice of adding bromide after development has started was abandoned long ago by expert workers, because it was proved to have no effect.

The secret of taking advantage of the great latitude of modern plates, and of success in developing over-exposures up to six times, is to use a normal developer with the average amount of bromide, ignore any sign of over-exposure and the appearance of the image, and develop for the same time as one would develop a correctly-exposed plate, thus throwing factorial development overboard for exposures other than the correct one, and adopting tank development—in theory, if not actually in practice. Tank development is unquestionably the best for all under- and over-exposed negatives, and although I rarely use a tank, I always use the system, but employ a dish.

There can be a no better or no more instructive experiment than to expose four or more quarter-plates for varying times beyond the normal, and to develop them all at one time in the same dish, along with a correctly-exposed plate, keeping an eye on the latter and ignoring the others. The finished negatives will, of course, vary in appearance and density very considerably, but they should, if properly printed, give good results—so good that it would be a very difficult matter for the uninitiated to tell the prints from the over-exposed plates from that correctly exposed.

If negatives less dense and of a more even appearance—but of little or no better printing quality—are wanted, then altering the composition of the developer to suit over-exposures will give them, but in order to secure the best results the approximate amount of over-exposure should be known. Assuming a normal two-solution pyro-soda developer is used, over-exposures up to four times may be counteracted by using equal parts (normal developer) and adding bromide (before applying the developer) up to, say, four drops of a 10 per cent. solution to each ounce of working solution, but for over-exposures above four times, which should be rare in everyday work, one must start increasing the density giver (No. 1) as well as the bromide. This increase goes on as the exposure increases, and I have found that for a known over-exposure of twenty times a developer consisting of 2 ozs. of No. 1 and 1 oz. of No. 2, with 15 drops of a 10 per cent. bromide, to give a good negative. This particular work, however, is beyond the scope of the present note.

The work I set out to do was to find out how far one could take advantage of the great latitude of modern plates without altering one's developer and method of working. In conclusion, I may say that for the very dense negatives one gets from over-exposed plates developed in the manner I have advocated, I find nothing better than ordinary and self-toning paper—I use Ilford and Wellington's respectively, though others may be quite as good.

L. Tennant Woods.

THE PHOTOGRAPHIC CANVASSING FRAUD AT CANTERBURY.

To the Editors.

Gentlemen,—The photographic profession in general owe to the Chief Constable of Canterbury, Mr. Carlton, a deep debt of gratitude for his having brought yet another photographic fraud to book in Canterbury, and the gentlemen sitting on the Bench are to be congratulated on taking the serious view of these frauds they did in passing sentence. It is only by doing so, that this sort of thing will stop, and the case should be well published.

This free enlargement and colouring stunt has been carried on for years, to the detriment not only of the photographic profession, but to the annoyance and loss of the general public. One looks back to the time of war, when so many people were left perhaps with one photograph only of the departed and much-loved one, and perhaps would not part with it for untold gold. These canvassing frauds collect such photographs with a plausible tale of what they are willing to do for nothing or little, so that many, on the spur of the moment, part with their much-cherished photograph, to find at a later date they can only get it back by paying 15s. 6d. for a 3s. frame; or, worse still, having paid a deposit, find they hear no more about it. The valuable photograph, which they are unable to replace, has been lost for ever.

It is quite evident that the Chief of Police of Canterbury is a very practical business man, and while he does not make too much of the few shillings collected as deposits, he has taken up the position of how cruel it is to rob people of their photographs in this way, and at a time so soon after a great war. He thus kills two birds with one stone—helps the photographer and opens the eyes of the public to the danger of parting with valuable photographs to strangers. Might I suggest that when photographers do get a Chief of Police to bring these frauds to book, a suitable letter of thanks should be personally addressed to the gentleman who goes to the trouble of taking the matter up, and a further letter should be addressed to the Chairman of the Watch Committee. This would prevent the matter dropping, and bring the public's notice to the fact that it is necessary to stop this canvassing fraud. The public then would not be so eager to believe all that is told them about something for nothing and the opening of premises. It would also induce other Chiefs of Police to take the same trouble as Mr. Carlton has in this matter.—Yours faithfully,

An Old Photographer.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

H. D. M.—The alkali of developers has a considerable corrosive action on zinc, and this metal has a comparatively short life as a lining for developing tanks. These tanks are better lined with sheet lead, or without any metal lining if well made of hard wood.

F. T.—Of the three designs, we prefer the simplest, No. 21A. In No. 21B light is lost by recessing the sky-light into the roof, and in No. 21 there is increased cost of construction with no compensating advantage. We should recommend a rather longer run of glass, say 17 ft., instead of only 15 ft.

W. Harpur.—Your friend is not quite right. You can use supplementary lenses on the lens of a reflex camera, although there is not the same advantage in using them as there is with an ordinary fixed-focus camera, since you can take a standpoint close to the subject and focus correctly by extending the camera to the required amount.

A. C. W.—(1) Many local periodicals would only pay a reproduction fee of 5s., or even less. (2) It is a case usually (unless the photograph is of special local interest) of getting what you can instead of charging what you should. In many cases the subdivision of the whole edition under different titles does not represent a very large circulation, and very frequently a fee less than the common one of 10s. 6d. is paid for the whole lot of the localised editions.

H. J. C.—Probably what is known as "Silver point" is referred to. In this method of drawing a point or pencil of silver is used upon what is called "metallic" card or paper on which the silver makes a very fine or delicate line. It is an art little practised, as few artists can draw with the firmness, delicacy, and accuracy necessary, as erasure or correction is impossible. We do not know of any brand of bromide paper on a vellum paper base. You could use Kodak Transferotype and transfer the gelatine film to any paper you choose.

E G.—The numbers that you quote, *f*/6.8, etc., are the F. Nos. of the lens, the exposure required with the different stops being proportional to the squares of these Nos.; that is to say, if you require 1 sec. at *f*/6.8, the exposure with *f*/9 will be 1 sec. x 9 x 9 ÷ 6.8 ÷ 6.8.

The corresponding U.S. Nos. are:—

f/6.8	*f*/9	*f*/12.5	*f*/18	*f*/25	*f*/36
3	5	9	20	36	80

In the case of the U.S. No., of course, the exposures are directly proportional to the Nos.; that is to say, exposure with stop No. 9 is one-quarter that with stop No. 36.

S. E.—A bleacher which is not so poisonous is the following:—

Thiocarbamide	240 grs.	25 gms.
Nitric acid	4 drs. (fl)	25 c.c.s.
Water	20 ozs.	1,000 c.c.s.

We suppose your difficulty is to buy the very poisonous cyanide. If you could buy mercury bichloride, as used for intensification, you would find this just as effective as cyanide and iodine, but we think you will find the thiocarbamide sufficient for the purpose, though you will probably have to write to Hopkins & Williams, 16, Cross Street, Hatton Garden, E.C.1, or British Drug Houses, Ltd., 22-30, Graham Street, City Road, N.1, in order to get it.

W. P. H.—The plates ought not to frill as badly as you describe. If the temperature is never above 75 deg. we should not have thought it was necessary to use the tropical hardener. Perhaps the cause of the frilling lies in the use of baths at different temperatures, or perhaps more likely, washing between development and fixing. We think that very likely if you were to use an acid hardening fixing bath, made up with alum, sulphite and hypo, and were to put the plates straight from the developer into this without any washing, you would find your frilling troubles disappear, particularly if you can keep all solutions at an even temperature of, say, 70 deg., testing this with a thermometer.

A. G.—You will not find five 1,000-c.p. lamps too much if you wish to give short exposures. The light from these, being spread over a larger area, will not require so much diffusion as was necessary with a single 3,000-c.p. lamp. If you use rapid Iso plates, 500 H. & D., you should not have to give more than 1 sec. at *f*/4. Of course, the distance between lamps and sitter has a great effect on the exposure. You will find it satisfactory to fix three lamps for the front light and two for the side, beginning opposite the centre of the background. If possible arrange to have the lamps to raise and lower. It is necessary to have them 8 ft. from the floor for standing figures and groups, but 6 ft. is high enough for most sitting figures and children. Roughly speaking, the light should fall on the sitter's head at an angle of 45 deg. Thin calico or nainsook makes a good diffuser.

Right to Photograph.—(1) If I take a photograph of, say, children playing on the sands and subsequently sell the photograph to a firm for advertising purposes, can the parents of the children take any action to stop the publishing of the same as an advertisement, either against me or the firm using the photograph? (2) Suppose I sell a firm a photograph of my own children for use in their advertising business, am I able to take other photographs of the same children and submit such photographs to another firm for their advertising department, without infringing my contract with the first firm? Actual contract with first firm: To supply them with a separate photograph of each child for a stated fee.—L. S.

(1) In this country the "right of privacy," which is what the subject of your query amounts to, is sustainable very seldom. Unless the photograph is libellous in character, holding persons up to ridicule or contempt, it is not possible to restrain anyone from making any use they like of portraits taken unawares. This is a rather complicated question, and involves certain legal obscurities, as you may see by referring to the article on it in the "B.J." of last year, August 27, page 525. (2) This question also is a somewhat obscure one, and in your case contract relations appear to be mixed up with the question of copyright. Generally it is assumed that you can create copyright in a photograph of the same subject repeated, with variations, several times, but we think that is a rather dangerous assumption, and in your circumstances we should think it very likely, in view of your contract, that the advertising firm would have a case against you on the ground of breach of contract. See "B.J." May 14 1920, page 294.

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THE BRITISH

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Contents.

SUMMARY.

Dr. B. T. J. Glover, in the second portion of his paper advocating a factorial system of developing bromide prints, sets forth the observations on which his recommendations are based, and shows that by adoption of a factorial method both the best exposure for the bromide paper and the best period of development may be ascertained, or, perhaps we should say, these two times brought into correct relation. (P. 519.)

In a leading article we deal with the provision of interchangeable fitments for the lenses and plate-holders of various cameras whereby considerable economy may be effected, not only in the time required for changing from one lens to another, but in the outfit which is necessary when employing different sizes of camera. (P. 518.)

In the further portion of the paper on the theory and technique of light-filters, M. G. V. Potapenko gives the specifications of different types of light-filter, and shows the relation of a filter consisting of several dyes to the properties of the individual components. (P. 522.)

A highly successful Convention of the Photographers' Association of the Pacific North-West was recently held at Vancouver, B.C. (P. 625.)

The estate of the late Mr. S. H. Fry, formerly secretary of the Professional Photographers' Association, has been proved at over £12,000. (P. 524.)

Change of colour in studio blinds, by exposure to light, may be the cause of misjudgment of the strength of illumination. (P. 518.)

In photographing large groups in the studio, the difficulty of obtaining even illumination may be reduced by the use of a large white background as reflector and by closing the blinds at the end of the studio where the group is arranged. (P. 517.)

Formulæ for preparing clear collodoid solution from waste film are given by correspondents of the "Pharmaceutical Journal." (P. 526.)

The death is reported of Mr. Peter Cooper Hewitt, inventor of the well-known lamp known by his name. (P. 526.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

Mr. E. A. Burchardt raises a point in connection with the making of sets of three-colour negatives from Autochrome transparencies. From his observations in making reproductions of sharply outlined colour charts, he concludes it is necessary to back up the Autochrome with a very thin negative made by white light. (P. 33.)

Mr. F. J. Wall concludes his review of processes for obtaining gelatine reliefs (for use in the assemblage processes of colour printing) by methods other than that of exposing bichromated colloid films to light. (P. 34.)

A two-colour process of cinematography is described in a patent specification, one of the authors of which is the late Mr. W. Friese-Greene. (P. 36.)

EX CATHEDRA.

Groups in the Studio. One of the greatest difficulties encountered in making large groups in an ordinary studio is that of obtaining even illumination of all the figures. This can be minimised by closing the curtains or blinds at the end of the studio where the group is posed and admitting as much light as possible from the other end, taking care to open the blinds right up to the top. This will give a high front light, which is what is wanted. Another aid is to use a large white background as a reflector. This should be placed about midway between the figures and the camera and slightly turned to throw the light upon the shadow side. Care must be taken not to include the edge of this reflector upon the negative. If the light will allow it, a rather small stop should be used in preference to swinging the camera back, as the latter procedure has a tendency to destroy the proper proportions of the various rows. If it can be managed, the best results are to be obtained by working at a slight angle across the studio, the camera being nearer the glass side. Full exposures should be given with large studio groups, so that the back row of figures can be fully developed before the front row is too dense.

* * *

System in Bromide Printing. The paper by Dr. B. T. J. Glover, of which the second part appears on another page of this issue, is deserving of a careful reading, since it is an endeavour to substitute a system based on scientific principles for rule-of-thumb methods in one of the most largely practised of photographic operations, viz., the making of prints and enlargements on bromide papers. That such a system is a desideratum was impressed upon us a day or two ago by the remark of a well-known teacher of photography to the effect that he was bound to tell his students of bromide printing that he could add nothing material to the instructions given by the makers of the papers. That is an admission that the difference between a maker of best bromide prints and the maker of indifferent ones consists in the possession of a certain skill, technique, *flair*—call it what you like—something that cannot be communicated from one person to another in definite terms. To the reform of that admittedly unsatisfactory state of things comes Dr. Glover with certain definite rules based on observations on the relation between the exposure and the time of development of bromide prints. Of these, the most challenging is that, within certain limits of time of development, that is above a minimum and below a maximum, as Dr. Glover defines these times, the product of the time of exposure and time of (correct) development is a constant. We think that more data and confirmation by other workers are required before accepting this formula, but it is relevant to add that a formula which falls short of scientific exactitude

may easily be exact enough for application with benefit to a process like bromide printing. A formula may fit working conditions sufficiently well to be of value in them—and that, we imagine, is all that Dr. Glover claims for his. Granting these preliminaries, the very simple rule for the factorial development of bromide prints, and also for the establishment of a correct time of exposure, follows, as set forth in the paper, and certainly is a system of a kind which has hitherto been lacking as a substitute for the eye in securing the best results of which the process is capable and in repeating them with uniformity.

* * *

Studio Blinds. Those portrait photographers who favour the convenient "festoon" curtains for controlling the light will do well to purchase only such fabrics as will stand prolonged exposure to light without fading. Many of the dark green and blue sateens and casement cloths lose much of their light-stopping power after exposure for a single season, but with these the effect on the lighting is visible and can be allowed for. We recently visited a studio where the conditions were, perhaps, rather unusual, the aspect being westerly and the dark curtains originally a deep brown. They have now faded to such an extent that a large quantity of orange-coloured light passes through, and even when the glass is entirely covered, the studio appears to be quite well illuminated. This, of course, makes it very difficult to judge any particular effect of light, as the orange, though visually luminous, has little effect upon the plate. The best material for the purpose which we have seen is black Bolton sheeting, which is quite opaque, and appears to remain so for several years.

LENS AND CAMERA FITTINGS.

It is hardly going too far to assert that a very large proportion of photographers fail to obtain the greatest amount of service from a fairly large collection of apparatus through lack of any means of securing interchangeability between the components of the various cameras they possess. Many years ago Messrs. Ross made the first step in this direction, when they issued their series of portable symmetrical lenses, the first ten sizes of which, having a range of focal lengths from three to fifteen inches, fitted the same flange. Later, the introduction of the R.P.S. standard flanges did much to remove the inconvenience of having several lenses of nearly the same size, each requiring a separate flange and front, because the screw threads differed slightly in pitch or diameter. To obtain the full advantage of the standard flanges it is necessary to take stock of all lenses up to a certain size, which can be used upon any particular camera, and to fit a front panel with a standard flange which will accommodate the largest of them, and to provide each of the smaller ones with a brass adapter of the correct size. Most opticians and some of the repairing firms will make such adapters for a very few shillings, and the time saved and the advantage of being able to transfer a lens without removing a flange and making even a rough front board will amply justify the expenditure. Another way of gaining the same end is to have a number of small standard-sized front panels carrying the original flanges, and to make another panel to fit each camera with a central recess to receive them. For example, to take an actual case, the standard panels fit a half-plate Premo camera and carry four lenses of from 3 to 12 inches focal length, besides an Adon. These can in a moment be transferred to whole plate and 12 x 10 cameras without any unscrewing being necessary. They also fit a copying camera and an enlarging lantern, in both of which short-focus lenses are often badly needed.

Coming to the camera, the same idea can be carried out with regard to dark slides and inner carriers. It is not uncommon to find two outdoor cameras of the same size of which the slides are of a different gauge and register, so that only, say, three slides can be taken on an outdoor job, when six might be used without the inconvenience of changing. As a rule, the adjustment can be done quite easily, the slides being either planed down or built up as necessary, and the runners on the reversing back shifted to fit. The next step is to make adapting frames to carry the reversing frames of the smaller cameras in the back of the larger one, thus utilising half- or whole-plate slides in a 12 x 10 camera. This will often save carrying a second set of apparatus, if worked in conjunction with the interchangeable lens system described above. A half-plate roll holder or film-pack adapter fitted in the same way affords a convenient means of carrying a reserve of exposures, which may possibly produce a larger return than the original order amounts to, an actual case being that of a photographer who, on a visit to take 12 x 10 architectural negatives, was asked if he could take some prize animals which were being sold the next morning. Thanks to his film outfit, he was able to do so, and netted a goodly order. It may be worth mentioning that to cope with an emergency order of this nature a 12 x 10 plate may be made to yield four 6 x 5 negatives by using a simple card or zinc mask which only allows one-fourth of the plate to be exposed at once. If the camera be provided with ample rising and cross front adjustment and a good lens the pictures can be sufficiently well centred. In like manner a stereoscopic negative can be made by using a card which will cover each half of the plate in succession and moving the cross front to centre the lens upon each as nearly as possible. Inner carriers and film carriers should all fit and register in every slide, and in any larger carrier in which it is desirable to use them. Some slides have metal corners to prevent the shutters from pulling out, while others have screws through the wood for the same purpose. If all carriers are grooved to allow the screws to pass, they can be used in either pattern of slide.

The studio camera is usually a complete item, but its usefulness can occasionally be increased by the addition of either a back or front extension. The tendency is towards the use of lenses of greater focal length, and the expense of a new camera to accommodate them may be avoided by the addition of a front extension, which may take the form of a light box fitted to an extra front panel. If this can be made to reverse it will allow of the use of a short-focus lens for making a very small picture or a greatly-reduced copy. An extension can be fitted at the rear of the camera, but is liable to interfere with the action of the swing-back. If a front extension is to be used for copying, it may advantageously be of conical form, as it is then less likely to interfere with the illumination of the original.

A very useful fitment for the studio camera is a bellows or sliding box fitted in front of the lens to carry a negative or transparency for enlarging or reducing direct upon bromide paper or when making enlarged negatives. This may conveniently be marked for different degrees of enlargement with one or more lenses, and then the required enlargement can easily be obtained by adjusting the rear of the camera.

It is, perhaps, hardly necessary to point out that all outdoor cameras should be fitted for the standard ¼-inch

Whitworth tripod screw, as not only can they be used with any tripod, but in the case of the screw being lost a "bolt" of this size can be procured for two or three pence from any village ironmonger or blacksmith. A long screw with a flynut is preferable to the usual T pattern, as it enables the camera to be fitted to the top of a pair of steps, or at the end of a plank for awkward jobs.

THE CASE FOR FACTORIAL DEVELOPMENT OF BROMIDE PAPER.

(*Concluded from page 504.*)

Exposure and Development Properties of Bromide Paper.

The exposure and development properties of bromide paper which will be dealt with in the succeeding paragraphs are restricted to those which have a definite bearing upon the problem of formulating rules to take the place of "development by inspection."

Various kinds of printing paper exhibit different powers of recording black. Other things being equal, the blacker the black that the paper can be made to record the better. Prominent workers use platinum paper, carbon paper, and work in ink (Bromoil, etc.), partly because of the ease with which they can get an intense black if they wish. The best black that a paper will yield is called its "maximum black." Let us examine the parts played by exposure and development respectively in the production of the best black possible on some particular brand of bromide paper. It is a matter of simple experiment, and is more or less common knowledge, that increase of exposure gives rise to increasing darkness of tone. Before black can be obtained, therefore, a sufficient exposure is required. More exposure than this will not yield a deeper black, and less exposure yields a dark grey or, at any rate, a less deep black. But it is not so generally known that unless development be carried *beyond* a certain minimum degree a very great increase in exposure is needed to record the best black (maximum black) compared with the exposure required when development for a proper time is utilised.

The following experiment illustrates this development property:—It was in the first place ascertained that under the temperature and development conditions which prevailed the minimum development time for maximum black, equivalent to the minimum development time for the gamma infinity of the paper, was approximately 70 secs. This time was deduced from the paper curves in which the reflection densities of the paper were plotted against the logarithm of the light intensities which gave rise to them. It was ascertained that with the particular printing light employed 16 seconds exposure and 70 seconds development yielded a black whose measurement was 1.50 (D_R), equal to the maximum black of this paper. Let us see whether increase in exposure will allow this black to be obtained in 35 seconds development. Sixty-four seconds exposure and 35 seconds development yielded D_R = 1.40. 256 seconds exposure and 35 seconds development yielded D_R = 1.425. Both of them were blacks of a bad colour. It is evident that 16 times the normal exposure fails to bring out black when only half the minimum time of development is employed.

Prints A and E in Tables I and II illustrate the same failure to record maximum black through insufficient development. Given sufficient exposure, there is a minimum time of development below which the paper fails to yield its best black. The attainment of maximum black coincides with the attainment of the maximum contrast of the paper.[1] The first rule we can formulate is therefore:—

"Development must not be for a shorter time than that required to produce the maximum black of the paper."

This rule must not be understood to imply that every print produced should exhibit black. It means that if the exposure given in printing be sufficient to produce black then the development must be sufficiently prolonged to allow of its attainment.

It is known that in the production of any bromide print there are two variables to be taken into account, one exposure and the other development. If they are completely independent of one another, then it will be necessary to calculate both, if print-making by rule is to be made possible. If, on the other hand, it can be shown that exposure and development are closely related and dependent upon one another, then the calculation of either of them alone will be sufficient.

In Table II details are given of four prints made from a step plate of eleven densities. Each print was developed in fresh Amidol of the Kodak formula at 62 deg. F. The printing distance and printing light were the same in each instance, so that it suffices to express the exposure in seconds in the manner usual with ordinary practical printing. It will be noticed that in each case the exposure given multiplied by the time of development in seconds = 1,800, that is to say, exposure × time of development = constant, or the exposure is inversely proportional to the time of development. The reflection densities (D_R) of each print were measured, and are given in columns E to H.

TABLE II.

	Print ..	E	F	G	H
Densities of the Step Plate. D_R	Exposure in seconds	45	30	15	10
	Total time of development in seconds	40	60	120	180
2.150	Reflection Densities.	.02	.025	.025	.025
2.025		.05	.05	.025	.05
1.875		.10	.075	.075	.075
1.725		.25	.175	.15	.25
1.350		.55	.45	.45	.475
1.075		.80	.75	.80	.80
.880		.975	.975	1.025	1.075
.725		1.125	1.125	1.175	1.375
.525		1.20	1.23	1.44	1.44
.225		1.30	1.35	1.475	1.475
.015		1.325	1.475	1.475	1.475
	Time of first appearance of image in seconds	5	6	8	8
	Watkins' factor	8	10	15	22½
	Fog strip density	.00	.00	00	.00

There is remarkable similarity in appearance in the case of prints F, G and H. Shown to an experienced photographer, he had difficulty in pointing out differences, except upon the closest critical inspection. Had they been pictorial prints they would have been quite indistinguishable. What differences there are can be seen from the figures giving the measured print densities (Table II). In practical photography prints F, G and H would be regarded as the same. It will be noticed that print F had 30 seconds exposure, and

1. "The Sensitometry of Photographic Papers." "B.J.," January 1, 8, and 15, 1915, Messrs. Mees, Nutting and Jones.

print H had 10 seconds exposure. The print with the short exposure was developed for a long time, and compelled to become as dark as print F. Prolonged development has compensated more or less exactly for short exposure. Within the range of exposures from print F to print H (30 seconds to 10 seconds) appropriate development has produced similar prints. The time of appropriate development is that which, when multiplied by the exposure, yields a constant. In print F, 30 seconds exposure × 60 seconds development = 1,800, in print G 15 seconds exposure × 120 seconds development = 1,800, and in print H 10 seconds exposure × 180 seconds = 1,800. The experiment is simple, and can be readily verified. Now let us examine print E. Here we gave 45 seconds exposure and 40 seconds development, again yielding a product upon multiplication of 1,800. But in this case 40 seconds development is insufficient to give the maximum black of the paper, yielding 1.325 instead of 1.475 (see Rule I). We have developed for less than the minimum time of development allowable. This print is also of poor colour compared with the other three. Print E is, in fact, developed to a Watkins factor of 8. With the Kodak formula for Amidol this is not sufficient, a conclusion similarly noted above apropos of Table I. By prints F, G and H we have established the fact that exposure and development are variables which are dependent upon one another. They show that exposure and development are inversely proportional when prints of similar depth are made from the same negative. In any scheme for making prints by rule it will therefore be unnecessary to calculate both exposure *and* development, it will only be necessary to estimate one of them, and the other will consequently be known in the manner indicated in a later paragraph.

Our second rule is that a knowledge of either the correct exposure *or* the correct time of development is a complete guide to both exposure *and* development, because exposure and development are dependent variables of which one is inversely proportional to the other.

Before proceeding to the third and last rule, let us consider this "give and take" in the exposure and development of bromide paper. It is totally different to the exposure and development relationships in the case of photographic plates and lantern slides. With the latter, increase in the time of development leads to a steady increase in contrast until a degree of contrast is reached far beyond the requirements of practical photography. There is no "give and take" in exposure and development when making negatives and lantern slides, and we acknowledge this in practice by calculating exposures and calculating times of development quite independently of one another, making no alteration in the development time, because of variations in exposure. Bromide paper, however, rapidly develops to its maximum contrast coincident with the possible attainment of maximum black, and further development does nothing but make the print darker. It is in this stage that further development can compensate for lack of exposure. It is this "give and take" peculiar to bromide paper and similar materials such as gaslight paper which leads to the announcements in paper makers' advertisements to the effect that their particular paper possesses exceptional "latitude." The use of the word "latitude" in this connection is most unfortunate. The same word is already used in connection with plates to describe the relationship between the range of light-intensities in the subject and the range of light-intensities which the plate is capable of rendering with truth. During printing the negative is the subject, so far as the printing paper is concerned, and the negative range and the paper exposure range must approximately coincide if a good print is to be obtained. There is no "latitude," because there has to be "coincidence." The terminology of photography is already sufficiently confused, and the use of one word to describe two totally different phenomena is to be deprecated. I would suggest that this "give and take" in the exposure and development of bromide paper be described as "pliancy." It is an ugly word, but fairly descriptive. A paper which will stand a considerable decrease in exposure, and will then allow prolonged development to produce a normal print without fog or stain, is a very "pliant" paper. The particular batch of Kodak Velvet Bromide paper which provided the figures for Tables I and II possessed a minimum development time of 60 seconds for the attainment of maximum black under certain developer and temperature conditions. There was no difficulty in getting fog-free and stain-free prints under the same developer and temperature conditions with 3½ times that time of development, and, of course, a corresponding *decrease* in exposure. The pliancy of that paper was I—3½, and it was a very good specimen of its kind. There are many papers whose pliancy is less than I—2, so that prolongation of development to compensate for lack of exposure is prevented by fog and stain.

The third rule is a very simple one. The practical stop to further development is the onset of fog or stain, or both. We can define the maximum development allowable as that which just stops short of these two undesirable defects.

These three simple rules descriptive of the exposure and development properties of bromide paper are all we require to formulate a scheme for the production of bromide prints accurately by rule without any possibility of failure so far as exposure and development are concerned. Briefly summarised, they are as follows:—

(1) The minimum time of development is that which is just sufficient to allow of the attainment of maximum black.

(2) Between the minimum and maximum times of development the exposure given and the development required are inversely proportional to one another.

(3) The maximum time of development is that which just falls short of fog or stain, or both.

These rules have been stated primarily to describe certain exposure and development properties of bromide paper in order to devise a scheme of work. They should also be considered in conjunction with the first part of this paper. It is obvious that development by inspection takes little, if any, notice of them, nor does it allow the photographer to judge whether they are being complied with or not. The fact that exposure and development relationships exist and are ignored is a measure of the failure of development by inspection.

The Choice of the Factorial Scheme in Preference to Others.

It has been shown that exposure and development need not both be calculated because of the definite relationship that exists between them. A correct exposure may be defined as that which allows of development above the minimum time but below the maximum allowable time, and produces in that time a print of the required depth. We are faced, therefore, with two alternative schemes:—

I. The calculation of correct exposure (in some manner) so that the attainment of the desired depth of print during development is indicative of the correct time of development; or,

II. The calculation of the correct time of development (in some manner) so that the attainment of the desired depth of print in that time is indicative of correct exposure.

Let us examine the practical possibilities of scheme I. In order to calculate the correct exposure we require to have the following information:—

(*a*) The strength of the printing light incident upon the surface of the negative during printing.

(*b*) The measure of the maximum density of the negative through which the minimum light action on the paper beneath it is required.

(*c*) The influence of the colour of the negative upon the time of exposure in conjunction with the spectral composition of the printing light.

(*d*) The speed of the paper.

(*e*) The depth of print required.

It is perfectly obvious, without any elaboration of those conditions, that the precise calculation of correct exposure

would tax the capacity of a well equipped laboratory, and is quite beyond the capacity of the ordinary photographer. It is not possible to calculate exposure with precision *preparatory* to exposing the print, and we use it as a factor in the determination of correct development.

Now let us explore the possibilities of scheme II. If we can determine a correct time of development the problem is solved. We have only to make an exposure trial strip and develop it for that correct time of development, and the portion of the trial strip which is correctly exposed is that which exhibits precisely the depth of print we want. That exposure given to the final print, which in turn is developed for the same correct calculated time, yields the print desired with absolute certainty. Can we devise a method of calculating or indicating the correct time of development for any brand of bromide paper under all the variable conditions of temperature and developer irregularities which occur in practical work? I have in the past shown that the Watkins' method of factorial development, however uncertain its indications may be in the development of plates, is an exceedingly accurate index as to the degree of development of bromide paper. A very great deal of experimental work has convinced me that bromide paper can be developed to a fairly precise pre-determined degree by noting the time of first appearance of the image and multiplying it by a factor, the resultant time being "a correct development time." Each developer has its own factor. That for amidol (Kodak formula) is 12. Our choice of a system for producing bromide prints by rule must fall upon Scheme II as being the simpler and, indeed, the only possible method, and it is rendered possible by the application of the Watkins' method of factorial development. The choice of a factor for any developer is limited by Rules I and III given above as to the minimum and maximum development allowable. With amidol (Kodak formula) the minimum factor is 10. With a very "pliant" paper the maximum factor is about 30, for further development is very liable to give fog or stain. Whatever factor be chosen, and for many reasons 12 is a good choice, both the trial strip and the final print must of necessity be developed to the same factor (Watkins) if the former is to be a guide to the exposure of the latter. Except for the purpose of altering the shade of sepia in subsequent sulphide toning, there is no need to depart from this factor of 12. It ensures the attainment of maximum black if the negative transmits a printing exposure which suffices, and it is far short of the onset of fog and stain if the photographer is careful in the choice of a bromide paper made by a firm of good standing. There are but few bromide papers on the market made by firms of repute with which it has not been tried, and it yields perfect results with all that have been so tried.

Summary.

The making of bromide prints by inspection fails in many instances because inspection does not tell the worker with certainty that *both* exposure *and* development are right. The common fault is over-exposure, followed by under-development, in an attempt to prevent the print from becoming too dark. A trial strip is no remedy for this, because the same faulty procedure is adopted with the trial print. The statement that development appears to stop when it has been carried far enough is untrue.

The making of bromide prints by rule is made possible by the Watkins' factorial method of development. With the guidance of this development rule correct development is ensured. If development be right, then the attainment of the required depth of print in that development time is proof of a correct exposure. The correctness or otherwise of both exposure and development is therefore known with certainty.

There are many who doubt the need for rule, and there will remain many who continue to doubt it. It is interesting to note, however, that there has never been published in any photographic text-book or pamphlet, so far as I know (and I have read most of them) any definition whatever of what constitutes correct exposure and correct development of a bromide print in a manner which enables the reader to apply that definition to his own work and obtain success with certainty. Correct exposure and correct development cannot be defined in terms of "development by inspection."

But the rules that have been given in this paper, and the scheme of print production based thereon, enables a complete and accurate description of correct exposure and correct development to be given. We can define them so that it does not matter what is the strength of the printing light, or what is the density or colour of the negative, or what the developer may be or what are the development peculiarities of the paper. It is a definition which is a practical working one, for it can be applied in practical work in any dark-room in any part of the world, whether it be hot or whether it be cold. It is as follows:—

The correct exposure for a bromide print is that which, when developed with amidol (Kodak formula) to a Watkins' factor of 12, yields a print of the desired depth.

That definition is based upon experimental evidence. Further experimental evidence of an opposite nature alone can upset it. It is useless for opponents merely to deny it. We cannot hope to help those who are inexpert unless we are able to define exactly the conditions to be fulfilled in order to yield the desired result. If the definition given above is untrue, then we must find another one if bromide printing is not to remain a matter of pure chance when in the hands of those who are struggling to learn. If there is another definition in existence which is equally precise and equally capable of being realised in practice I would be glad to hear it, for it does not yet seem to have appeared in print.

There is an interesting point of commercial importance illustrated in Table II. The two prints F and H are equal in all practical respects. Print F took 30 seconds to print and 60 seconds to develop, a total of 90 seconds in all. Print H took 10 seconds to print and 180 seconds to develop, a total of 190 seconds in all. From the point of view of time involved in production, print F is the better commercial proposition. There have been some short-sighted and ill-considered criticisms of the factorial development of bromide paper as to its utility to the trade photographer. It appears to have been overlooked that the development of one print factorially at the beginning of a term of work yields a *total* time of development applicable to the particular batch of bromide paper in use when certain developer and temperature precautions are taken. Trade photographers will probably admit that their aim is the highest quality combined with the shortest possible expenditure of time. It is reasonably certain that a high degree of quality and a vast saving of time and material could be made by substituting rule for experience. I have seen skilled and experienced bromide printers temporarily baffled by some unknown condition which was leading to loss of quality, wasting time and material trying to overcome the difficulty. Not the least advantage of bromide printing by rule is the readiness with which changed working conditions can be recognised instantly, so that faulty work, the result of an unrecognised change, may be avoided.

The correct exposure for a bromide print is that which, when developed with any developer to an appropriate Watkins' factor, yields a print of the desired depth.

At the present time this is the only definition in existence which has any value in practical work.

B. T. J. Glover.

Welsh National Exhibition.—A booklet descriptive of the exhibition to be held during next summer at Cardiff has been issued from the headquarters of the Welsh National Exhibition, 4, Mount Stuart Square, Cardiff. In the section devoted to industrial arts, photography and colour photography are to be included, and the making and operation of moving pictures will be exhibited.

THE THEORY AND TECHNIQUE OF LIGHT-FILTERS.

[The following is an important paper on the principles of the action of light-filters and on the practice of their preparation and use. It is the work of a Russian physicist, M. G. V. Potapenko, and was first published in the Journal of the Russian Physical and Chemical Society (Chemical Section) 1916, vol. 48, p. 790. We owe the accessibility of the paper to Dr. C. E. K. Mees, by whom the translation from Russian has been made. Dr. Mees while rendering the text into English, does not thereby wish to imply his agreement with everything contained in it. He has refrained from exercising a translator's right of commentary except in one or two instances which particularly call for correction. The fact that he has made the translation and given us the opportunity of publishing it, may be taken as an indication that he regards the paper as a contribution to the literature of light-filters of exceptional value.—EDS. "B.J."]

(*Continued from page* 510.)

An even greater number of investigations have resulted in the successful preparation of sets of three filters for tri-colour photography, which are usually termed standard filters if they are employed for photography by the so-called additive process, and which divide the spectrum into three parts—red, green, and blue-violet. The most extensive work on this question was done by Eder[25], who definitely stated the limits of transmission for standard filters and gave formulæ for their preparation. After König had made available a whole series of organic dyes suitable for the preparation of light-filters, which were placed on the market by the firm of Meister, Lucius & Brüning, many workers tried to prepare standard filters of the greatest precision, and at the present time the formulæ given by Von Hübl[26] have been generally adopted as representing filters of the highest accuracy and transparency. The limit of the red filter prepared by him lies near 585$\mu\mu$ which corresponds to the middle of the yellow part of the spectrum. The green filter transmits light between 585$\mu\mu$ and 495$\mu\mu$, so that its curve terminates in the middle of the blue-green part of the spectrum. Finally, the third filter transmits the blue and violet rays from 495$\mu\mu$ to 400$\mu\mu$.

At this point the limit of a filter must be defined more exactly. The absorption curve of a dye is never perpendicular to the axis, but is inclined to it at a greater or smaller angle. If we refer to Fig. 1 we shall see that the absorption curve of this filter terminates near 620$\mu\mu$ and 458$\mu\mu$ but these values cannot be taken as the limits of the filter since the absorption curve could easily be extended further if it were possible to increase the precision of measurement, and thus determine the transmission in other parts of the spectrum, such as near 640$\mu\mu$ or 450$\mu\mu$, where it is very small, and therefore cannot be measured. From equation 8 we see that when e=1.0 the absorption of the light amounts to 90 per cent., when e=2.0 it is 99 per cent., and when e=3.0 it is 99.9 per cent., *i.e.*, scarcely any light is transmitted by the filter. The practical limit of transmission for a filter may be considered to be the wave-length which corresponds to a value for e of 2.0, when the filter transmits 1 per cent. of the light; for all points on the absorption curve beyond this the light transmitted will be less than 1 per cent., and can be neglected in practice. In conformity with this criterion Hübl used the following concentrations of dyes in order to obtain filters whose limits are those given above.[27]

Rose Bengal	1.5 H.	for the red filter.
Tartrazine	2.0 H.	
Patent blue	0.7 H.	for the green filter.
Tartrazine	2.5 H.	
Acid Rhodamine	3.0 H.	for the blue filter.
Patent blue	1.0 H.	

Von Hübl's green and blue-violet filters, however, are sometimes unsuitable since they transmit much red light of long wave-length near 700$\mu\mu$, which is quite visible. They can therefore be considered monochromatic filters only for photographic use, since the most orthochromatic emulsions have very little sensitiveness to these long waves. In order to obtain more strictly monochromatic filters other combinations of dyes must be used, but up to the present it has not proved possible to absorb entirely the extreme red light, though its intensity can be greatly weakened. In the preparation of liquid filters similar difficulties are not met with, since numerous coloured inorganic compounds can be used, solutions of which completely absorb the red light, but these, of course, are unavailable for use in film form. As early as 1903 König[28] showed that naphthol green was very suitable for the absorption of the red light transmitted by the standard green filter, but it cannot be used for the blue-violet filter since it has a second maximum of absorption near 450$\mu\mu$, and it therefore diminishes the transparency of the filter to a great extent. The author has experimented with toluidine blue, and after a number of trials has obtained a series of standard filters which completely absorb light of 700$\mu\mu$, transmitting only waves longer than 710$\mu\mu$, which are scarcely visible. These waves also can be absorbed, but at the cost of too great a loss in the transparency of the filter; in addition to which the amount of red light transmitted is so small that it can only be detected spectrographically with long exposures.

In these experiments a peculiarity of vision was very noticeable. Under normal circumstances the retina is sensitive only to rays of shorter wave-length than 765$\mu\mu$, when these rays are absorbed by a filter the eye begins to see rays from 770 to 775 $\mu\mu$, and when these are absorbed light is observed up to 790$\mu\mu$, and so on. How far such observations could be pushed is not definitely known, but Stefanik,[29] using a filter transmitting only the infra red end of the spectrum, could see light whose wave-length was 1,000$\mu\mu$.

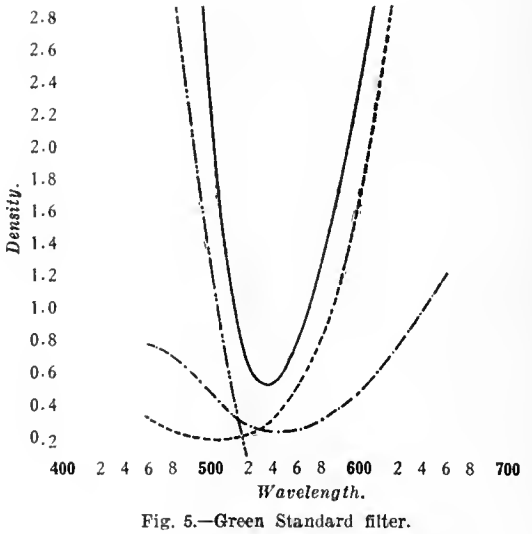

Fig. 5.—Green Standard filter.

The third light-filter of the series was made from the following dyes :—

Fig. 5.—
- Absorption curve of patent blue in concentration 0.45 H. .....
- Absorption curve of naphthol green in concentration 0.4 H. – – – – –
- Absorption curve of tartrazine in concentration 1.5 H. – – – – –
- Absorption curve of light-filter ——

The technical details for the preparation of filters will be given later. We will here deal only with the formulæ which were used for this series of standard filters. The first of them, the red filter, was made according to Von Hübl's formula given above.

Rose Bengal	1.5 H.
Tartrazine	2.0 H.

25. Eder, Spectr. Stad. über Dreifarbenphot, Ber., d.k.k.akad. Wiss., Wien, 1902, Bd. 72.
26. Hübl, *Die Dreifarbenphotographie*, Halle, A.S., 1912, 3rd Ed.
27. Hübl, *Die Phot. Lichtfilter*, p. 101.
28. König, l.c.
29. Stefanik, C.R., CXLII., 1906, pp. 986 and 1569.

For the green and blue-violet filters the following combinations of dyes were used :—

Green standard filter, 585$\mu\mu$ to 495$\mu\mu$.

Patent blue	0.45 H.
Naphthol green	0.4 H.
Tartrazine	1.5 H.

The absorption curve of this filter is given in Fig. 5, in which are shown also the curves corresponding to the several dyes. All

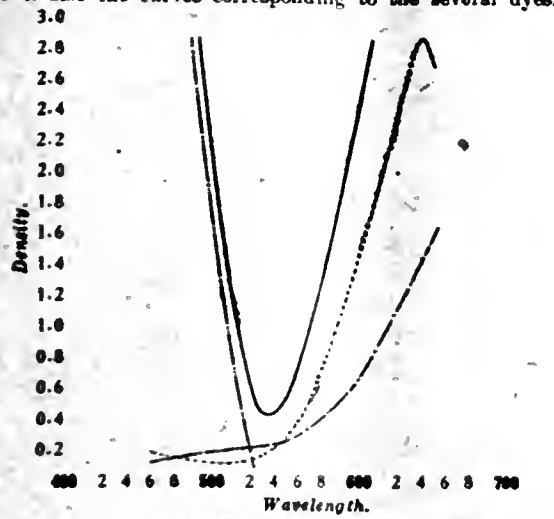

Fig. 6.—Filter of Patent Blue, Toluidine Blue, and Tartrazine.

Fig. 6 {
- Absorption curve of patent blue in concentration 0.35 H ——————
- Absorption curve of tolnidine blue in concentration 0.75 H. – – – – – –
- Absorption curve of tartrazine in concentration 0.25 H. – – – – – –
- Absorption curve of light-filter ——————

Blue-violet filter (595$\mu\mu$—400$\mu\mu$).

Tolnidine	1.8 H.
Acid rhodamine	1.4 H.

the absorption measurements made in the course of this work were carried out on a König-Martens-Grunbaum spectrophotometer in which the light-filter under investigation was placed on one side, and on the other an exactly similar but undyed gelatine film, thus compensating for the absorption of the gelatine and the reflection from the surface.[30]

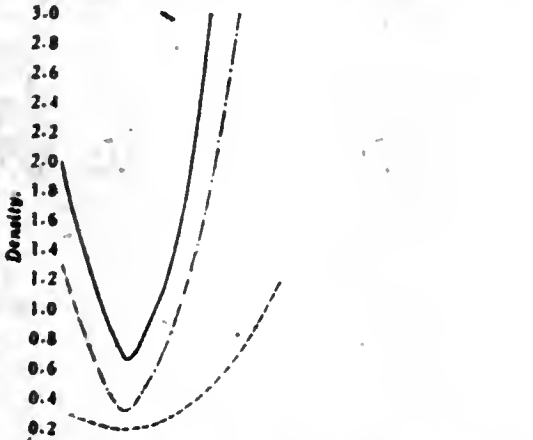

Fig. 7.—Blue-violet filter of Tolnidine and Acid Rhodamine.

Fig. 7. {
- Absorption curve of toluidine blue in concentration 1.8 H. ——————
- Absorption curve of acid rhodamine in concentration 1.4 H. – – – – – –
- Absorption curve of light-filter ——————

30. For the apparatus and method of measurement see I. Plotnikoff. *Photochemische Versuchstechnik*, Leipzig, 1912, p. 133.

The slit of the spectro-photometer was illuminated by means of a gas burner or a Nernst lamp.

In the formulæ given above toluidine blue can be substituted for the naphthol green The formula will then be :—

Patent blue	0.35 H.
Toluidine blue	0.75 H.
Tartrazine	2.5 H.

The absorption curve of this filter is given in Fig. 6.

Fig. 7 gives the absorption curve of this filter.

Instead of acid rhodamine, rhodamine B is often applied, the curve of which is of a somewhat different form, more red light being transmitted by rhodamine B than by acid rhodamine.

The filter made from this dye is not sufficiently transparent, since it is necessary to increase considerably the concentration of the tolnidine blue.

In Fig. 8 are given the curves of Von Hübl's filters. By comparison with these it is clear that the elimination of the red rays from the filters has made it necessary to sacrifice transparency.

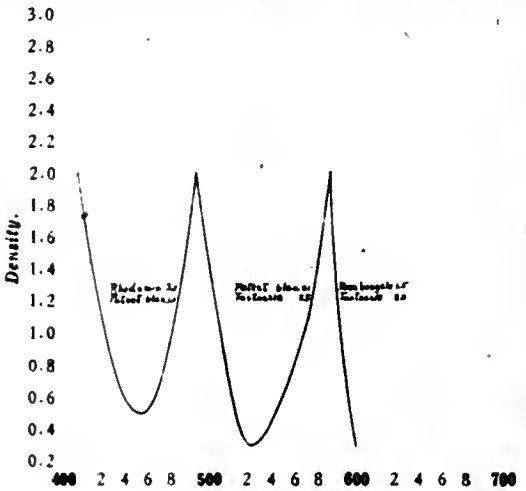

Fig. 8.—Von Hübl's filters.

However, our series of standard filters makes it possible to work with emulsions of greater red-sensitiveness and thus increase the accuracy of the work. The results obtained are summarised in the following table :—

STANDARD (ADDITIVE) FILTERS.

No.	Light transmitted.	Dyes.	Concentration.	Limits.	Remarks
1.	Red	Rose bengal	1.5 H	–585$\mu\mu$	Hübl's filter
		Tartrazine	2.0 H		fig. 8
2(a).	Green	Patent Blue	0.45 H		
		Naphthol Green	0.4 H	585–495$\mu\mu$	fig. 5
		Tartrazine	1.5 H		
2(b).	Green	Patent Blue	0.35 H		
		Toluidine Blue	0.75 H	585–495$\mu\mu$	fig. 6
		Tartrazine	2.5 H		
3.	Blue & Violet	Toluidine Blue	1.8 H	495–400$\mu\mu$	fig. 7
		Acid Rhodamine	1.4 H		

All the above-mentioned dyes are acid; they mix well in one solution and do not precipitate each other.

Parallel to the standard additive filters we may have a series of subtractive filters, used in three-colour photography by the subtractive process from which they derive their name.[31].

The shape of their absorption curves has already been discussed, and one of these subtractive filters has been given in Fig. 3. We will not discuss them further since they do not exhibit any points of especial interest: for formulæ the reader is referred to the papers of König, Von Hübl, and Eder.[32]

Let us turn now to the theory of compensating filters. If we examine the absorption of the yellow compensating filter, given

31. For a discussion of the additive and subtractive processes of three-colour photography, the reader is referred to the books and articles by König, Hübl, and Eder already referred to.

32. König, l.c. Hübl, *Die Dreifarbenphatographie*. Eder, *Spektral-Stud. über Dreifarbenphot*, Denkschrift der mat. natur-Wiss.

in Fig. 2, we shall see that it is characterised by an unidirectional curve, which stretches continuously from the red end of the spectrum to the violet. Compensating filters are mostly used for the correction of the inaccurate reproduction of colours by photographic emulsions, the maximum of sensitiveness of which does not accord with the maximum sensitiveness of the eye. According to Schwarzschild[33], ordinary gelatino-bromide emulsions are most sensitive to light of λ 430 while the maximum sensitiveness of the eye is in the green.[34]

By special sensitizing the curves of sensitiveness of photographic plates can be extended towards the red, but they never coincide with the curve of the eye.

Compensating filters are used to correct this difference, absorbing the violet and blue light, and therefore appearing of a yellow colour. Sometimes such compensating filters also absorb the red and thus appear of a greenish colour. All artificial light-sources are very rich in red rays in comparison with diffused sunlight, and such greenish filters are therefore used with them. Ellis[35] has measured the intensity of various light-sources for the three spectral regions, and gives the following results :—

	Ratio of Intensity.		
	Red.	Green.	Blue.
Diffused daylight	100 :	100 :	100
Nernst lamp	100 :	515 :	11.3
Carbon filament lamp	100 :	45 :	7.5

From this it can be seen that the compensating filter for a Nernst lamp, for example, will have an absorption curve whose ordinate values corresponding to the above-mentioned spectral regions will have the ratio :—

$$100 : 51.5 : 11.3.$$

Such a filter will be of a bluish-green colour, and the light transmitted by it will resemble daylight, corresponding to its selective absorption.

The theory of compensating filters was first worked out by Callier,[36] who published the method of finding the absorption curve of a filter adapted to any emulsion.

It is well known that the blackening S of a photographic plate is proportional to the quantity (It) where I is the intensity of the illumination and t is the time of exposure, *i.e.*,

$$S = k\ It \qquad (9)$$

where k has a value ranging from 1 to 2, increasing with the time of development.[37] The blackening of the plate is determined photometrically from the relation

$$I = I_0 10^{-S}$$

analogous to formula (5) where I_0 is the intensity of the light falling upon the plate, and I is the intensity of the light transmitted.

If we photograph a spectrum and express the measured densities S as a function of the wave-length we obtain a curve characteristic of the plate used, and corresponding to the equation

$$S = \phi\ (\lambda).$$

If the ordinate values of this curve are diminished by an amount c it is obvious that we obtain the same result as if the light by which the curve were made had been screened by a filter having absorption coefficients equal to c. In Fig. 9 is given the spectral curve of a gelatino-bromide plate sensitized with pinachrome and also the visual intensity curve of diffused daylight, measured by Vierordt[38] and corrected by Callier from Köttgen's[39] observations.

In order to render these two curves as much alike as possible it is necessary to use the light-filter whose absorption curve is shown as the dotted curve on the diagram. The ordinates of this curve are obtained simply by subtracting the ordinates of the curve A N from those of the curve A M.

Usually orthochromatic plates do not have such simple spectral curves as that shown in Fig 9 : they generally have two maxima of sensitiveness, with a minimum between them, this usually being the green part of the spectrum.

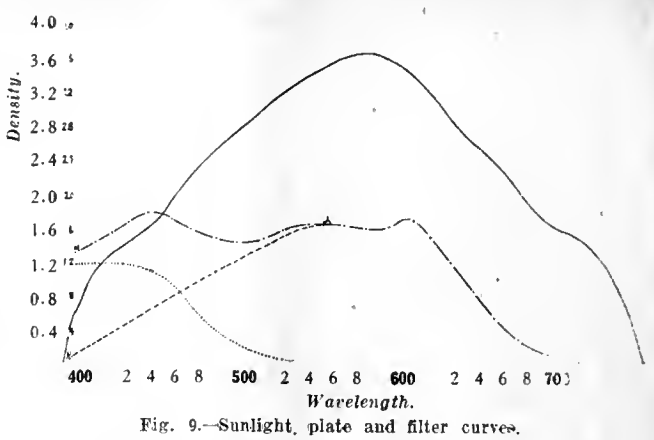

Fig. 9.—Sunlight, plate and filter curves.

Fig. 9. { Intensity curve of diffused sunlight ——— ; Curve of pinachrome sensitized plates according to Callier – – – – – ; Desired form of characteristic curve ····· ; Absorption curve of compensating filter ····· }

The compensating filters for such plates should also have absorption curves of a wavy form and lose their simple character.

An example of such a filter is given in Fig. 10, and its absorption curve can hardly be classified under any one of our three classes.

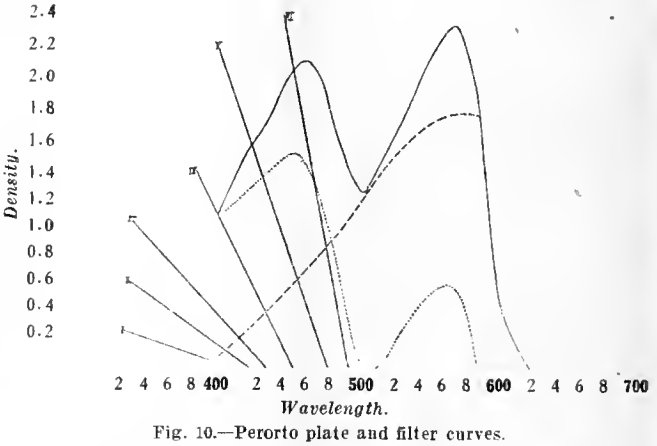

Fig. 10.—Perorto plate and filter curves.

Fig. 10. { Characteristic curve of Perorto plate (green label), according to Callier ——— ; Required curve ····· ; Absorption curve of compensating filter ····· }

It appears to be a combination of the curves corresponding to the compensating and the subtractive filters. On the existence of such minima of sensitiveness for orthochromatic plates in the green part of the spectrum is based the use of green safelights for their development.[40]

A formula for such a filter was given by Von Hübl.[41] The yellow filters commonly found in commerce have a steeper absorption curve than those shown in Figs. 2 and 3, and absorb the blue, violet, and ultra-violet rays.

G. V. Potapenko.

(*To be continued.*)

33. Schwarzschild, Publ. der V. Ruffnerichen Sternwarte in Wien, Bd. V.
34. Plotnikoff, *Photo chem. Versuchs*, p. 120, 1912.
35. Ellis, Phot. Ind., 1910, p. 992.
36. Callier, Bull. Ass., Belge Phot., 1905, April, and Rev. Sci. Phot., 1906, p. 298.
37. Eder, Handbuch der Phot., Vol. III., p. 220. (This equation is entirely incorrect, the true relation being $S = k \log It + C$.—Translator.)
38. Vierordt, *Die Anwen d. Spectral app zur Photometrie der Absorptionspectrum.*
39. Köttgen, Ann. der Phys. und Chem., 1894, p. 793.
40. This is not correct; green safelights are chiefly used for panchromatic plates, and their transmission region does not correspond to the minimum of orthochromatic plates. Their use is based on the great sensitiveness of the eye to small amounts of green light. (Translator.)
41. Naphthol green, 6.0 H; Filter blue, 0.2 H; Wiener Mitt., 1910, p. 355.

THE LATE MR. S. H. FRY.—The estate left by the late Mr. S. H. Fry, formerly secretary of the Professional Photographers' Association, has been valued for probate at £12,219 (gross).

PHOTOGRAPHERS' ASSOCIATION OF THE PACIFIC NORTH-WEST.

Seventeenth Annual Convention.

The seventeenth annual convention of the Photographers' Association of the Pacific North-West was held in Vancouver from August 2 to August 9, under the presidency of Mr. Thomas Gagnon, of Tacoma. The Association has a membership of about 400, 200 of whom attended the Convention, which on all hands was pronounced to be the most successful gathering of photographers on the Pacific Coast which has hitherto been held. The Convention had its headquarters at the Dominion Hall, Vancouver, where members were officially welcomed by the acting Mayor and by the American Consul-General. On the opening day, Mr. J. C. Abel, general secretary of the Photographers' Association of America, gave an address on cost systems and cost finding. As a representative of that Association, he emphasised its importance to all photographers in America as regards national advertising and other co-operative movements. He outlined a plan formulated at the last meeting of the P.A. of A., whereby it is proposed to undertake a campaign of national advertising in the interests of the professional photographer. Various means of financing the undertaking were mentioned.

In a talk on "A New Idea for the Craft," Mr. Dick O'Connor, of Vancouver, urged that there should be combined with the present form of convention a photographic "clinic," similar to what was so successfully adopted at a convention of dentists. He advocated that they should secure the services of the most expert photographers for demonstrations and short courses of instruction in the various branches of photography in which they were interested. This suggestion was viewed very favourably by the Convention, and it is hoped that at next year's meeting the opportunity will be provided for individual instruction in any part of his work in which a member feels weak.

Other addresses were given on "Character Analysis," by Mr. A. L. Struthers, and on "The Value of Organisation," by Mr. J. T Crowder, president of the Retail Merchants' Association.

A great feature of the Convention was the exhibition of photographic work by British, American, European, and Japanese professionals. Several hundred pictures were brought together, including a fine collection of the work of English and Scottish photographers sent by Mr. Marcus Adams. Individual exhibits were sent by Mr. W. Crooke and Mr E. Drummond Young. The Canadian Trade Commissioner in Japan had obtained for the Association a large collection of the work of leading Japanese photographers, and the exhibition, of course, included the representation of Canadian studios on the Pacific Coast and in the Prairie Provinces. This exhibition was thrown open to the public, and was largely visited by residents in Vancouver.

We are informed that a grand sweepstake prize went to Mr. W. Crooke, of Edinburgh, and that the first and second awards to foreign exhibits were made to Mr Lumney and Mr. Herbert Lambert. The Curtis studio, of Seattle, was awarded first place for a study of mounted Indians, entitled "The Vanishing Race," and other Salon honours went to Mr. H. C. Knight, of Victoria, B.C., and Messrs. Dupras and Colas.

So appreciative were members of the Convention of the enormous labours which the officers of the Association had undertaken in making the meeting a success that they decided it would be unfair to re-elect them for the further session. The following officers were therefore elected:—President, W. G. McCormick, of Friday Harbor; vice-president, Mr T M Grady, of Seattle; secretary-treasurer, Wilfred Gibson, Victoria, B.C. It was also decided to increase the subscription to the Association to 6 dollars per annum.

Bird Photography.—The camera (writes "Nature") is being used increasingly to elucidate the habits of birds, and striking success has been achieved by Dr. Overton in his observations on the great horned owl, described in "Natural History" (vol. xxi., No. 2). It has hitherto been supposed that the bird attacks its enemies and prey by means of its wings or bill. The remarkable series of photographs which are used to illustrate Dr. Overton's article clearly demonstrates, however, that the bird attacks solely with its feet. We have seldom seen so conclusive a collection of photographs of birds.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, August 15 to 20 :—

Plates.—No. 22,043. Manufacture of photographic plates and films. H. E. Coley.

Colour Cinematography.—No. 21,671. Colour cinematography. F. W. Donisthorpe.

Cameras.—No. 21,873. Automatic photographic cameras. F. C. V. Laws and C. M. Williamson.

Toy Camera.—No. 21,830. Toy camera. G. C. Nesbitt.

Lens Device.—No. 21,718. Devices for indicating reduced light intensity of apertures of lenses when used at considerable extension of camera. W. G. Rickman.

Cinematography.—No. 21,747. Optical devices for viewing photographic, etc., film pictures. H. F. G. Smith and A. L. Stouvenaut.

Cinematography.—No 21,748. Attachment for photographic, etc. films or film pictures and means for filing such pictures. H. F. G. Smith and A. L. Stouvenaut.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Two-colour Cinematography.—No. 165,826 (June 4, 1919). The invention relates to a two-colour process of colour cinematography in which a yellow screen, which may be of flavazine, is employed.—W. Friese Greene (the late), 41, Portsdown Road, Maida Vale, London, W.9, and Colour Photography, Ltd., 3, St. James's Street, London, S.W.1. (Details are given on another page in the "Colour Photography Supplement.")

The following complete specifications are open to public inspection before acceptance :—

Cinematographs. No. 167,737. Cinematographic apparatus. O. Messter.

Stereoscopy. No. 167,751. Classifying apparatus for examining stereoscopic or panoramic views. E. J. Delens.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Trefoil Design ("As de Trefle").—No. 416,088. Photographic paper. Grieshaber Frères and Cie, also trading as Société des Produits Photographiques "As de Tréfle," 27, Rue du Quatre-Septembre, Paris, France, manufacturers. June 13, 1921.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, SEPTEMBER 6.

Hackney Phot. Soc. Print and Slide Competition

WEDNESDAY, SEPTEMBER 7.

Bradford Phot. Soc. Evening Excursion to Chellow Dene.

THURSDAY, SEPTEMBER 8.

North Middlesex Phot. Soc. "The Chemical Side of Photography." J. H. Harris.

SATURDAY, SEPTEMBER 10.

City of London and Cripplegate P.S. Outing to Wimbledon Common.

Glasgow and W. of Scot. Amateur Phot. Assoc. Excursion to Erskine Grounds.

Hackney P.S. Outing to Waltham Cross. F. C. Toye.

Hammersmith (Hampshire House) P.S. Outing to Ickenham

North Middlesex P.S. Outing to South Mimms.

CROYDON CAMERA CLUB.

"Odds and Ends by Oddities," so ran the announcement for last week's fixture, which, in the opinion of the chairman, Mr. F. C. Reynolds, might be excused by the licence allowed bill sticker Sellors.

The Brothers, L. J. Hibbert and J. W. Purkis (a strong combination of talent) provided the main turn with a divertissement on P.O.P., supported by a powerful company of test-tubes and chemicals. The "brothers" are to be congratulated on dealing very interestingly with a hackneyed subject in a quite unhackneyed manner. Mr. Hibbert explained and demonstrated practical procedures, and was followed step by step by Mr. Purkis with instructive test-tube experiments, and not once did the demonstrators jam. In this way, among other things, was illustrated the necessity of washing out the free silver nitrate before toning, and the production of stains by the introduction of minute traces of hypo into the washing water prior to, and after, toning.

A P.O.P. emulsion of Abney's formula was prepared and utilised in a novel and pretty experiment. The warm emulsion was poured into a rectangular glass tank, and allowed to set. A clear-glass type of negative, representing a horse with two amateur jockeys up, was then placed in contact with the tank and illuminated by an electric arc. The treasurer having offered level money on the horse for a place, the bet was promptly taken by the "office boy." This led to a disagreement between the two owing to the heat of the arc eventually melting the emulsion and causing the picture of the horse, in sadly contorted state, to mount to the top of the tank, which the last-named stoutly maintained was not "a place within the meaning of the Act." A second trial with the arc removed to a greater distance was completely successful in securing an adequate representation of the negative. A concluding experiment consisted in toning a shilling into a sovereign to recoup the lecturers for their outlay.

An interlude was next afforded by a member exclaiming that he had been suddenly struck with softening of the brain. He based this opinion on being unable to comprehend, despite strenuous concentration, the second paragraph of an article by the "Bandit" (in the "A.P." of August 24), which he read aloud. The case of the afflicted was not considered hopeless.

The evening terminated with Mr. J. Walker discoursing on the unorthodox entry of light into film-packs, which he resented. In one adapter he had kept the intruder out by glueing strips of velvet one over the other along the top of the back so that they exercised just sufficient pressure.

DEATH OF MR. COOPER HEWITT.—Mr. Peter Cooper Hewitt, the well-known American scientist and inventor, died on August 25 at the American Hospital, Neuilly. He was in his 61st year, having been born at New York on March 5, 1861. Mr. Cooper Hewitt was educated at the Stevens Institute of Technology, Hoboken, and at Columbia University. Throughout his life he devoted himself to the study of economics, physics, electricity, and chemistry. He was probably most widely known as the inventor of the "Cooper-Hewitt lamp," which inaugurated a new principle in electric lighting, and has been largely adopted in photographic studios.

Commercial & Legal Intelligence.

NEW COMPANIES.

STEREOSCOPIC MOTION PICTURE SYNDICATE, LIMITED.—Registered August 20. Capital £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in stereoscopic cinematograph cameras and projectors, film producers and manufacturers, etc., and to adopt an agreement with E. H. Wright. The first directors are: E. H. Wright, 49, Cresswell Road, Twickenham; E. F. Savage, 36, Brookfield, Highgate, N. Qualification: 1 share. Registered office: 152, Finsbury Pavement, E.C. Private Company.

News and Notes.

THE CLUB PHOTOGRAPHER.—Members of the Portsmouth Camera Club provide the contributions to the current issue of the "Club Photographer." Dr. Bertram Stone has some notes on methods in Nature photography; Commander E. J. Mowlam writes on seascape photography; and Mr. R. Parker gives formulæ for range of tones in sulphide toning.

CELLULOID SOLUTION.—A correspondent of the "Pharmaceutical Journal," writing on the making of varnish from celluloid, says:—The best celluloid is old Kodak film, cleaned *both* sides. It makes no difference whether exposed or not. I use:—

Clean film		1 oz.
Acetone Amyl acetate	equal parts	10 ozs.

First polish the article with anything liquid or paste. Then thoroughly clean with plenty of methylated spirit and soft rag. Set aside to dry—say half an hour—then polish up again with a clean polishing cloth or chamois, apply the lacquer with a soft large brush; use plenty, and leave to dry. Another correspondent, Mr. R. J. Stratton, writes:—My experience is that ordinary clear celluloid (such as old photographic films, cleaned from emulsion) is sufficiently soluble in acetone to form a thick syrupy solution, but that the solution dries semi-opaque with a patchy whitish appearance. If, however, equal parts of amyl acetate and acetone are used, the film formed on drying is perfectly transparent. A smaller proportion of amyl acetate might suffice; this could easily be decided by experiment.

PHOTOGRAPHY ON THE LOST AIRSHIP.—Photographs were being taken on the ill-fated airship (R38) when it fell into the Humber on the 24th ult. Mr. Arnold Bateman, one of the Government scientists on board at the time of the accident, has given to the Press an account of the incidents leading up to the disaster, and of his own wonderful escape. Mr. Bateman was on board as one of the representatives of the National Physical Laboratory, Teddington, taking measurements of the forces that act on the control surfaces, with a view to testing airworthiness. He was in the tail of the airship taking photographs of the pressure on the fins, and says:—"There were three of us making these measurements, which are for the guidance of designers of future airships in relation to the fins, which have always been a doubtful point. . . . I took up my position, and had been taking photographs for about 15 or 20 minutes when the accident occurred. It was swift and complete. . . . My parachute was handy, and I attached myself to it and jumped overboard." Mr. Bateman, who was one of the five saved out of a crew of forty-nine, was picked up in a dazed condition by the barge "Klondyke," of Ramsgate.

MEASURING THE GLOSS ON PAPER.—L. R. Ingersoll has designed an instrument for measuring the gloss on paper. When light falls on a piece of paper, part of it is diffusely reflected and part is reflected specularly—that is, as from a mirror. This latter part is found by experiment to be almost completely plane-polarised, when its angle of incidence on the paper is about 57.5 degrees. An eye-piece is set so as to receive the specularly reflected beam which has mingled with its also diffused light. Gloss is defined as the fraction of the brightness of the composite ray, due to the plane-

polarised light contained in it. This constituent of the beam is eliminated by passing the light through a nicol, and from the setting of the latter it is possible to calculate the desired fraction. There still remains an arbitrary element, the angle subtended by the source of light, and, since this is so, the author takes the angle through which the nicol must be turned from a certain setting as a convenient, though not an absolute, measure of the gloss. On this scale blotting-paper reads 20 degrees; Solio, 50; ordinary magazine paper, 25 to 40. An absolute determination of the gloss as above defined can be got by using two different angles of incidence. The instrument, the glarimeter, is portable and strong. Only 15 or 20 seconds are needed for a determination, and darkening the room is not necessary. Its use is not limited to paper. The gloss of paints, varnishes, textile fabrics, and finishes can be investigated with it. Its special employment seems to be for controlling the calendering process of papers. The instrument in its general outlines was devised some years ago, but the famine of optical parts during the war delayed its completion. Keiser, in Germany, appears to have developed a similar instrument independently, though later (see "B.J.," February 11, 1921, p. 78).

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

SULPHIDE TONING.

To the Editors.

Gentlemen,—The writer desires to call attention to two small matters in connection with the communication, "Experiments on Sulphide Toning," which appeared in the July 29 number of this journal. In each case the statements made, while not incorrect in themselves, are misleading as they stand, and should have been amplified in the original paper.

First, the use of a bleach bath of potassium ferricyanide with potassium chloride suggests the intention of converting the silver of the image to silver chloride (see page 447, expt. B1). There was no such thought, however, in these experiments; and, in fact, the ferricyanide-chloride bleach of the composition used yields an image which consists mainly of silver ferrocyanide, and in which it is difficult or impossible to detect any silver chloride. And, as being of some importance in practice, it should have been specifically pointed out that while true conversion to a chloride, as by means of a permanganate-chloride bleach (see page 448, expt. B11), gives on subsequent sulphiding a tone which is somewhat more purplish than normal, a decided deviation in the *opposite* direction results from the use of the ferricyanide-chloride bleach. This latter bath, it should further have been specifically mentioned, appears identical in action (both speed and tone) with ferricyanide alone.

Second, in footnote 1, on page 448, the wording, through lack of amplification, is such that the impression is given that the writer's experiments have proved the non-formation of thiosulphate by the spontaneous oxidation of sodium sulphide solution in the air. The reverse is the case, however, and the tacit admission that sodium sulphide is converted at a certain stage of oxidation very largely into sodium thiosulphate was intended in the footnote. The toning experiments pointed to the conclusion that dilution alone, rather than the formation of hypo by oxidation, is the main cause of the too yellowish tones obtained by using a sulphide solution which, although freshly prepared from good material, is too dilute.

The writer desires to avail himself of this opportunity of stating, in explanation of the empirical and somewhat incomplete character of the "Experiments on Sulphide Toning," that the work was carried out some time ago as part of a plan—now abandoned—for an exhaustive examination of the methods of toning by means of sulphur, selenium, and tellurium. Much further photographic manipulation, together with both chemical and physical (colour) analyses, are probably necessary before it would be possible to understand fully the *rationale* of the tone-variation effects already known, and a theoretical discussion of these was therefore omitted.—Very truly yours,

E. R. BULLOCK.

Research Laboratory, Kodak Park, Rochester, U.S.A.
August 1.

TRADE DISCOUNT ON MAWSON PLATES.

To the Editors.

Gentlemen,—We have received several complaints lately from customers stating that certain dealers are not allowing the maximum discount on the sale of our plates. We know that the majority of our friends selling our plates are careful to give the usual trade discounts.

In the interest, however, of ourselves, as well as of the buyer, we should be glad if you will give publicity to the fact that our discounts are the same as those applying to higher-priced plates.—Yours faithfully,

For and on behalf of MAWSON COMPANY, LIMITED,
DAVID BLOUNT, Managing Director.

Newcastle-upon-Tyne, August 26.

THE KODAK MANUFACTURING POLICY.

To the Editors.

Gentlemen,—In common with other professional photographers of the Kingdom, I received a day or so ago an "Announcement" from Messrs. Kodak, Ltd., stating that they were about to give up making glass plates, and were in future going to confine their attention to Portrait Film.

Had the announcement in question been confined merely to a statement of this change in the policy of the firm there would have been no cause for me to trouble you with any comments upon the matter. I should have just assumed that the management of the firm had decided that it could make more money out of film than out of plates, and I should have accepted the situation with what philosophy I could command, consoling myself with the thought that, should I require glass plates, there were other firms prepared to supply my needs.

But this announcement goes on for three pages trying to prove in the high-flown language so characteristic of the modern advertising manner that the glass plate has become old-fashioned and must be relegated to the past to which it now definitely belongs—"that the Eastman Portrait Film marks the beginning of a new era in photographic history—an era in which the plate is destined to become little more than a memory," together with much fulsome talk about "progress," and a picture of the Kodak Company leading the way throughout the ages, which I feel to be profoundly boring and unreal.

Now, as a matter of interest to the profession generally, I want to ask a question: Does the glass plate belong to the past, and are all those who, like myself, decline to give up using it, to be classed as "unprogressive persons who abhor change of any kind"? Personally, I think not. After making a most careful trial of the film, extending over some months, I find that I return to the glass plate more than ever convinced of its superiority and convenience, and I will give the Kodak Company the credit of being the manufacturers of the plate which I prefer to their much advertised film.

I am not saying for a moment that the Portrait Film is not a good film; it is, indeed, one of the best, but it has several very definite disadvantages and no amount of advertising will obviate these disadvantages. May I hazard the suggestion that the real reason why Messrs. Kodak are giving up the manufacture of plates is that they find it pays them better to import films from America than it does to employ British labour and to manufacture in this country. If this should prove to be the case, it appears to me to be a matter for very great regret, and not at all the subject for dithyrambic advertisement talk about "progress."—Yours faithfully,

HERBERT LAMBERT, F.R.P.S.

32, Milsom St., Bath.
August 30.

[In reference to the concluding paragraph of the above letter, we are informed by the Kodak Company that Eastman Portrait Film is made at their Harrow works.—EDS., "B.J."]

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

H. C.—We have never head of a developer supplied as "Creatol."

G. T.—We cannot see any difference between your two questions. In order to include the same amount of view on a quarter-plate as with a 19-inch lens on a whole-plate, the required focal length is half 19, that is 9½ inches, the quarter-plate being exactly half the scale (linear) of the whole-plate.

J. B.—There are no formalities whatever in obtaining copyright, registration having been abolished by the Act of 1911. The mere fact that you take the photographs without being paid by anybody to do so vests ownership of the copyright in yourself.

R. H.—Either of the lenses marked ought to cover a 15 × 12 plate. Of the two, we should prefer the Krauss, if in good condition. *F*/6.3 is quite large enough aperture for a lens of 20-in. focus; in fact, we think there is very little advantage in having a lens of this size of larger aperture than *f*/8. Except for subjects such as groups, and often for them, you will find yourself using the lens regularly at *f*/8 for the sake of depth.

An Old Hand.—We cannot undertake to make chemical tests of materials, but we have passed on your sample to a friend, who now informs us that it certainly is a sample of sulphite, but one, he considers, of low quality. Probably it contains less sulphite and apparently some acid impurity, so that, if you have to use it, you may perhaps be able to make it do by using more of it, and, at the same time, adding a little soda carbonate to the amidol developer, as found to be necessary.

A. J. F.—(1) If self-toning paper is well washed before fixing, or, better still, if it is passed through a weak bath of bicarbonate of soda before fixing, we think the results are just as permanent as P.O.P. Cases of impermanence of self-toning papers are chiefly due, in our opinion, to placing prints directly into the fixing solution which, thereby, is very often rendered acid. Therefore, we advise you to choose a paper which will give a good tone if thoroughly washed, or treated with bicarbonate, before fixing.

M. D.—Taking price into consideration, and also the fact that you only require to cover one-quarter of a quarter-plate, we think the best choice would be 152B, which could be easily fitted and would give excellent definition if in thorough condition. Another lens, also suitable for these midget portraits, is No. 156S, but this would not be of long enough focus to cover the whole quarter-plate. If you want to use the lens for quarter-plate negatives, No. 152B would be the better choice, and would be a fairly satisfactory lens for enlarging as well as for indoor and outdoor use.

Royal Patronage.—Can a photographer, who is engaged to photograph "a house-party group" amongst whom is the King and Queen, advertise, and use the term: "Under Royal Patronage."
Wallasey.

We think that if he advertises himself in these circumstances as having received Royal Patronage, he will come under the unfavourable notice of the Lord Chamberlain. From the brief particulars given it does not appear that he has received any royal patronage. The mere fact that the King and Queen were included in the group could surely not be considered as such.

C. Usherwood.—Unless we could personally supervise your work, it is difficult to say the cause of the veiling and inferior tones. But the most usual cause is over-exposure of the prints and development for a shorter time than can be given if you expose less. You should try cutting down your exposures, say to half or less, and then see whether you can get the required depth in the black prints by a longer period of development. As a rough guide, prints should be kept in the developer for at least 3 minutes. If you are developing in a less time than this, it is a sign that you are exposing too long. We should not use sulphide which has become liquid. It may be all right, but, on the other hand, it may have deteriorated. In any case, now it is liquid it is impossible to make up a sulphide solution of the proper strength.

W. H. C.—(1) If you are not familiar with making up the mercuric-iodide intensifier we advise you to buy it ready made, either in powder form from Mr. T. K. Grant, 89, Great Russell Street, London, W.C.1, or in "tabloids" from any photographic chemist. (2) We do not advise using M.Q. with caustic alkali, but if you must have a developer of this type, the following is a very good formula, particularly for use in cold weather, owing to the larger proportion of metol:—

Metol	60 grs.
Hydroquinone	30 grs.
Sodium sulphite	1 oz.
Sodium hydrate	120 grs.
Potass bromide	10-15 grs.
Water	15 ozs.

(3) We know of no method of restoring a negative which has received patchy stains from mercury intensification. The best thing you can do is to make an enlarged transparency from it, and work this up on the back with stump, and on a "Bildup" coating, so as to even out the patches of lesser density.

W. A.—(1) We do not think temperature of development has anything to do with it. The darkness of the renderings is no doubt due simply to the exceptional tanning of the complexions in conjunction with the use of an ordinary plate. You would do better with a self-screen plate and liberal exposure. (2) The usual plan of making embossed titles more distinctive is by the use of thin-metal foil, which adheres to the relief letters, and can be brushed away from other portions. You can obtain these foils through any dealer in embossing machines. (3) If the ordinary mercuric-iodide intensifier does not give you sufficient increase of contrast we should try more powerful means, for example, the Monckhoven mercury-cyanide intensifier, a very short action of which will give very considerable increase in contrast, often a great deal too much. (4) To a certain minor extent the definition of a complete lens suffers from the fact of construction allowing of the use of the separate elements as single lenses. But in practice this does not amount to a very great deal. Generally speaking, however, the greatest perfection in lens construction is reached when the whole objective is not convertible into separate lenses.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3201. Vol. LXVIII. FRIDAY, SEPTEMBER 9, 1921. Price Fourpence.

Contents.

SUMMARY

Mr. T. C. Turner sends a graphic description of the disaster to the R.38, of which he was an eye-witness, and of which he obtained the first photographs taken at close quarters on the Humber. (P. 537.)

Mr. Thomas Bolas, in an article on the Freund process of desensitising with potassium iodide, points out the characteristic peculiarities of this method, one of which is that bromide acts as an accelerator in the subsequent development. He gives practical instructions for the making of the iodide desensitiser and the subsequent developer. (P. 532.)

Mr. Harold Baker relates his experience in attempts to develop bromide paper according to a system. (P. 541.)

In a contributed article, Mr. R. R. Rawkins gives instruction in the making of bromide prints with a plain tint border, and insists on the use of a printing box specially for exposure of the tint surround. (P. 531.)

In a leading article we deal with the considerations which govern the selection of an appropriate height for the camera, both for landscape and interior subjects. Among the latter a low point of view will frequently effect a very great improvement. In portraiture also a low position of the camera renders the neck more gracefully, has the effect of shortening the nose and of causing the corners of the mouth to droop slightly. (P. 530.)

The repair of studio roofs with one or other of the semi-fluid compositions which are sold for application to zinc or lead roofing can be recommended as a means of preventing leakage which, otherwise, is pretty certain to occur as the result of the abnormally long spell of hot weather. (P. 529.)

M. G. V. Potapenko, in the concluding part of his paper on the theory and technique of light-filters, deals with the practical preparation of filters consisting of dyed films. He appends a list of 118 notable publications on the subject. (P. 534.)

The policy of the Kodak Company in discontinuing the manufacture of dry plates has prompted letters from several correspondents on the respective advantages of plates and cut film. (P. 542.)

A correspondent draws attention to the local trade to be done in views of buildings, which frequently are not published as postcards (P. 541.)

The programme of lectures to be delivered during the course of the exhibition of the Royal Photographic Society, which opens on September 19, will be found on page 538.

A recent communication from the Home Office describes the regulations which it is proposed to make relating to trades in which articles of celluloid or cellulnid material are manufactured or stored. (P. 540.)

The multi-view postcard or print may serve as an appropriate kind of advertisement for photographic studios. (P 530.)

The advantage of brilliant light when photographing still-life subjects or garden scenes in which much colour occurs is the subject of a paragraph on page 530.

A process of colour cinematography and methods of aero-photographic mapping are among the patents of the week. (P 538.)

EX CATHEDRA.

Leaky Roofs.

The long hot season which is now drawing to an end has probably loosened the putty in many studio roofs, and the first heavy rain is likely to reveal a goodly crop of leaks. There are some skylights which appear to defy all ordinary methods of rendering them weather-proof, but from an experience which we had last winter, we are able to suggest what would appear to be a permanent cure. It is, to use instead of putty or paint one of the plastic materials now extensively employed by builders to repair leaky slate, zinc and lead roofs. Our experiment was made with Matex, a semi-fluid composition, which was applied to every suspicious place in a studio roof with a palette knife. It appeared to run into the smallest cracks, and while in a few days it became fairly firm, it has not yet become hard enough to chip out of its grooves. There appears to be no necessity to remove any putty which is not actually loose, and there is no need to replace putty which has come away. There are several similar products, which would probably answer as well, and can be obtained from any builder's merchant.

* * *

Plates and Film.

As our correspondence columns show, the decision of Messrs. Kodak, Ltd., to discontinue the manufacture of dry plates, and thereby to mark their belief in the qualities of the Eastman portrait film as a negative-making material for professional photographers, revives a controversy which in the amateur field is of old standing. As we all know, reams of polemics have been filled during the past twenty years in debating the respective merits of plates and roll-film. Now that the controversy is transferred to the portrait studio, it involves questions on which opinions differ with equal sharpness, although the properties which distinguish the one type of material from the other for the purposes of the portrait photographer are of a different kind. It seems evident that one result of the action of the Kodak Company will be to provoke a more frank and heated discussion of the respective merits of plates and cut film in studio practice than has taken place hitherto. The Kodak Company have judged it well to challenge the merits of the dry plate, and, therefore, it is not surprising that users of the latter should be stirred in its defence. Without wishing to exhibit a bias one way or another in the discussion, it is necessary that we should correct a note which we appended to the letter of Mr. Herbert Lambert in our last issue. Although Eastman portrait film has been made at the Harrow works, the present supply comes from America. It is due to Mr. Lambert and also to the Kodak Company that prominence should be given to this correction. On the cognate point of employment of labour which is raised by Mr. Lambert, it is stated that the discontinuance of dry-plate manu-

facture does not affect the number of employees of the Company, but on the contrary will lead to a greater employment of labour in the future.

* * *

Light and Colour. There is an old proverb which says, "In the dusk all cats are grey," and the saying embodies a fact of great importance to all workers in colour photography by either screen-plate or three-colour processes. On looking at an ordinary street in sunshine one cannot fail to be impressed with the difference in colour contrast which exists between the lighted and the shadow sides. Photographing the same subject upon a dull day is virtually equal to working in shadow and the colour-rendering suffers accordingly. The same effect is produced in a less degree by working with a small lens aperture. Here again, the intensity of the light is reduced and the colour values are degraded, the defect not being avoided by prolonging the exposure. The best results from most still-life subjects can be obtained by working in the open air in the brightest diffused light obtainable, or in some cases full sunlight. It is never worth while making garden scenes in the evening, as the evening effect will be much more pronounced in the picture than it appeared to the eye when exposing.

* * *

Advertisement Postcards. A hint for producing an acceptable advertising novelty for manufacturers, boarding-house and hotel-keepers, may be taken from the view cards, composed of several pictures of a town, which are to be seen at most pleasure resorts. We have before us one issued by a photographer depicting his own premises. It consists of five views—an exterior, two studio interiors, the reception room, a dressing room, the entrance hall, and a workroom. These are fitted under a decorated cut-out mount bearing the name and address, which is photographed to the exact postcard dimensions. It is, of course, necessary to make a series of half-plate negatives in the first place, and these should be a source of profit independently of the cards, as they could be mounted for display at railway stations or other suitable places. If the cost of bromide cards be thought too heavy for large numbers, good collotypes could be substituted, or even half-tone blocks might be used. The latter, however, must be made through a very fine screen and well printed, or a cheap effect will be produced. Some of the trade printers are ready to make up and print the whole thing in bromide at a reasonable rate, if the photographer is uncertain as to his powers.

* * *

The Magic Lantern. The ordinary projection lantern, as sold for exhibiting slides, is a very useful addition to the apparatus of the amateur who works a small-sized camera, for not only does it enable him to show his work on a large scale upon the screen, but it enables him to make permanent enlargements from his small negatives, or such portions of them as are included within a four-inch circle. Most lanterns are provided with a lens of the portrait type, which is very similar, except that it is not provided with diaphragms, to those sold as "enlarging objectives." Should the field be too curved to give good definition at the corners, a cardboard stop fixed close in front of the lens will remedy this Should there be any leakage of light from the lantern body, it may be intercepted by hanging up a focussing cloth, with a circular hole cut in it, in front of the lens. Conversely, an enlarging lantern will answer perfectly for screen work if its construction allows of the slide being placed far enough away from the condenser to receive practically the whole cone of rays. If this cannot be done, an ordinary four-inch condenser may be substituted for the 5½ or 8½ one already fitted. This can easily be done by fitting the smaller condenser into a wooden block of the proper diameter.

THE HEIGHT OF THE CAMERA.

The height of the camera in relation to the object or view to be depicted is a subject which does not usually receive the consideration which it deserves. Many photographers practically work at a fixed elevation and adjust their subjects upon the screen, either by tilting the camera or by using the rising front, thereby neglecting a valuable aid to successful and artistic rendering.

It is granted that no particular elevation has advantage over others, the sole aim being to choose such a one as will suit the lines or proportions of the subject. In landscape, commercial work or portraiture a high or low view-point must be adopted according to the exigencies of the case; and it must not be forgotten that a difference in ground level between the camera and subject must be allowed for in reckoning the height of the camera. This may seem too obvious to need mention, but it is sometimes overlooked.

In landscape work the importance of objects in the foreground is to a great extent determined by the degree of elevation of the camera; and it may be well to point out that the effects of using the rising, or falling, front and of raising and lowering the whole instrument are widely different and must not be confounded. The former merely serves to adjust the view on the plate, while the latter has a very considerable effect upon the composition of the picture. This, perhaps, can best be explained by describing a photograph of a river scene taken with the lens less than two feet from the ground, the river bank being about six feet above the water level. At the eye level of a person standing, the edge of the bank is entirely omitted, and the view commences with an unbroken stretch of water, the buildings and trees on the further bank appearing flat and uninteresting. By lowering the camera some small bushes and plants are brought into sight, and serve to break up the monotonous surface of water, without materially altering the appearance of the distance or the amount of sky visible. If the camera front had been lowered to include the same amount of foreground, a large proportion of the sky would have been sacrificed and a much less pleasing view of the bushes obtained. On the other hand, if an unsightly iron fence had been in the foreground a higher point of view would have been the correct one to choose, and in certain positions might allow a foreground, invisible from the lower point, to come into view. A low view-point has the effect of foreshortening wide flat expanses, and this is usually beneficial to the composition.

When working on indoor subjects, either general views of interiors or single articles of furniture and the like, the height of the camera is of even greater importance, although it must be confessed that the photographer will here often find himself between two evils. A rather low position will minimise the "wide-angle effect" of table tops and chair seats which are near the camera, but at the same time it causes such near objects to obstruct the view of other things which it is desired to include. In such cases, the general effect must be considered and the distortion minimised by keeping such low objects as chair seats as far from the camera as possible, and bringing a small table or cabinet into the foreground. The flat surface in this case will be higher and the perspective less offensive. With single articles of furniture, as photographed for illustrative purposes, this trouble does not arise, and for these a lower position

with the camera kept perfectly level is to be preferred to using a higher one and tilting the camera, as is commonly done, particularly when the available space necessitates the use of a shorter focus lens than is desirable. There is one contingency in which a very high standpoint is advantageous in interior work, and that is when making flashlight or even daylight views in rooms containing a number of persons. In such cases it is necessary to choose a position from which all the faces are visible and, in the case of a dinner, the display upon the tables. Here the camera may be placed any height up to eight feet, or even more, from the floor and the lens pointed down, the camera back being brought to the vertical so as to secure both parallelism of the upright lines and to bring the nearer sitters into focus with a fairly large aperture. By this means it is possible to use a much larger aperture than if the camera were level, and the saving of flash powder or of time of exposure is considerable. When working by daylight the risk of movement is thus greatly reduced.

In portraiture, camera-height plays a very important part, and neglect of it militates against the success of the artist. The practice of placing the sitter upon a throne or platform, so generally adopted by portrait-painters, indicates a recognition of the merits of a low position for the eye. The reason generally assigned for this is that it gives a more dignified appearance to the sitter, while it has also been claimed that a more natural effect is produced when the picture is afterwards hung at a considerable height. The photographer will find it instructive to make duplicate exposures upon a life-sized plaster bust, altering nothing but the height of the camera, the lens being three feet and five feet from the floor respectively, and the head being in the position usually occupied by that of a sitter. Upon comparing prints, many noteworthy differences will be found. At the 3-feet elevation the neck will appear longer and more graceful, being more or less clear of both shoulders, the nose shorter, and the mouth more turned down towards the corners, than is the case with the picture taken at five feet. Lowering the camera is, of course, equivalent to raising the sitter as the painter does. Some very successful portraitists prefer to take bust pictures while the sitter stands, which, of course, comes to the same in the end, but the risk of movement, now that the head-rest is abolished, prevents many from attempting to do this.

It may be contended that as far as the features are concerned the same relative positions between the lens and the face of the sitter can be obtained by slightly inclining the head forward or backward. There is some truth in this, but such inclination must alter the pose of the head and neck, as well as the lighting, and the general effect will not be so good. A common mistake in taking full-length figures, where the lens has to be raised to the height of the sitter's breast, is to give an excessive tilt to the camera, so as to include the feet and foreground; or, failing to obtain sufficient tilt, to lower the camera. The proper course is to work at the proper height, to tilt slightly, and then to centre the image by lowering the lens board. It must be remembered that in any case, and more especially with a tall sitter, the lens is always in a relatively low position with a standing figure.

BORDER PRINTING ON DEVELOPMENT PAPERS.

A GREAT deal of the work turned out by high-class photographers consists of prints made on development papers (mostly of the gaslight type) with a faintly printed border surrounding the picture. At first sight the effect appears to be obtained by multiple mounting, and the whole production has a distinctive appearance. I am inclined to think that this style will become quite a vogue amongst the photographers who do a high-class business, but it is neither suitable nor desirable for general adoption by other photographers. The prints are generally made on card thickness or double-weight papers considerably larger than the negative—12 x 10 for whole-plate negatives and 9 x 7 for half-plate negatives.

The Cosway borders had a run some years ago, but the results were too ornamental and detracted considerably from the photograph itself. Personally, I think the border should be quite plain, and printed lightly with the edge of the photograph softened into the border so that there is no line or shadow showing.

The Apparatus.

Border printing sets can now be obtained commercially in a variety of stock sizes. To those who are not familiar with border-printers I may say that a set consists of two parts. One is a mask upon which the negative is placed, and the other a framework of celluloid upon which is fixed the part cut out of the mask. Small right-angle "feed" stops are fixed so that registration shall be correct. The negative is placed film up on top of the mask, adjusted the printing paper "fed" to the stops, and exposed. The paper is then transferred to the celluloid tinter part, "fed" to the stops and exposed. If the "feeding" has been correctly done the resulting print should not show any join or shadow, but I have heard several photographers complain that the "feed" stops are too small and not raised sufficiently in some of the commercial sets.

Photographers can easily make their own border-printers provided they can cut masks true. I prefer the home-made variety, and make a point of fixing prominent right-angle "feeds" the whole length and breadth of the paper. To those who intend to make the border-printers I would say that everything is easy with the exception of fixing the "feeds" in the correct place on each part. One good method is to use pin-pricks and fix the stops to the holes. Another is to print a piece of P.O.P on both the parts, join by transmitted light, and trim together. Other methods may occur to the practical man. It must be understood that with a properly made border set there is no special skill required to produce perfect results, but the fact that the image cannot be seen until developed makes it imperative for the "feed" stops to be correct and foolproof.

Printing the Border.

The object of this article is to deal with printing the borders and not to describe how to make the apparatus. To those who are desirous of introducing border-printed photographs let me say that one essential to success is to make a special exposing light-box for exclusive use with the celluloid tinter part. The illuminant should be such that an exposure of not less than two seconds (four seconds for preference) will produce upon full development a light grey border. The exposure would seldom vary (excepting with different papers or batches) and the border part could be exposed by a junior assistant, who could do as many as required and place them in a light-proof box (all one way up, of course) for the printer who exposes the negatives. It is asking for trouble to use the same box and printing light for both negative and tinter unless some definite method be adopted of screening the light when exposing the tinter. The exposure would be so quick that a big margin of error is possible, and instead of obtaining a light

grey border we should get a border like a funeral card. In exposing borders as above for stock it is not advisable to do more than is likely to be required for three days' work, as I have found that with some papers the latent image deteriorates to such an extent as to almost disappear, especially in damp places or in damp weather. The exposures may have to be varied under special circumstances, such as printing the portrait part from a hard negative, which necessitates considerable over-exposure and arrested development to produce a soft harmonious result. This short development would naturally affect the border part and therefore the exposure through the tinter should be increased. The same remarks apply to prints made on development papers that give warm-blacks by over-exposing.

Printing the Portrait.

In printing the portrait part, the negative is placed film up on top of the mask opening and adjusted to suit the subject. There is very little to play with if the mask is only a quarter-of-an-inch smaller all round. For half-plate negatives I use a $5\frac{3}{4}$ x 4 opening. Some negatives have rather wide clear-glass rebates, and if this rebate comes within an eighth of an inch of the mask opening the light will creep under and cause a shadow line to appear on the border. The remedy is to block out the rebates with an opaque strip, or reduce the rebate ledge in the dark slide of the camera. Another way to avoid shadow lines is to permanently fix (by the top edge only) a thin opaque mask a trifle larger all round than the negative mask so that the negative can be slipped under this special mask to protect the clear-glass rebate.

Printing from Films.

If film negatives are used it is necessary to fix permanently a piece of clear glass to the mask. This glass should be at least half-an-inch larger all round than the mask opening, and must be fixed on top of the opening. The film negative is then placed on this glass and fastened temporarily with gummed strips at, say, two corners. The usual thickness of glass used for negatives is just sufficient to give that very necessary diffusion which the edges of the mask give by being in contact with the "glass" side of the negative.

Helps to Correct Registration.

The best type of border printer is that which has raised "feed" stops because the printing paper used may not be cut absolutely true, and correct registration can be obtained by making a point of *always* "feeding" the paper to one side and simply allowing the top to touch where it will. This must, of course, be done with both mask and tinter.

The pressure pad can be made from thick cardboard or three-ply wood covered with felt. When the printing paper is "fed" as described, the pressure pad can be slid on the back of the paper up to the feed-stops, and the grip given by the felt will be sufficient to ensure correct feed. Paper that is inclined to curl is difficult to handle, but a good pad with felt grip will help to prevent any bulging.

Printing Names or Titles.

The best place to fix a negative or positive of, say, the photographer's name is on the tinter part, as the exposure of this part is constant. If a facsimile of a signature is required it is an easy matter to first write the name in indian ink and then to copy it on a celluloid film. This can be fitted in the tinter part by cutting away some of the opaque paper outside the actual tint at a spot chosen and fastening the film negative to the opening with adhesive. It may be necessary to add one or two additional thicknesses of clear celluloid to the *back* of the little opening to ensure perfect contact.

R. R. Rawkins.

DESENSITISING WITH POTASSIUM IODIDE. FREUND'S METHOD.

Now that so much attention is being given to Lüppo Cramer's method of desensitising so as to allow of comfortable observation in a good light during development, it may be well to look back on an old, much neglected, and very much misunderstood or misrepresented method by which a similar end can be realised, but without the disturbing element of stains or dyes.

The method in question, that of Freund, merely requires a weak solution (1 in 25) of potassium iodide, in addition to the usual chemicals for development; and development can be carried out in a white light such as one has in an ordinary room; in fact, by such a light as will serve for reading a newspaper or book. The absence of obscuration by a dye is a distinct advantage when careful watching is desirable, as in making the triad of negatives for heliochromy.

Freund devised his process some fourteen years ago, and full working details are given in his German patent specification of 1908 (No. 213,775), but I have not traced any parallel British specification. The process consists in soaking the exposed plate for about two minutes in a 4 per cent. solution of potassium iodide, whereby the unexposed particles of silver bromide are superficially or partially transformed, or pseudomorphed into silver iodide; while the fully exposed particles appear to undergo little or no change. The plate so treated develops in the dark-room much or nearly as an ordinary plate would develop, or as if no bath of potassium iodide had been used, but there is this advantage: Once the developer is well over the plate the dish (not a glass-bottomed dish, unless protected) may be taken into moderately intense daylight, and the development can be minutely watched or carefully studied without fear of fogging. Bromide of potassium added to the developer acts as an accelerator, and tends to softness, and Freund mentions a developer for ordinary use which contains one-sixtieth of potassium bromide; but if the utmost acceleration with softness is required, the developer may be nearly saturated with potassium bromide, the extra dose being added towards the finish of the development.

All the above will be fully understood if it is remembered that silver iodide, whether exposed or unexposed, is almost unaffected by such weak alkaline developers as are used in ordinary photographic practice, while the developability of the latent image is scarcely or not affected by the potassium iodide, excepting so far as too prolonged treatment with the iodide or the use of an over-strong solution of the iodide may appreciably iodise and weaken the latent image.

While the iodide of potassium solution covers the exposed plate, light will obliterate or destroy the latent image: the action in this case being analogous to the essential feature of Bayard's pre-Daguerrean process, the chemistry of which process is very admirably illustrated and explained in lines 17 to 28 of col. 1, p. 158, of Volume IV, Watts's "Dictionary of Chemistry," new edition, 1888 to 1894. The article in which the above is contained is on photographic chemistry, and is by the late Professor Meldola. It is pointed out that in the system which consists of:—(1) Exposed gelatino-bromide film, (2) potassium iodide solution, the potassium iodide is the photolyte and the exposed film the sensitiser; so, the photolyte being uncoloured, it is by no means surprising to find that

the red light of the dark-room may have in this case a very considerable action, hence the potassium iodide should act in complete darkness—or in a remote corner of the dark-room. Another source of over-iodising and obliteration is the use of almost chemically pure iodide of potassium. The chemically pure iodide of potassium is so sensitive to the combined action of light and moisture that, as seen, sold and handled, it is invariably more or less brown from the presence of free iodine, and its solution in water often becomes very definitely brown. This solution will not only over-iodinate the plate as a whole, but will partly or entirely destroy the latent image. The remedy is to use the so-called medicinal potassium iodide, which contains free alkali and remains white, or to add an alkali to the pure iodide, as described in the practical section below.

Potassium Bromide as an Accelerator in the Developer.

If all conditions are satisfactorily realised, a state of things by no means difficult, a fully vigorous and well-gradated negative is obtained without the use of bromide in the developer, but if there is over-iodination a hard negative recalling the result of under-exposure is obtained. A partial remedy for this is to use potassium bromide very freely in the developer: the potassium bromide acting as an accelerator and producing the weak, thin and often fogged negatives which, in the case of ordinary work, result from excess of alkali in the developer, and the non-use of bromide.

Thus the effect of bromide is precisely the reverse of its effect in ordinary work, this being quite easy to understand when it is remembered that the function of the soluble bromide in Freund's process is to partly de-iodinate the plate by the "action of mass." In this reaction we have a specially interesting example of one of the many notable inter-actions of silver halides and alkali halides.

Early Misunderstandings as to the Freund Method

Most, and perhaps all, of the troubles incident to the early history of the Freund method are, I think, traceable to a misunderstanding of the function and effect of the soluble bromide in the developer.

Take, for instance, the account of the method which is to be found on p. 1427 of "Die Photographische Industrie" of October 20, 1909, an account which appears to be the source of inspiration of most of the notes and articles which have appeared in the English and French publications. To Herr Freund's statement that a very large dose of bromide in the developer acts as an accelerator, "Die Photographische Industrie" appends no word expressing doubt; but the course taken reminds one of the legendary Sacristan:—

"The Sacristan, he says no word that indicates a doubt,
But he puts his thumb unto his nose, and spreads his fingers out."

The "(? ?)" which follows Herr Freund's statement may be regarded as a journalistic or technical equivalent of the Sacristan's gesture.

No wonder, then, that on p. 13 of the 1912 edition of Cassell's "Cyclopædia of Photography," under the heading "Aktinal" (the iodide solution was sold under this name) is to be found a statement that the "developer is fully restrained with potassium bromide."

Important Researches by M. Coustet.

The one carefully studied and serviceable article on Freund's method which requires special notice is that by M. Coustet, and it is to be found on p. 197 of the "British Journal" of March 15, 1912; but M. Coustet's comments and experiments on the Freund method are rather likely to escape notice and indexing, as this matter is supplementary to an article on development in daylight after fixation.

M. Coustet carries the method several stages farther. He considers the possibility of operating by adding the soluble iodide to the developer (soda sulphite and diamidophenol) without the use of a soluble bromide, and although the indications appear against this course, the secondary outcomes are highly important. In this case the iodination does not travel through the film towards the glass side so fully as when the separate iodising solution is used, and M. Coustet was led to observation of the depth action, or extra density of image in the lower strata. Here we may have a gradual change towards the ordinary condition, and a region may exist where bromide in the developer may be much weakened in its accelerating action; or possibly in a thick stratum the turning point may be passed and the bromide may function slightly in the lower strata of a thick film, in its usual *rôle* of a restrainer.

To the experiments and comments of M. Coustet I owe suggestions which made the Freund method really satisfactory in my hands.

Practical Instructions for the Freund Method of Daylight Development.

The preceding matter should be read and understood, and thus the present section may be made concise in some parts.

Plates.—Gelatino-bromide, slow or rapid, colour sensitised or otherwise. Bromo-iodide plates are less suitable, but may be used if increased exposure is given, and a tendency to thin images is tolerated.

Exposure.—Usual or ordinary exposure for bromide plates. Bromo-iodide plates may require one and a-half to twice the usual exposure. If the iodising solution contains even a mere trace of free iodine, there will be partial destruction of the latent image: so, whatever the exposure, results will be unsatisfactory.

Iodising Solution.

White medicinal potassium iodide	1 oz.
Water	24 ozs.

Somewhat greater certainty is realised by using the "pure" potassium iodide of "analytical reagent" standard, but the free iodine must be neutralised (see above, under the heading "Important Researches by M. Coustet"), or if at any stage the potassium iodide solution shows the faintest trace of brown colour from the presence of free iodine, the following routine must be followed:—To the above 25-oz. batch add 5 grains of crystallised sodium carbonate, if the brown tint is so obvious as to be seen at a glance, or 2 grains if faint. The carbonate of soda acts slowly, and requires warmth, as by placing the bottle in a saucepan containing cold water, raising the temperature to near the boiling point, and allowing to cool. By repeated treatments, if necessary, and in this way every trace of brown colour must be eliminated, the bottle being placed on a sheet of white paper for observation, and it must be remembered that the action of light may renew the brown tint, but restoration in this case is by warmth alone.

Iodising the Exposed Plate.—Ordinarily two minutes in *complete darkness* or in a dark corner of dark-room. Longer for cold weather or hard coating, less for warm weather or soft coating. Rock dish whole time.

Signs of Over-Iodising.—Slow development, hard picture. Bromide required in developer as accelerator.

Signs of Under-Iodising.—Rapid development, soft picture, fogging in the weak daylight. Addition of iodising solution acts as a restrainer.

Washing after Iodising.

Three or four changes of water in dark-room. Avoid even red light during the washings, or until the developer covers the plate. Failure to wash, or a short washing, is equivalent to adding a restrainer.

Developer.

Purest (A. R. Standard) crystallised sodium sulphite	1 oz.
Crystallised sodium carbonate	1 oz.
Water	4½ ozs.

Crush the salts in a mortar, add the water, and grind till dissolved. Then add:—

Hydroquinone	45 grs.

Measures about 5½ ozs. Will keep good for years in full and well-closed bottles. Suited for most aspects of work. Seldom requires the addition of bromide. Dilution undesirable.

Development.—Not in the direct stream of light from a window. Glass dish to be preferred. In light tight case with lid. The crux of development is the condition of the deeper strata, so occasional glances are required by lifting out. The coated side should be turned towards the window during inspection. The iodising solution acts as a restrainer: one-twentieth the volume of the developer and over. Potassium bromide acts as accelerator: of a 10 per cent. solution add one-tenth or over. If practicable, it is better to avoid the use of potassium bromide. See mention under heading "Important Researches by M. Coustet."

Fixation.—After washing, a plain "hypo" bath, 1 to 4 of water, is used for fixation, and rather more time is required than in the case of plates containing no iodide. All the usual considerations apply. For example, fixation in the dark-room or in a subdued light, thorough fixation and, perhaps, second hypo bath after plate appears clear, testing the purity or efficiency of chemicals. The worker who is careful in these matters is likely, on the whole, to do better and more uniform work than one who is lax. Similarly, one who realises standard activity of solutions by using but once is likely to fare better than one who uses solutions many times; but it may be mentioned that the iodising solution may be used many times, and that the above-mentioned developing solution has a like quality in a very pronounced degree; but to realise the many merits of this developer the purer grade of sodium sulphite must be used.

Somewhere I seem to remember having seen a suggestion that potassium cyanide should be used for fixing in the Freund method, but I regard this as undesirable from several points of view, although there are exceptional cases in which cyanide fixing may perhaps be desirable for gelatine plates, as, for example, when a weakening of the fainter tones is desired.

Much more might be said about the Freund method, but it is hoped that enough has been said to call more general attention to it—a much neglected method—so that it may take its due place in photographic practice.

THOMAS BOLAS, F.C.S., F.I.C.

THE THEORY AND TECHNIQUE OF LIGHT-FILTERS.

[The following is an important paper on the principles of the action of light-filters and on the practice of their preparation and use. It is the work of a Russian physicist, M. G. V. Potapenko, and was first published in the Journal of the Russian Physical and Chemical Society (Chemical Section) 1916, vol. 48, p. 790. We owe the accessibility of the paper to Dr. C. E. K. Mees, by whom the translation from Russian has been made. Dr. Mees while rendering the text into English, does not thereby wish to imply his agreement with everything contained in it. He has refrained from exercising a translator's right of commentary except in one or two instances which particularly call for correction. The fact that he has made the translation and given us the opportunity of publishing it, may be taken as an indication that he regards the paper as a contribution to the literature of light-filters of exceptional value.—EDS. "B.J."]

(*Concluded from page* 524.)

For yellow compensating filters a most useful dye is rapid filter yellow, prepared by König[42] (Höchst Dye-Works), and the six filters given by him are included in the following table :—

No.	Dye Concentration.	Edge of Curve.	Filter factor.
1	.07H	415$\mu\mu$	1.5
2	.15H	425$\mu\mu$	1.8
3	.29H	435$\mu\mu$	2.0
4	.59H	450$\mu\mu$	3.0
5	1.18H	470$\mu\mu$	4.0
6	2.37H	490$\mu\mu$	6.0

In the last column of the table is given the factor of the filter, *i.e.*, the increase in the exposure required when the filter is used with plates sensitized with pinachrome, whose spectral curve is given in Fig. 9.

In Fig. 10 are shown diagrammatically the absorption curve given by these six filters, and it will be clear at once that none of them correspond exactly to the compensating filter required for correct translation of colour values in the making of the negative.

These filters, are, however, of considerable importance in landscape photography, since, thanks to their absorption of the violet light, they increase the constrast of the photograph, and the clearness of detail in the scene. In Grebe's classification they are placed in a separate group and called "contrast" filters, regardless of the fact that from the point of view of their absorption curves they belong to the group of compensating filters.

We have not yet considered the degree of precision which can be obtained in the production of a given absorption curve, or how far we can expect to repeat the preparation of a filter of a given constitution. This will depend both on the instability of the dyes and on the effect on their absorption curves of small amounts of impurities in the gelatine, and even on changes occurring as a result of keeping the dye solutions. In order to deal with these questions we must consider the technique of the preparation of filters.

The Preparation of Dyed Films.

Filters may be divided into those of gaseous, liquid or solid form. The first are very rarely used, having first been employed by Cornu, who used bromine vapour, which H. P. Peskoff recently utilised for the preparation of an ultra-violet filter.[43]

Liquid filters have been more widely used, thanks to their simplicity and to the variety of coloured solutions which are available.

Solid filters, as we have already said, for a long time were used only in the form of coloured glasses, and it is only recently that these have been replaced by thin films made from solutions of dyes in collodion, celluloid or gelatine. Such films are very cheap, convenient in use, and can be obtained more easily than the various forms of glass-walled cells required with coloured solutions, which must be made with extreme care if they are not to affect the optical definition. The most accurate and technically perfect appear to be films made of gelatine, the preparation of which we will now consider in detail.

In practice such films are most conveniently placed between two thin glass plates or collodion films, which will protect them from damp and injury.

Any transparent emulsion gelatine is suitable for making filters, but the hard gelatine which dries more quickly and gives a firmer film when set is easier to use, and is therefore to be recommended for initial trials; the softer varieties make it possible to obtain after some practice a more even coating and a clearer surface. A preliminary soaking of the gelatine in an alum solution hardens it and raises the melting point. Recently the firm of Meister, Lucius & Bruning have placed on the market special gelatine of great transparency for making filters.

The melting point of gelatine, as was shown by Dr. Lohse,[44] is not definite, and does not appear to be constant, but for 8 per cent. solutions it may be taken as from 30 deg. to 32 deg. C. With lower concentrations the melting point falls, and rises with greater concentrations.

Gelatine solutions set at temperatures below 30 deg., and the difference between the melting and setting points for most emulsion gelatines is 8-10 deg.

In making filters a weighed quantity of the gelatine is first solution of bromide instead of water. After washing, the gelatine

42. König, *Das Arbeiten mit färbenenff, Platten.* Berlin, 1909, p. 41.

43. H. P. Peekoff, J. Russ. Chem. Soc., 1915.

44. Lohse, Phot. Archiv., 1880, p. 50.

being continuously kneaded with the hands to ensure the removal of soluble salts. Henderson[45] recommends the use of a 1 per cent. solution of bromide instead of water. After washing, the gelatine is transferred to a weighed beaker, where the required amount of water is added. The temperature is raised to 30-35 deg., solution being aided by stirring with a glass rod.

Frequently the gelatine contains a small quantity of fat which produces on the surface of the filter small transparent spots like pinholes. The fat can be removed by keeping the gelatine solution in the liquid state for two or three hours without increasing the temperature. In this time the fat separates from the solution and appears on the surface in a large spot. A longer keeping of the warm gelatine cannot be recommended since otherwise it will set badly, an effect which Eder[46] ascribed to decomposition. Without shaking the solution it is allowed to set, and after warming the outside of the beaker the set mass is removed and the top and bottom layers to the thickness of 5 10 mm. are cut off with a horn knife.

The remainder of the gelatine will be perfectly transparent, and can be used for making filters. The gelatine must now be dissolved again, warming it to the former temperature, and it is then filtered through flannel or chamois leather just as thick liquids are filtered (i.e., by the aid of suction or a filter press).

König and Hübl[47] recommend the use of 5 per cent. solutions of gelatine, but it is much better to employ a somewhat greater concentration, about 8 per cent. This gives better results, since drying proceeds more quickly, but owing to its thickness it flows over the surface of the glass more slowly, so that its use requires some practice. Many authors advise the use of still stronger solutions containing 10—12 per cent., which set still more quickly, stating that when more liquid solutions are used there is sometimes a dulling of the surface, which is ascribed to the separation of grease from the solution.[48] If difficulties are met with as a result of using thick solutions, thinner ones should be substituted for them.

Sometimes it is advisable to add alcohol to the dye solutions, but only in small quantity, up to 5 per cent.; this improves the surface of the film, increasing its polish. The addition of the alcohol to the gelatine also assists in preserving it from decomposition, which affects setting, and also leads to curling and wrinkling of the film.

To prevent the film cracking, which occurs especially with high concentrations of dye, glycerine is sometimes added, which adds to the elasticity of the film and diminishes its contraction when coated on the glass. This contraction can easily be observed from the bending which it produces in the glass plates on drying.

The extent of the bending produced can be seen from the fact that an 8 per cent. gelatine solution coated on a glass of 1.12 mm. thickness to the extent of 7 c.c. per 100 square c.m. will produce a curve having a radius of from 14,889 to 19,471 mm.[49] The shrinkage also results sometimes in the cracking of the film. While making a filter from Crystal Violet in a concentration of 3.0 H. coated on a plate 40 by 60 cm and 1.0 mm. thick, the curvature was easily visible as a result of improper drying, and the surface of the film was covered by a network of cracks.

In such cases it is necessary to add to the gelatine about 3 per cent. of glycerine, but this diminishes the stability of the dyes, so that they are liable to fade rapidly and thus render the filter useless.[50]

The addition of acid or alcohol to the solution has sometimes a considerable influence on the dyes, changing the character of their absorption curves. This is often the cause of considerable difficulty in obtaining duplicate results. The gelatine solution prepared as above and carefully filtered is ready for use, and after the addition of the dyes we may proceed to the most difficult part of the work, the coating of the filters. Experience has shown that the best results are given by using 7 c.c. of gelatine solution to 100 cm. of filter surface.[51]. The thickness of the film obtained in this way will not exceed .04 mm. Before coating, two solutions must be prepared separately, the dye solution and the gelatine, which when mixed together will give the required concentration and colour. If the above-mentioned quantity of dyed gelatine is used for coating, each square metre will require 700 c.c., and consequently the following solutions may be used:—600 c.c. of 9 per cent. gelatine and 100 c.c. of dye solution, containing as many grams of dye as the required filter contains in Hübl units (grams per square metre). When the two solutions are mixed they will clearly correspond to about an 8 per cent. solution of gelatine. We may repeat that throughout the work the temperature of the gelatine must not exceed 35 deg. C.

Before coating, the glass must be carefully cleaned from dust and grease. The glass may be treated with boiling water, dilute nitric or sulphuric acid or spirit. We obtained the best results by cleaning the glass with a hot soda or borax solution, and then polishing with alcohol.

If the surface of the glass is not perfectly clean and grease spots remain on it, the film is uneven, this being particularly observable just after setting. The greatest number of failures are due to insufficient cleanliness of the surface, to which the greatest attention should be paid. The coating is carried out in two different ways, according to whether the film is to be stripped from the glass, or whether it is to remain on it. In the latter case the glass must be of very good quality, and should not be thicker than 1-½ mm., in order that its absorption for light should be as small as possible. If it is intended to strip the film from the glass its surface should first be coated with a 3 per cent. solution of collodion containing 1 per cent. of castor oil; this is then coated with the necessary quantity of dyed gelatine, and after drying it coated again with the collodion. The film is then cut through at the ends and lifted from the surface of the glass. Such a film, however, has not much strength, and owing to its thinness is easily torn. To obtain a stronger and thicker film the following procedure is used:—The collodion-coated glass is first coated with an undyed gelatine solution prepared as follows:—

200 c.c. of 12 per cent. gelatine solution warmed to 40 deg., to which is added

5 c.c. of acetic acid.
5 c.c. of glycerine.
70 c.c. of alcohol.

After drying, this is coated with collodion on which is again coated the dyed gelatines, and this is finally protected by another coating of collodion. Such a film will be strong and very flexible, while its thickness does not exceed .2 to .3 mm. The thick coloured films found in commerce are made in this way. A formula given by Fleck[52] is as follows:—

To a solution of

Alcohol	70 gms.
Ether	30 ,,
Collodion	4 ,,
Castor Oil	2 ,,

Add the required quantity of dye and coat in a thick layer (5 to 10 mm.) on a carefully levelled glass plate. The plate is placed in an electric oven and dried at a temperature of 50 deg.

To aid in stripping the films it is sometimes recommended that the glass should be prepared with talc or a solution of wax, but this often causes failures, as the gelatine coats badly on such a surface, and with small filters an even coating cannot be obtained, the centre being thicker than the edge.

The coating is done as follows:—The required amounts of gelatine and dye are mixed in the proportion of 1 : 6 and are warmed on a water-bath to a temperature of from 40 to 45 deg. A calibrated pipette is also warmed, this being used to measure out the required amount of solution. The solution is then flowed on to the middle of the glass, which has been levelled carefully and is spread over the surface. Two or three cm. above the glass is placed a cover to protect it from dust, this being preferably a second glass, though a piece of cardboard can be used. When the gelatine is set, the filter is placed on edge in a drying cupboard until completely dry.

The solution must not be heated above 45 deg., or the setting power of the gelatine may be affected. Insufficient heating also introduces difficulties, since the gelatine is difficult to coat, and is sometimes covered with characteristic damask-like markings. The room should be rather warm, about 20 deg. C. The glass must not be warmed, since this cannot be done evenly, and thus affects the cleanliness and evenness of the film. Failures are often caused also by shaking the glass in order to cause the solution to spread over the surface. If the solution spreads badly it may be ascribed to inferior gelatine, and the coating can be improved by the addition of a little acetic acid.[53] If, on the other hand, the gelatine

45. Henderson, Phot. News, 1885, p. 303. (This is probably a misunderstanding; Henderson was discussing the use of gelatine for making emulsions, not filters.—Translator.)
46. Eder, Handbuch der Phot., Vol. III., 1906, 37.
47. Hübl, *Die Phot. Lichtfilter*, 1910, p 63.
48. Cr. Phot. Rundschau, 1903, p. 235.
49. Calller, Rev. Sci. Phot., 1908, p. 310.
50. Hübl, *Die Phot. Lichtfilter*, p. 37, and Wien Mitt., 1909, p. 268.
51. Calller, l.c., p. 311; this is adopted also by Hübl, König, and others

52. Fleck, Phot. Chronik 1901 p. 366.
53. Eder, Phot. Corr., 1896, p. 483.

sets slowly and unevenly, it is often due to decomposition, since the gelatine solution must not be kept too long; it is also possible that too soft a gelatine has been used which could be improved by treatment with alum solution. Such in brief is the whole process for the making of light-filters. It will be seen that it is quite simple, and that with some practice failures should be rare.

There is another method which may be called "the bathing process." In this the glass is first coated with undyed gelatine forming a thin film over its surface. After this has been dried the glass is immersed in the dye solution, where the gelatine becomes coloured to the required degree and is then completely dried. In this process the colouring is often uneven,[54] and it is advantageous only because of the possibility of using ready-coated gelatine, such as a fixed out photographic plate of which the gelatine film can be used for dyeing.

Dyes for Light-Filters.

The selection of the dyes to be used in making light-filters is of the utmost importance. We have already seen that not all dyes can be used in dry films, since many of them crystallise out during the drying of the gelatine. In addition to the fact that many are unstable and fade rapidly, only a few have sharp enough absorption curves to give satisfactory filters. These considerations, as we have already said, led König[55] to select about 40 special dyes, of which 18 were investigated by Von Hübl, who measured their absorption curves with the utmost precision.[56] The most complete series of investigations of the absorption spectra of dyes is due to Formanek,[57] but his results can only be used as preliminary indications, since the absorption curves of dye solutions which were measured by Formanek rarely agree with their absorption in dry gelatine films.

The part played by gelatine has not yet been definitely settled, but its influence on the absorption curve of a dye may be considered to be demonstrated; this was confirmed by Monpillard[58] and Von Hübl[59], who ascribed it to the influence of sulphite present in the gelatine. The prolonged washing of the gelatine in clear water previously recommended was for the purpose of removing these salts. The reproducibility of our curves previously referred to may therefore now be considered as dependent on the purity of the gelatine and the accuracy with which its solution is made.

The general character of the absorption curve does not vary when different kinds of gelatine are used, but the numerical value of the co-efficients vary within a few per cent., and greater accuracy cannot be expected until the influence of the gelatine on dyes has been more completely investigated. In coating filters it will be observed that the colour of the dry film and of the undried gelatine after setting is never the same. It is possible to some degree to form an idea of the way in which the drying should affect the absorption curve changing its position in the spectrum to some extent; this effect is often called the shifting of the curves. More careful measurements show that the character of the curves is also not entirely unchanged, and that they are frequently deformed to a surprising extent, which suggests that processes of unknown nature take place during the drying of the film.

A question of some importance is the effect of the mixing of the dyes on their absorption curve; changes might arise from reactions between the materials, and it might be expected that the absorption co-efficient of the mixture would be a complex function of the co-efficients for the separate dyes. For solutions of dyes, a case has been given by Plotnikoff.[60]

In the simplest case the dyes are indifferent to one another, and equation (5) can therefore be written in the following form for a mixture of dyes in a dry form:—

$$I = I_0\, 10^{-(c_1 c_1 + c_2 c_2 + c_3 c_3 + \ldots\ldots)}.$$

In his investigations Hübl[61] did not notice any departure from the law expressed in this formula, and accepted it without qualification. From our own measurements the formula is also satisfactory within the limits of accuracy discussed previously, but the measurements made on coloured films on the dry film up to the present time are so limited that a definite decision on the question must be left to the future.

54. Cf. Phot. Rund., 1903, p. 237.
55. König, *Das Arbeiten mit Farbenempfindlichen Platten*, 1909, p. 5.
56. Hübl, *Die Phot. Lichtf.*, p. 29.
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58. Monpillard, l.c.
59. Hübl, Phot. Rund., 1912, p. 9.
60. E. C. Plotnikoff, *Photochemical Investigations*, Moscow, 1912, p. 100.
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In conclusion, I add a list of the publications dealing with the making and testing of light-filters which will be of value in this connection.

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G. V. POTAPENKO.

THE AIRSHIP DISASTER AT HULL.

MR. T. C. TURNER, of Regent House, Anlaby Road, Hull, kindly sends us the following vivid description of the disaster to the R38 dirigible, of which he was an eye-witness. It will be seen from his account he was the first photographer to reach the wreck of the rear part of the airship on the water, his exposures being made at close quarters some time before those of any other photographer's. Moreover, his account is of great interest, since it corrects some of the imaginative "descriptions" of the disaster which have appeared in the newspapers. Mr. Turner's notes should have appeared in our last issue, and were despatched from Hull in time for inclusion in our issue of last week. Unfortunately, through a delay in postal transmission, which appears to be a fairly common feature of the present high-priced postal facilities, it failed to reach us until seven or eight hours after going to press.—EDS., "B.J.")

The studio was about to be closed when I heard the loud roar of an airship approaching from the north. For the moment I did not hurry to go down into the open, and, as projecting walls shut out my view to the north-west and north-east, I could only obtain a limited view of the sky due north. But as the airship seemed to be quickly getting overhead I hurried down to the front of Regent House, which faces due south and the Humber.

I was just in time to have a magnificent view of the immense vessel sailing due south-east after having just passed, presumably, over my house in a sharp curve from the north-east, as I noted the people outside were pointing upward in that direction. She was, apparently about 1,200 or 1,500 ft. up, and was moving fast. The weather was fine, and sunshine bathed everything around in glorious light; only in the upper strata was there fine mist in patches. The airship at moments passed through these patches of mist, but they were not sufficiently dense to obscure the view of it, only thick enough to make the chances of a perfect negative a little doubtful.

From the moment she passed over the house to the final catastrophe seemed to be but a minute or slightly more. As I look into the sky opposite, I still shiver with the horror of what happened. The glorious vision of beauty and movement suddenly and quite noiselessly parted well behind the middle, and to my amazement I saw the front portion for some seconds continue its course, while the rudder end followed more slowly, and, inflated, I suppose, by the draught, began to descend, but quite in its ordinary shape like a long cup with its open mouth towards the Humber. It was an amazing sight to see the two portions of the gigantic vessel separately moving in the sky and both descending. It occurred to me that if they were far enough to the south they might both safely reach the water. Suddenly, however, the front portion took a severe angle, and then commenced a terrific nose dive. With increasing speed and an awful twisting movement, she disappeared from my sight behind the houses which stand between my place and the Humber, which is from a quarter to half a mile away.

Four seconds elapsed, and then two frightful bursting reports shook the city. I just had time to jump away from a huge sheet of glass next door which shivered and fell to atoms. It was as if the gas, liberated on reaching the ground or water, had mixed with air and exploded, for it was very different from the more localised shock of bombs in the days when we were too horribly familiar with enemy airships, and would have rejoiced to see such a catastrophe.

Frightfully excited, I picked up my focal-plane camera, which ever since the days of the war I have always kept loaded ready for emergencies, and rushed with one of my sons to the river front. All Hull seemed to be rushing with us. Arrived at the front, near the Victoria Pier, the surface of the water was seen to be covered with burning pieces of the covering. I suppose the cellulose dope made it blaze with so much smoke, and the tide (it was almost dead low water) was carrying the burning material slowly up the river.

Right opposite was the rudder-end section, which I had seen detach itself from the airship and fall slowly and almost straight down. It was on the "Middle" sand, which lies some distance out in the river opposite the pier (and at that state of the tide might have only a foot or two of water over it). This part was *not* in flames, but nothing of the front portion, which exploded, remained above water except a few blazing and smoking pieces, which the water quickly extinguished.

You may guess what I think of such utterly misleading accounts as the following, which appeared the next evening in the London Press with absurd sketches:—

"It was like some huge elongated eggshell, cracked over a basin, and each end turned up for the yolk to fall out."

And another:—

"He said (the worthy "eye-witness" who gave the account to the Press) he was haunted all the way by the fear of the wrecked and blazing airship falling on to the people of Hull."

But the airship was never on fire over Hull, and the large piece of the rudder end, which had had no fire in it at all, broke up as the tide rose into fantastic shapes and presented the extraordinary appearance which pressmen arriving an hour later managed to record.

The first photograph undoubtedly showed smoke on the river, and was taken with a small camera from the shore, but at the moment I saw no interest in mere columns and patches of smoke, but rushed on to the pier to get on to the river for a close view.

A tug was just bringing in, I think, Capt. Wann, one of the survivors, and Neville (my son) and I just managed to jump from a slippery pier to its deck before it was away again. Owing to the extreme shallowness of the water on the sandbank, no tugs had been able to get close to the wreck, the rescue work being carried out by rowing boats. But by using the long boat hooks as sounders, we managed to find places where the water was deep enough for our tug to bring us into good positions for the camera. These views are the earliest taken from the Humber itself, and, looking towards Hull, have the advantage of making a record of the portion of the wreck against the outline of the city in the distance. Looking seaward, or towards the low Lincolnshire shore on the south, the historical value would have been much less. About an hour later our vessel returned to the pier and took off several other men with cameras, and they arrived on the scene when the wreck had broken up a great deal by the action of the tide, and had become perhaps a good deal more picturesque, although not appearing as it did when it first reached the water.

On reaching home I set to work enlarging the negatives to 12 x 10 for transmission to London by an early train the following morning. Some of the photographs have already appeared in leading newspapers without any acknowledgment of the photographs underneath, although the prints sent to an agency had the name, address and the word "copyright" carefully stamped on the back.

This is, of course, the chief return a professional photographer expects; the fees paid him by the Press are almost beneath contempt in many cases. I hope in the near future to initiate a discussion at our P.P.A. Council meeting on methods of preventing injustice of this sort.

TEACHING LANGUAGES BY PHOTOGRAPHS.—A Chicago contemporary tells of a plan worked out by a professor in the University of Oregon and used in the Spanish correspondence courses of that institution. Students had their greatest difficulty with pronunciation, until this teacher, recognising that the lips are used more than in speaking English, devised photographic aids. A series of 19 pictures are sent out with the lessons on pronunciation. These pictures show the position of the mouth in pronouncing all the difficult vowels, diphthongs, and triphthongs. The idea is that if the mouth is formed to the correct shape the issuing sound will be right. With the picture in front of him the student can practice the sound until he gets it

R.P.S. EXHIBITION LECTURES.

The following lantern lectures will be delivered during the forthcoming Annual Exhibition of the Royal Photographic Society, which will be open from Monday, September 19, to Saturday, October 29 :—

Tuesday, September 20.—Lantern Lecture : "London's Historic Mile," A. H. Blake, M.A.

Friday, September 23.—"Picturesque Cities of France," James Shaw, F.R.P.S.

Tuesday, September 27.—"Further Adventures among the Tree tops." Capt. C. W. R. Knight, M.C., F.R.P.S.

Friday, September 30.—"Wonderlands of the Western World," J. Dudley Johnston.

Tuesday, October 4.—"The Making of Portraits." C. P. Crowther, F.R.P.S.

Friday, October 7.—"Chartres Cathedral," E. W. Harvey Piper, Hon. A.R.I.B.A.

Tuesday, October 11.—The Twenty-fourth Annual Traill-Taylor Memorial Lecture : "Aerial Photography and Phototopography," Monsieur L. P. Clerc.

Friday, October 14.—"A Loon in London," W. L. F. Wastell, F.R.P.S.

Tuesday, October 18.—"Some Savoy Tributaries of the Rhone," E. W. Mellor, J.P., F.R.G.S., F.R.P.S.

Friday, October 21.—"Geological Rambles with a Camera," F. Martin-Duncan, F.R.M.S., F.Z.S., F.R.P.S.,

Friday, October 28.—"Durham Cathedral." H. W. Bennett, F.R.P.S.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

DEFEATING PIRATE PHOTOGRAPHERS.—During the staging of thrilling scenes for cinematographic purposes, many of the film producing firms in America have been greatly annoyed by amateur and Press photographers making exposures on arranged scenes, such as railway accidents, aeroplane stunts, etc. After spending £5,000 on staging and taking one scene, the officials of one cinematograph firm detected six pirate photographers at work upon it, and having many more thrilling scenes to arrange set to work to discover a method of preventing their open-air scenes being pictured by other photographers, particularly pirate cinema cameras After much thought and many experiments we are told that the reflection-mirror method was decided upon. When the next big scene was ready the producer detected several pirate cameras upon roofs and in windows, but this time (saye "Popular Mechanics") he was prepared for them. As many of his assistants as there were pirate camcras were on the scene with small hand mirrors The pirate camera men were not requested to leave, and no attention whatever was paid to them. When the scene was ready for taking, however, the men with the mirrors were ready. As the director called for his operator to begin filming, the men with the mirrors directed beams of reflected sunlight directly into the lenses of the pirate cameras. The reflected light in their lenses precluded the possibility of their taking the picture. Several of the pirate camera men went on photographing before they discovered the beam of reflected light in their lenses, but many observed the mirrors and beams of reflected light and simply picked up their cameras and tripods and marched away knowing that they were outwitted.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, August 22 to 27 :—

PHOTO-STENCILS.—No. 22.228. Photographic methods of producing stencils. M. J. D. Carter.

LENSES.—No. 22.231. Photographic objectives. C. C. Minor and H. A. de Vry.

CINEMATOGRAPHY.—N. 22.313. Cinematograph screens. W. Parker.

CONCEALMENT DEVICE.—No. 22,409. Device for concealing advertisements, photographs, etc. A. F. L. Smith and W. E. Tucker.

CINEMATOGRAPHY.—No. 22.527. Cinematograph screens. F. D. Sunderland.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

COLOUR CINEMATOGRAPHY.—No. 166,344. (April 13, 1920.) The invention provides an apparatus with which two or three separate negatives for cinematography in colours may be taken by the additive method of colour-photography in such a manner that the pictures joining each other are placed one above the other on a continuous film, but so that the pictures, generally speaking, are placed on a shorter length than represented in the distances from one optical lens-centre to the lens-centre of the next lens in the lens batteries of the lenses employed, the direct light-cones forming the pictures being deflected. By reversing the light-action the same apparatus may be used to project the positive pictures in such a manner that the pictures are united into one picture of colours. To achieve this object two or three lenses are used and the two outside light-cones formed by such lenses are deflected by means of inserted wedge-shaped prisms.

In the drawings fig. 1 may be taken as the embodiment in a general way of this invention, and in which O^1, O^2, and O^3, are the three paired lenses which for taking pictures are generally

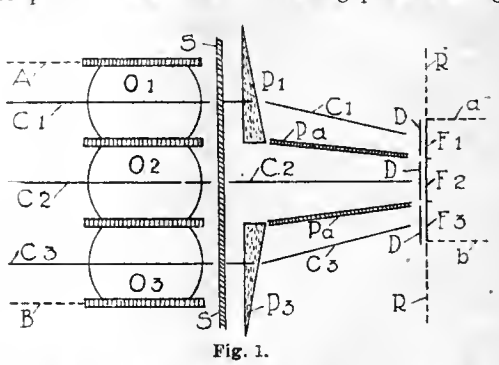

Fig. 1.

adjusted and then fixed together as a battery making one body and as a battery are movable for focussing purposes. This body of lenses project the pictures forming light-cones, C^1, C^2, and C^3, are the central light-rays in the respective projections, and such central rays passing through the combination arrive at their focussing planes F^1, F^2, and F^3, which in extent occupy the space *a—b*. This space is, in the drawing, given as half the length of A—B, the combined diameters of the lenses, but it is obvious that the space of the combined diameters of the lenses can be made to have other proportions as compared with the combined space of the focussing planes, *a—b*, and the deflection by the prisms has to be calculated to suit the respective case.

S, represents the revolving shutter, which could also be placed on the other side of the lenses. D, are the colour filters required by the additive method of colour photography. They could also be placed anywhere in the light-path if more convenient. P^1, and P^3, are the two wedge-shaped prisms of which the deflecting power is calculated so that the light-cone is deflected inwards

towards the central picture for just the amount required. Ps, stands for the partitions which are necessary to keep the different light-cones in their limited picture-plane and space. R, is the continuous film of the ordinary or desired picture width on which the picture series are impinged when taking the negatives.

For correcting or compensating purposes in the central light-path, C', a parallel, cylindrical, or lenticular plate or lens or block is inserted.

When reversing the light-action, the positives obtained from the negatives are placed in the same order in the apparatus, but if the apparatus remained as described above, the pictures would not unite into one colour-picture, since the central light rays

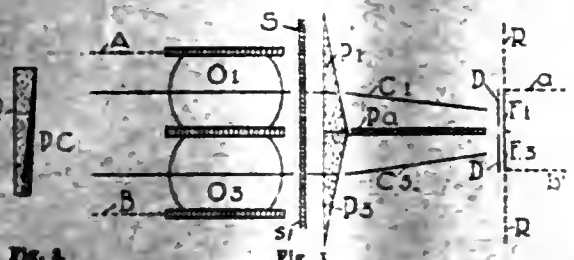

Fig. 3.

Fig. 3.

C', C', C', passing through the lenses are parallel. To arrive at that end several means of effecting this super-position may be used, *e.g.*, wedge-prisms with stronger deflecting power, or adjustment of the relative positions of the prisms, the lenses and the focussing planes by moving either the prisms or the lenses or both; or another prism may be placed in front of each of the outside lenses. Wedge-lenses, also called stereoscopic prism lenses could be used in place of the wedge-prisms, and would act similarly to the wedge-prisms and would be of special advantage in the apparatus when short distance projections are necessary.

An ordinary wedge-prism does not only deflect the light-cone, but if the wedge is of rather an obtuse formation, prismatic light-separation in the form of spectroscopic colour-fringes will be introduced and the more acute the wedge-prism used, the less will be seen of this light-separation, and the sharper will be the passed picture. Acute angled prisms are used in this apparatus, so the above named defect does not amount to anything destructive, but the defect can be corrected by compensation by cementing two smaller wedges of different glass together, as shown in fig. 3. PC, the compensation to P, the ordinary wedge-prism.

If a shutter of the generally known form (fig. 4) is used when exposures are made by means of a battery of lenses, such exposure is not alike in time through the different lenses and the correction is to provide the shutter with a different opening. The opening

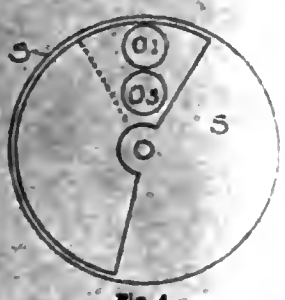

Fig. 4.

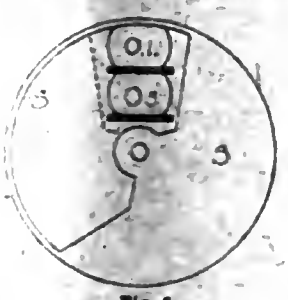

Fig. 5.

should be cut eccentrically, similar as shown in fig. 5; other eccentrically cut openings are naturally also possible. A good plan is to work a separate shutter for each lens or two shutters over three lenses, as the case may be.

While fig. 1 shows the embodiment of the apparatus, it is not necessary to employ the three light-cones; any two of the three light-paths can be used to form an apparatus taking a series of two pictures only. In that case one light-cone can be dispensed with altogether and as an instrument on that basis can be made, it has been thought advisable to give a separate illustration of a two light-paths apparatus in fig. 2, further description of which is, however, not necessary as the reference numbers and the letters employed therein, as well as in fig. 4, and fig. 5, are the same and refer to the corresponding parts as in fig. 1.—Otto Pfenninger, 44, Hitherfield Road, Streatham, London, and William Agate, 12, Liverpool Terrace, Worthing.

Aerial Photography.—No. 134,853 (August 24, 1915). The invention is an improvement on that of Eng. Pat. No. 134,851 ("B.J," March 25, 1921, p. 175). Instead of first taking a positive strip from the exposed film and cutting this strip into individual picture sections as previously, the exposed film itself is first cut into picture sections which are mutually superposed at their edges so as to eliminate repetition of similar portions of the picture appearing on adjoining sections. One of the

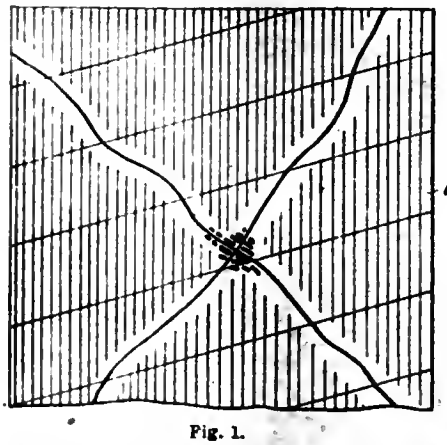

Fig. 1. Fig. 2.

overlapping edges of each section is then cut off, so that when the sections are again mutually arranged they will comprise a complete panoramic picture and present a flat surface. The complete negative thus produced is then preferably secured to a glass plate to facilitate production of positive copies.

Figs. 1 and 2 are respectively front elevation and transverse section illustrating a positive copy produced according to the present method.—Oskar Eduard Meester, 110-111, Leipzigerstrasse, Berlin, W.8.

Aerial Photography.—No. 134,854 (January 27, 1916). The invention is a modification of that in Eng. Pat. No. 134,851 ("B.J.," March 25, 1921, p. 176). A film band moved transversely to the direction of flight as previously is not used, but, instead, one which is moved in the direction of flight and is of such width that again dimensions of the resulting picture are, transversely to the direction of flight, a multiple of the dimensions in the direction of flight.

The apparatus employed for taking the exposures according to the present method will be substantially the same as that illustrated and described in the principal classification above cited.—Oskar Eduard Messter, 110-111, Leipzigerstrasse, Berlin, W.8.

The following complete specifications are open to public inspection, before acceptance:—

Colour Photography.—No. 168,035. Colour photography and cinematography. E. Wolff.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Wellington Speedy (Design).—No. 412,402. Photographic dry plates. Wellington and Ward, The Elms, Shenley Road, Boreham Wood, Elstree, Hertfordshire, manufacturers. February 18, 1921.

Dupli-Tized.—No. 416,805. Photographic film. Kodak, Ltd., Kodak House, Kingsway, London, W.C.2, dealers in photographic materials. July 9, 1921.

Novabrom.—No. 416,635. Photographic printing paper and post-cards. Photo-Produits Gevaert (Société Anonyme), 23, Sapte Straat, Vieux-Dieux, Belgium, manufacturers of photographic materials. July 4, 1921.

Messrs. J. Lancaster & Son, 87, Parade, Birmingham, send us a prospectus of their condenser-enlarger, issued in five sizes and three patterns at approximately pre-war prices.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

TUESDAY, SEPTEMBER 13.

Hackney Phot. Soc. "Kent, the Garden of England." A. Hester.
Manchester Amateur P.S. "Prints and Slides." H. B. Bradley.
Scottish C.W.S.C.C. (Glasgow). Enlarging and Combination Printing.

THURSDAY, SEPTEMBER 15.

Hammersmith Hampshire House P.S. "Home Portraiture." R. Chalmers.
Kinning Park Co.-op. Soc. Open Night.
North Middlesex P.S. "The A.B.C. of Enlarging." W. Mitchell Bond.

SATURDAY, SEPTEMBER 17.

Kinning Park Co-op. Soc. Outing to Bardowie Loch.
Scottish C.W.S.C.C. (Glasgow). Outing to Fereneze Braes.

CROYDON CAMERA CLUB.

Mr. F. C. Reynolds gave a highly entertaining chat on the tiny Principality of Monaco, with particular reference to the Casino and the various ways of losing, and occasionally winning money there, systematically and otherwise. He had been much struck with the church-like atmosphere prevailing, and so intense is the decorum that if cash or anything else is dropped, the correct thing is to call for an attendant, who worms under the table and restores it with expectant-tip expression. He, the lecturer, somewhat ambiguously said, had experienced this on one occasion.

At the end of his remarks an equipment for roulette was produced complete even to the rakes, and paper bags containing an equal number of haricot beans were distributed. This immediately converted the club rooms into a vegetarian gambling hell of the worst description. The "office boy" having inadvertently dropped some haricots called in vain for an attendant, and diving for their restoration found on return that Mr. Harpur had appropriated his stake. In attempting to eject him from the Casino the injured one succeeded in smashing his pipe. Mr. Witterick, plunging heavily on the lucky number 13, at one swoop amassed a highly nutritious, if somewhat indigestible, fortune. The other side of the picture was presented by Mr. Taylor who, early in the evening, lost his last haricot, and with ashen countenance left the table. A loud report followed as the *coup de grâce* was administered to an air-distended paper bag.

Commercial & Legal Intelligence.

NEW COMPANIES.

A. E. ASHBY, LTD.—This private company was registered on August 30, with a capital of £500, in £1 shares. Objects: To carry on the business of dealers in photographic supplies, etc. The first directors are: A. E. Ashby, 105, Woodhouse Street, Leeds; Alice Ashby, 105, Woodhouse Street, Leeds. Qualification: 1 share. Registered office: 105, Woodhouse Street, Leeds.

IMPROVED GLASS FOR DAYLIGHT LIGHTING.—Knowing the importance of greater conservation of daylight, research work of a leading American wire glass manufacturer has been directed towards the production of glass with high diffusing power. The American scientific Press states that it has been the aim of this manufacturer to provide a glass that would "handle" daylight to the best advantage, and that the glass is particularly suitable for roofs of workshops and studios. The result is in the form of a new wire glass, every square inch of which has 900 prisms that appear like tiny corrugations. Their shape and size have been scientifically determined to promote diffusion. The United States Government used over 100,000 square feet of this new glass for a single building, and the new glass is attracting much attention wherever it is being introduced.

News and Notes.

CANINE PHOTOGRAPHS.—The 5-guinea prize for the best dog-photograph (offered by the National Canine Defence League) has been equally divided between Miss Eleanor Warren, 105, Queen's Road, Loughborough, and Mr. A. Atkinson, 1, Wilton House, Alum Chine Road, Bournemouth, W. Fourteen others were highly commended.

THE STAFF OF MESSRS. LAFAYETTE, LTD., to the number of 46, had their annual outing at Westcliff, last week, when an enjoyable day was spent in games, swimming, motor-boat trips, and dancing. Votes of thanks to Miss White and Mr. D. M. Lundie and toasts to the success of Messrs. Lafayette brought a most successful excursion to an end.

LIFE LOST FOR A CAMERA.—Last week's newspapers told of a fatal accident at St. Malo, the victim being a Miss K. Emery, of Surbiton, Surrey. The lady was going by tram to St. Malo from Parame, when she dropped her camera, and jumped from the moving tram to recover it. Losing her balance, she slipped and fell under the following car. First aid was immediately forthcoming, but the victim died before reaching hospital.

HAMMERSMITH PHOTOGRAPHIC SOCIETY.—Our energetic friends at Hampshire House, Hog Lane, Hammersmith, have just issued the programme of lectures and papers for the session from September 8 to May 11. The fixtures cover a great diversity of subjects, and the programme includes a long list of well-known lecturers on photographic topics. Those in the west-end of London are well catered for by this society, the secretary of which is Mr. J. W. Carruthers, 18, Greenhill Road, Harrow.

THE AUTOTYPE CO., 74, New Oxford Street, London, W.C., have just issued their new trade price list for carbon and bromide enlargements, miniatures on ivory and ivorine, ceramic enamels, and other branches of service for professional photographers, including presentation oil portraits. Their department for printing and enlarging in bromide has recently been extended, and is now equipped in a most up-to-date manner, permitting of high-class work being turned out in the shortest time. The Autotype Company will be pleased to send a copy of this list to any professional photographer.

UNDER-STAMPED LETTERS.—An unusually large number of insufficiently stamped letters are now being sent through the post, especially to places abroad. A special notice has been sent out by the Postmaster-General reminding commercial establishments and others that the prepaid rate of postage on letters for all foreign countries (except the United States and Tangier) is 3d. for the first ounce and 1½d. for each succeeding ounce or fraction of an ounce. From the United Kingdom to British possessions generally, the United States, Tangier, and H.M. ships and troops on foreign stations, the letter rate is 2d. for the first ounce and 1½d. for each succeeding ounce or fraction of an ounce.

EDWARD FITZGERALD ON PORTRAITS.—Admirers of the Rubáiyát of Omar Khayyám" will no doubt be interested to know Fitzgerald's ideas on portraiture. In one of his letters (to W. H. Thompson) appears the following: "I am all for a little Flattery in Portraits; that is, so far as I think the Painter or Sculptor should try at something more agreeable than anything he sees sitting to him. When people look either bored, or smirking, he should give the best possible Aspect which the Features before him *might* wear, even if the Artist had not seen that Aspect. Especially when he works for Friends or Kinsfolk; for even the plainest face has looked handsome to them at some happy moment, and just such we like to have perpetuated." It is interesting to recall the fact (writes a correspondent) that in the well-known photographic portrait of Fitzgerald (taken at Ipswich) the subject is not by any means looking comfortable or pleasant.

CELLULOID FIRE DANGER.—The Home Secretary proposes to make regulations under the provisions of the Factory and Workshop Act, 1901, relating to dangerous and unhealthy industries, dealing with places in which celluloid, or any article wholly or partly made of celluloid, is manufactured, manipulated, or stored. The draft regulations, to which objections may be submitted before

September 20, provide, *inter alia*:—Stocks of celluloid shall be kept in a suitable place, outside the workrooms, plainly marked "celluloid store." Stocks exceeding one hundredweight shall only be kept in a chamber constructed of fire-resisting materials, in which no open light or fire shall be allowed, and which shall not be used for any purpose other than the storage of celluloid. The store shall not be situated so as to endanger the means of escape from the factory or workshop or from any part thereof in the event of a fire occurring in the store. The amount of celluloid in a workroom at any one time shall be kept as small as is practicable without unduly interfering with the work carried on. In the case of cinematograph film the amount in a workroom at any one time shall not exceed the supply immediately required for the work in hand. Cinematograph films, except while necessarily exposed for manufacture, shall be kept outside the workrooms in suitable receptacles provided with covers. Efficient steps shall be taken to prevent celluloid from coming into contact with open lights or fires, or, except to the extent that may be necessary for the processes of the industry, remaining near thereto. No open lights or fires shall be allowed in a room in which cinematograph film is manufactured or repaired. Adequate means for extinguishing fire, having regard to the amount of celluloid present in the room at any one time, shall be kept constantly provided for each workroom and storeroom. Adequate means of escape in case of fire shall be provided. Persons working in a "dark-room" shall be instructed as to the means of escape from such room.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

THOSE LOCAL VIEWS! A SUGGESTION.

To the Editors.

Gentlemen,—To my mind, there is one section of the local view business that seems to be neglected, and as there is some depression in trade, doubtless there are many photographers doing a little local view-publishing as a side-line. I refer to interior subjects. Look in the stationers' shops, you will find the park, the town hall, the main streets, and the local public buildings will be shown taken from all aspects, but rarely will you see an interior of the smaller schools and churches. This fact was brought to mind by an experience of my own. I recently made two views of a small Sunday school, an outside view and the interior, and although there are scores of postcards of our town, so far as I can gather these are the only two views that have ever been taken of this place. I first showed them to one of the officials of the place; he sold a gross of postcards on the spot the same day, and they are still going strong. After this experience I made up my mind not to neglect any subject, because however small it may appear, there are usually sufficient people interested in it to make the job worth while. Look at the public school. You may see a picture of the scholars, of different classes, but rarely a view of the old schoolroom itself; and those of us whose school-days are now in the long past would rather like a picture of the old room with the schoolmaster's desk, even if it brought back painful memories. Having got the negatives, there is no need to send them away to be printed unless one so wishes; they may be done at home with the strip printer, and there are few of us who do not use one nowadays. You can do a good number on a quiet half-day, and there is no difficulty about the work. The views may be taken at dinner time when the scholars are away, or on Saturday when there is a holiday.

Do a few samples, both black and white and sepia, and take them to the stationers' shops, not forgetting the one nearest to the place taken, as then they are sure to be seen by the scholars. If you feel you have got something a bit exclusive, make a small enlargement; it will draw attention to the smaller pictures, and the shop-keeper will only be too pleased to exhibit it for a time as an attraction to his window. To conclude, make a good job of it, put your name on each card, and I think you will find this branch of photography quite worth while, whether in postcards or larger sizes.—Yours faithfully, H. CLEWES.

80, Cherrytree Lane, Stockport.
August 26.

SYSTEMATIC BROMIDE PRINTING.

To the Editors.

Gentlemen,—The articles by Dr. Glover on bromide printing are extremely interesting and valuable, but I am afraid the average bromide printer will not pay much attention to them; he prefers his own rule of thumb method. I must confess he generally gets very good results, but he would probably do better if he would adopt some system of timing development, as well as exposure. In conversation with Mr. Watkins, a good many years ago, he said that he found that his factorial system was excellent for bromide printing, but I did not try it for a long time after. I did not find the complete factorial system answer for regular professional work, but developing for a stated time proved of great service, especially for prints to be toned. We found that as a general rule whatever the exposure might be no print would tone well, or even become a good black print, that was developed for less than three minutes. There were exceptions, however. I had a few extremely hard negatives of pictures to be printed, 12 x 10 size, and I failed to get satisfactory prints with metol or amidol. I tried exposures that ran into minutes, but could not get a decent print. At last I tried amidol made decidedly alkaline with sodium carbonate, with greatly reduced exposure; after a good many experiments I got quite good prints by giving an exposure of thirty seconds and a development of about sixty seconds. Of course, this meant developing one print at a time, but at any rate I got the prints done, and quite good ones too. But I should not recommend such a method for regular work. It was to suit an exceptional case. Out of curiosity I toned one of the prints and was surprised that it came quite a good colour. I expected it would be very yellow. But amidol gives a colder colour than metol and hydroquinone, and requires a shorter exposure, and this, I think, accounts for the cooler colour. If Dr. Glover would follow up the experiments he records in Table II. by toning the prints he would add to the debt we owe him already. I have always argued that the colour of a toned print depends upon exposure; a short exposure and prolonged development giving a cool colour, and long exposure and short development a warmer colour. But I would like to have this confirmed by a trained investigator, for the professional photographer has neither the time nor the knowledge to make exact scientific experiments. But I am quite sure from my own experience that it is a good plan to adopt a standard period for the total time of development; as I have already said, three minutes proved to be the minimum.

When a large number of prints have to be developed it is difficult to note the time of appearance and the total time of development, but this is quite simple when making the trial print, and to adjust the exposure to give a development time of three minutes. I prefer, if possible, to modify the light to suit the negative, so that an exposure of not less than five seconds may be given; if a printing box is used sheets of waxed paper may be added for a thin negative and taken out for a dense one, and if an ordinary printing frame is used the distance from the light may be varied until five seconds becomes the correct exposure. I prefer this, as it is difficult to give exact exposures of less than five seconds, even when using a special dark room clock. It is useless to expect a series of bromide prints to be uniform, either in depth or colour, unless identical exposure and development have been given. Some assistants will try to save the trouble of using a clock and count the time of the exposures. If I find this going on I stop it at once, as no two people count at the same speed, and probably no one counts at the same speed for every exposure, so that it becomes almost impossible to get a dozen prints all alike to complete an order. Assistants vary so much in this matter, especially when young beginners. For instance, one boy would be given a dozen negatives to make a print from each, and he would do what

I could not do myself; he would get a good print from each negative straight away, almost without a failure. But if he were told to get a dozen good prints from one negative he could not do it. No two would be alike. Another boy would be quite unable to get a decent print "on his own" from any of a number of negatives, but show him the exact exposure and depth to develop for a certain negative, and he would make any number of prints all alike. A system such as Dr. Glover recommends would make good printers of both those boys if they would follow it carefully.

But I can see difficulties in following out this system when a large number of prints have to be made from one negative, because they cannot be developed one at a time; probably a dozen prints will he in a developer at one time in different stages of development. My own method is to make my trials until I get a correct print when viewed by daylight, if possible with five seconds exposure and three minutes development, perhaps sometimes three-and-half or even four minutes. Then expose as many as may be required and proceed to develop, but, of course, in developer of the same constitution as the trial. One print is slipped face up into the solution and the time noted, a second print is then slipped under the first and brought to the top, and then the first is brought to the top and a third slipped under the second, and so on until about six prints are in the solution. The prints are kept face up and constantly moved, bringing the bottom print to the top. The first print will be easily detected as it is the darkest, and when I am printing I always put not only the number of the negative, but also the consecutive number of print exposed; they are kept face down until developed and slipped into the developer in order, so that the first print to go in bears the highest number. By this means it is always possible to know which print has been in the longest. At the end of three minutes the first print should be ready to take out. A fresh exposed paper is then slipped under the bottom print and brought up to the top as before. All the prints are moved in the same way until the fresh print is again at the bottom, and another fresh print slipped under at the bottom. By this means the prints are kept in consecutive order, and by bringing the bottom print to the top one sees the prints in order, graduated from the least developed to the one that is almost finished. Of course, by this method the time of development of the second and subsequent prints cannot be ascertained, but the eye should be able to judge by appearance after having had the first print as a guide. I do not see how the time of development of each print can be counted when a number are developed at once. I think the advantage of this method is that the eye is led by degrees from the least developed, and one's judgment is not upset by seeing perhaps a print half developed, and the next to it may be one just put in and the next almost completed. If the fresh print is put in the developer at the top, one sees the prints in the wrong order from the darkest to the lightest, and then the darkest again, so that the eyes, instead of being led from the lightest to the darkest, see the darkest print next after the lightest, and the eyes cannot estimate the proper depth of the darkest print, and one is apt to take it out of the developer too soon.

But some systematic method is necessary if prints are to be uniform, especially for toning.

I am not sure that amidol is the best developer for large numbers, because its life is so short, and it seems to lose its developing power so soon. It is true that "Serteka," glycollic acid and other preservatives prolong the period during which it remains active, and prints developed with amidol seem to tone to a more uniform colour than when other developers are used, even when the time of exposure and development have been varied. When large numbers are to be developed I should prefer D.50, for it seems to retain its power longer than any other developer I have ever used.

Dr. Glover's experiments, I have no doubt, will prove of great value to the careful worker, but the professional works under such totally different conditions from the scientific investigator that the latter methods often have to be modified considerably before a practical working system is evolved. And there is always the difficulty of persuading one's assistants to give the new ideas a fair trial. And they have to be persuaded and not coerced, as many show an aversion when new methods are suggested.

Some experiments on the lines indicated by Dr. Glover tend to confirm his statements. It was found that when using D.50 as a developer, with the same negative on different brands of paper, a multiplying factor of seven gave correct development. The image appeared in thirty seconds and development was completed in three and a half minutes. The exposure was five seconds.

It was found possible to time each print of a batch. The first was put into the developer and the time noted; at the end of thirty seconds a second was put in, and so on at intervals of thirty seconds. By this means it is possible to take each print out at the end of three and a half minutes. But an expert printer would be able to dispense with this method, although it would very greatly help a beginner. It will be interesting to hear the views of other workers. Dr. Glover's articles will prove, I believe, of great value. —Yours faithfully,

Birmingham. HAROLD BAKER.
September 3.

To the Editors.

Gentlemen,—I always read Dr. Glover's papers on the factorial development of bromide paper with the greatest interest, and I feel that all workers in bromide whose aim is to get the best out of their medium, owe him a debt of gratitude for his work in this direction.

There are, however, two difficulties in his method on which I should be glad to have an opinion. Dr. Glover states, in your issue of September 2, that "both the trial strip and the final print must of necessity be developed to the same factor." While admitting this, I find difficulties in securing its accomplishment. The range of test exposures I usually take is 5, 7, 10, 15, 25, and 40 seconds, and the time of appearance of each section varies from its neighbour, so that one has a latitude of several hundreds per cent. in estimating the time of development.

Further, assuming the above difficulty to be surmounted, if the time of appearance of the test exposure strip—and, in consequence, its total time of development—is to be the same as that of the final print, it is essential that the test strip should be made in the shadows. Such a test, however, is of little value, as it gives no indication of the exposure necessary to give gradation in the high lights.

My own practice is as follows—whether it would meet with Dr. Glover's approval I cannot say:—"Using the Kodak amidol formula (on either Kodak or Ilford paper), I take the factor which Dr. Glover originally recommended, namely, 15. I know from experience that this factor, under my normal working conditions, requires a development time of about four minutes. I make a test exposure in the highest light in the print, and develop for this time, select that exposure which is just sufficient to give the high-light detail, and develop the final print to a factor of 15.

The use of the factor is an absolute safeguard of the quality of the print, and I do not often find any serious discrepancy between the depth of the print and that of the correctly exposed portion of the trial strip.—Yours truly, J. AINGER HALL.

28, Bishop's Mansions, London, S.W.6.
September 5.

THE KODAK MANUFACTURING POLICY.

To the Editors.

Gentlemen,—I have read with interest, in the current issue of the "B.J.," Mr. Herbert Lambert's comments under the above heading.

I confess that I permitted myself a smile when I perused the "Announcement" referred to, because I, myself, like Mr. Lambert, have gone back to plates after making what I considered a very fair trial of the much-boomed portrait film. Mr. Lambert suggests that a question of "profits," perhaps, was the main factor which induced Messrs. Kodak to forsake plate manufacture. I should scarcely endorse this fully. What I imagine is that Messrs. Kodak have developed a touch of what our trans-Atlantic friends term "cold feet," through keen but none the less effective competition on the part of certain of our own native British plate-makers. One firm, at any rate, have recently instituted a competition which is bound

to produce some fine examples of professional portraiture, and, I think, Messrs. Kodak's kind intention is, if possible, to create an unreasoned bias beforehand against anything which is designedly shown as due to a good old dry plate.

But this is only conjecture. I feel, at any rate, on securer ground, in discussing my experience of portrait film itself. As film, it was lovely to work with, but in my own case any good qualities were outweighed by the following main disadvantages:—

Firstly, the need for full exposure. With shorter days rapidly coming in, I do not envy the operator who has to work with portrait film exclusively for daylight exposures. Perhaps, however, Messrs. Kodak are projecting another startler, this time in the way of a new type of illuminant which will put our old friend, King Sol, in the shade.

Secondly, came the facility of the film for accumulating scratch marks on the back. These marks, I found, were artful enough to remain practically invisible until some stray dust had made for itself a comfortable home inside the scratches. A remarkable penchant for finger-marks was also to be noted.

Thirdly, I needed to take almost extravagant precautions in wintertime to ensure that a film negative was thoroughly dry before proceeding to enlarge from it to any extent. Possibly, however, the new Kodak projection printer overcomes this objection, and might even permit the printing of film wet from the wash-water in case of urgency. It may also inhibit any scratch markings, however pronounced, but, even so, some simple and unprogressive souls might consider it to be on the dear side, even though resolutely sacrificed at a mere trifle of £120. But this is only by the way.

But I think that what I have written will do for now, as serving to demonstrate my opinion that plate-manufacturers generally need not think of closing down yet awhile; in fact. I have noted, with some pleasure, that two of your regular advertisers are by no means despondent, judging by their own "announcements" in the "B.J." on the matter. While in this connection I have also observed that Messrs. Kodak have prudently left themselves a way of retreat in case of necessity, by saying in a concluding paragraph of their "Announcement" that they will unhesitatingly send portrait film to the scrap-heap when a better medium is discovered. It would provide a good blaze, anyway, when a lighted match was applied! So would studio premises in which a few thousand film negatives had accumulated.—I am,

Yours faithfully,

J. Mallinson

The Studio, Shrewsbury, September 5.

To the Editors.

Gentlemen,—I was very much interested to note in the columns of the last issue of the "B.J." the discussion provoked by the recent announcement of the Kodak Co. regarding the discontinuance of their glass plate manufacture. The writer, however, devoted but little attention to the relative merits of film versus glass, dismissing this all-important phase of the question with the statement that he personally had tried film and found them no advantage over the glass plates. The rest of his letter consisted of conjectural statements founded upon his private opinion which he took as axiomatic. The purpose of this conjecture was to satisfy himself, and possibly his readers, as to the motive behind the Kodak Co.'s action.

It does not seem to me that we photographers need be very interested in the motive lying behind a manufacturer's decision to manufacture or not to manufacture any particular article, when there are many other manufacturers still making the article which the one discontinues. In short, if we wish to use plates, we can still use plates; our hand is no way forced.

Yet I do think that all of us are interested in this growing favour for flat films, and I think discussion on the relative merits of films and plates can be very useful. This house being the very first user of films, I would like to have my say on the other side of the question. From the commencement I noticed that the quality of the film was excellent, in my opinion, better than any plate, and that the non-halation it possessed over plates could be used to good account. Therefore, to me the answer to the question is in the product itself. In my opinion the quality is better, and it enables me to do better work; that is all I ask.—Yours faithfully,

H. Walter Barnett and Co., Ltd.,
O. Hardee, Managing Director.

12, Knightsbridge, Hyde Park Corner, London, S.W.
September 6

To the Editors.

Gentlemen.—I regret to note that Messrs. Kodak, Ltd., are discontinuing the making of glass plates. I have used their plates for some time and found them to suit my work in every way.

I have given the portrait films a good trial, having used about a gross of them, but I do not like them. There are two strong objections, in my opinion, i.e., they are a nuisance to retouch, owing to having to be held down all the time, and in damp weather the gelatine backs are so soft they pick up all kinds of dirt, and very easily get scratched. It is impossible to clean the backs like a glass plate. Also, I find they do not "scrape" so well as a plate.

They are a nuisance in the enlarging lantern, and for "sketch" printing they have to be fastened in the masking card with gum-paper. Their great advantage is freedom from halation, but I have never had much trouble with that in the studio, as careful lighting obviates it.

I, like Mr. Lambert, must find another plate to suit.

Yours faithfully,

Andrew C. Glover.

St. Ives, Cornwall, September 3.

INTERESTING THE SITTER.

To the Editors.

Gentlemen,—In the "Ex-Cathedra" notes appearing in your pages dated August 5, mention is made of the old saying that Sir Joshua Reynolds wished he could dine with a man before making a portrait of him. The writer of the paragraph (page 457), referring to the story, says very wisely "whether this be true or not," having apparently no reliable evidence as to the authenticity of the statement. Sir Joshua's "desire to dine," however, has been made such good use of by writers on portraiture that most students are in the habit of taking it as gospel, having no reason to doubt it, and no wish to spoil a good story—if they could.

We have, I believe, the famous essayist, W. Hazlitt, to thank for some very good—if not the best—details of Reynolds's methods of working, but the dining story of Hazlitt's differs slightly from the modern version. Hazlitt, as a lad, may or may not have known Reynolds personally—the artist dying when the essayist was but fourteen years of age—but it is certain he knew many of the artist's sitters, and probably had no difficulty in getting from them his methods of working.

What the essayist says is this: "Sir Joshua formed the circle of his private friends from the *élite* of his sitters; and Vandyke was, it appears, on the same footing with his. When any of these noble or distinguished persons were sitting to him, he used to ask them to dinner, and afterwards it was their custom to return to the picture again, so that it is said that many of his finest portraits were done in this manner." And further: "During the first sitting, Sir Joshua did little but chat with the new candidate for the fame of portraiture, try an attitude, or remark an expression. His object was to gain time, by not being in haste to commit himself, until he was master of the subject before him." We are also told by Hazlitt that none but friends and acquaintances of the sitter were allowed in the studio during the progress of a portrait, that cake and wine were always handed round, and that "he (Reynolds), as it were, by this act of hospitality, assumed a new character, and acquired a double claim to confidence and respect."

As far as I can discover, this is the origin of, and all the authority we have for, the oft-quoted statement concerning the wish of Reynolds. At any rate, except for the dining and the wine and cake, it will be noted that all really good photographers of to-day work something after the manner of Reynolds as regards interesting their sitters.—Yours, faithfully,

Godfrey Wilson.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

X. G.—We have not heard anything further in regard to the process. If you were to address a letter to Mr. John A. Tennant, editor of the "Photo-Miniature," 103, Park Avenue, New York, he would pass on your inquiry to the people who are interesting themselves in the process.

A. W.—(1) Of the two formulæ for the mercuric-iodide intensifier we prefer the one made up with sulphite for moderate degrees of intensification. (2) There is no advantage in using an acid fixing bath when it is intended to reduce or intensify negatives. (3) Yes, if the negatives suffer from under-exposure, and probably are, therefore, somewhat hard in contrast, the mercuric-iodide or the uranium intensifier is the most suitable.

F. P.—Your plan for a studio should work out all right, but as the width is so little (get 12 ft., if possible), it will be better to have a longer run of glass than 10 ft. Four feet of solid wall and roof at either end is quite enough. If you want to take a large group, or even a single full length, you will have to take the figures close up to the end wall, and then the longer light will give a more even lighting on the shadow side. You will also find it useful for back or Rembrandt work, as the studio will be too narrow to work across. Be sure to have enough *thin* white curtains to cover the glass entirely when the sun is on it.

H. H.—We are afraid we do not know enough about the matrices of the Roneotype and Neo-Cyclostyle to be able to say whether these machines can be utilised for your purpose. For such a considerable number of copies we should think the cheapest plan would be to have a zinco made and get a printer to run off this number of impressions from it. You could, no doubt, prepare a litho transfer and lay it down on your stone, but litho work requires a fair amount of practice. About the best book containing instruction in it is "Photo-Mechanical Processes," by W. T. Wilkinson, published by Messrs. Hamptons, Ltd., 12, Cursitor Street, London, E.C.4, price 4s.

W. A.—(1) We have never heard of *s*/11, but imagine that it is an equivalent of *f*/11. (2) We have not experience ourselves, but it is evident the author finds that he can remove the effect of exposure. (3) Very inconvenient in our opinion since it has to be used on a tripod, and then it is very awkward to see the image on the ground glass. Moreover, a wide-angle lens has often to be used in interiors and that cannot be fitted to the reflex type of camera. (4) Perspective has nothing to do with the size of the image of an object, but only with the distance of the object from the camera. The focal length of the lens then determines the size (scale) of the image.

W. H. W.—The process of Fox Talbot's, of 1852-8, is really the modern photogravure. If you apply to Mr. John A. Tennant, the "Photo-Miniature," 103, Park Avenue, New York, you can get a text-book on this process, although a systematic course of instruction is necessary in order to obtain proficiency in working it. For making prints in quantity without elaborate mechanical plant about the only process which is within the competency of anyone with the average photographic experience is collotype (again, text-book from "Photo-Miniature"), but it requires a lot of practice, and we should say that when time and labour are taken into consideration there is nothing cheaper than the multiplication of prints on bromide or D.O.P. paper.

J. N.—We are not surprised that you get a milky kind of deposit when cleaning negatives with fluoric acid, since the acid etches the glass, and, in some cases, produces a matt surface. If you can let negatives soak over night (in an earthenware vessel) in a fairly strong solution of nitric acid, the films will become so rotten that they can easily be scrubbed off the next day. Buyers of old negatives usually clear off the films by dipping the plates for a few seconds in a very hot solution of caustic soda, but this is liable—according to the quality of the glass—to cause a slight opalescence on the surface, which cannot be removed. Nor is there any means of getting rid of the matt markings produced by your fluoric acid.

J. H.—The formula recommended by the makers of D.50 is as follows:—

	A.	
D.50 concentrated solution	.....	250 minims.
Water to make	.....	10 ozs.
	B.	
Sodium sulphite, cryst.	.....	400 grs.
Sodium carbonate, cryst.	.....	250 ,,
Potassium bromide	.....	5 ,,
Water to make	.....	10 ozs.

For use take equal parts.

J. LADE.—(1) On the whole, nothing very much better, although it blunts the trimming knife somewhat quickly. Some people prefer to use cork lino. (2) A focussing mount is one which contains the lens in an inner tube, which can be moved to and fro in the outer tube, the adjusting lever indicating the distances of objects from the camera, which are in correct focus when the lens is in the respective positions. The mount is, in fact, a substitute for the focussing scale, but, of course, the lens requires to be fixed on the camera so that—at a given extension—objects in the extreme distance are in focus. For this reason a mount of this type is usually employed only with cameras having one fixed extension, for example, the folding focal-plane. (3) The strong dextrine mountant sold under various names ought to be sufficiently adhesive. Gelatine, applied hot, ought to answer, but is far less convenient. (4) Messrs. Fairbrother and Bowen, 9, Farringdon Avenue, London, E.4.

W. T. SMITH.—(1) The following method is, perhaps, the easiest for you. Though it is not quite accurate the error is very small, probably not more than one-eighth of an inch with a lens of average size and type. Focus on a flat object (say a foot rule) so that the image on the focussing screen is the same size, that is to say, 4 inches on the rule measures 4 inches on the focussing screen. Then, without moving the camera, measure the distance from the object to the ground glass and divide it by 4. The result is the focal length of the lens. (2) The lens you name is quite a good lens of the old type, but 8 inches focal length is rather short for covering a half-plate to the corners. We should prefer to have a lens of 9 inches or even 10 inches if it is not an anastigmat. When stopped down, no doubt, the lens will cover quite satisfactorily. (3) The Whitworth thread is that known as quarter-inch Whitworth standard. If you go to any maker of tools you can get a screw, say, in the form of a bolt, of this size and type.

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Contents.

SUMMARY.

The exhibition of the London Salon of Photography opened on Monday last at the Galleries of the Royal Society of Painters in Water Colours, 5a, Pall Mall East. Mr. F. C. Tilney, in the first portion of his review, deals in detail with the various types of portraiture on the walls, and particularly with the character and pictorial portrait studies, which, as in former years, outnumber what may be termed the legitimate professional studio portraits. (P. 547.)

The exhibition of the Royal Photographic Society opens on Monday next at 35, Russell Square. (P. 545.)

The twenty-fourth Traill Taylor Memorial lecture will be delivered at the Royal Photographic Society on Tuesday, October 11, by M. L. P. Clerc, on aerial photography and photo-topography. (P. 545.)

In his "Paris Notes," M. L. P. Clerc reports some new photographic appliances now being shown in Paris, and describes the Dufay process of colour photography on paper, as disclosed in a patent specification just published. (P. 549.)

The relative merits of plates and film were debated in the customary manner at the Croydon Camera Club, and are the subject of further letters from correspondents. (Pp. 555 and 557.)

In an article on the speed of a lens, the principle of the rule according to which the focal length is divided by the diameter of the stop in order to obtain the F number is explained. (P. 550.)

The actual diameter of the stop is not the aperture which is effective if the stop is behind a converging lens, as it is in most doublet and compound objectives. (P. 551.)

In certain circumstances the effective aperture of the stop is liable to variation from other causes, but this variation seldom occurs, and is always of relatively small amount. (P. 551.)

The older systems of marking lens apertures sometimes give rise to confusion with present-day F numbers. Lenses of Dallmeyer, Goerz, Voigtländer, and Zeiss were formerly marked with special numbers. The F numbers equivalent to the markings adopted on these now obsolete systems are given in the article. (P. 553.)

Also, the F number varies with the scale of reproduction of a relatively near subject. The rule for ascertaining the exposure compared with that when photographing same size will be understood from the last section of the article. (P. 553.)

In circumstances when a studio conforming to one or other of the recognised types cannot be secured, more than ordinary attention is required as regards its dimensions and aspect if satisfactory portraiture is to be done in it. We refer to some of these questions, and to the means which can be taken to improve the working conditions in a relatively unsuitable place, in a leading article on page 546.

Dr. J. M. Eder strongly repudiates the recent criticism by Mr. E. J. Wall of his account of the origins of flashlight photography. (P. 559.)

Definite quotations of price is a practice which will often save subsequent unpleasantness in undertaking commissions away from the studio. (P. 546.)

EX CATHEDRA.

The Traill-Taylor Lecture.

For the first time during the twenty-four years since the Traill-Taylor memorial lectureship was established, the lecture will be delivered by a Frenchman. On the forthcoming occasion of the twenty-fourth lecture, on October 11, the lecturer is to be M. L. P. Clere, who for many years has occupied a leading place in France as an authority on photographic technique and on the scientific principles of photography. During the war M. Clere was commander of an aerial photographic section and instructor in aerial photography at the headquarters where training was carried out for this branch of the military service. It is, therefore, appropriate that he should take as his subject "Aerial Photography and Photo-Topography," subjects in which he not only took a practical interest, but to which he made valuable contributions by way of the establishment of accurate methods of procedure. M. Clere is the author of two treatises on aerial photographic methods, issued uniformly with his earlier works on photo-mechanical reproduction in monochrome and in colour. As he speaks English with considerable fluency there is no doubt that his discourse on October 11 will be one which should attract a large audience.

* * *

Salon and Royal.

The exhibition of the London Salon of Photography, which opened on Saturday last at the Galleries of the Royal Society of Painters in Water Colours, 5a, Pall Mall East, has proved once again a remarkably fine collection of current work in pictorial photography. As will be seen from the very understanding and detailed review by Mr. Tilney, which appears on another page, there are remarkably few exhibits on the walls which do not call for careful consideration. The fact that the "Times" of Friday last reproduced on a large scale two of the works from the Salon (one of them, Mr. Thomas's fine portrait of the Lord Chief Justice) is a sign of the place which photography has made for itself among the fine arts in the estimation of the public. The Salon remains open until October 8. Monday next, September 19, will see the opening of the exhibition of the Royal Photographic Society at 35, Russell Square. Apart from the pictorial section, several exhibits of exceptional interest will be included. One of these is a specimen of the remarkable process of M. Louis Lumière, in which the sensation of solidity and relief in a portrait is produced by the arrangement of several positive transparencies, one behind the other, in front of a source of diffused light. The mathematical principle of this process was set forth some months ago by M. Lumière in a paper which appeared in our pages. Another exhibit is the collection of apparatus and specimens, formerly belonging to Fox Talbot, which has recently passed into the keeping of the Royal Photographic Society. The

exhibition at Russell Square remains open until October 29. Lectures are delivered every Tuesday and Friday evening during the period of the exhibition; those during next week are by Mr. A. H. Blake and Mr. James Shaw, of Manchester.

* * *

Quote the Price. Much unpleasantness has been caused by omitting to give a fairly close estimate of the cost of work which is not quoted in the price-list, and good customers lost in consequence of over-charge, as they have considered it. This refers not only to difficult copies and enlargements, but also to some classes of outdoor work. We have in mind a case which recently came under our notice wherein a photographer in North London was instructed to go to St. Albans and photograph some houses which his customer was trying to sell. Upon receiving the bill the customer was very wrath at the charge made, which was about three times as much as had been previously charged for a similar job done within half-a-mile from the studio. Although the charge was quite a fair one considering the time taken and the expense of the journey, a considerable reduction had to be made to avoid losing future orders. The same trouble has often arisen over other classes of work, so that it is always a wise precaution to agree upon a price which is then quoted in writing before starting upon the job.

UNORTHODOX STUDIOS.

THERE is a certain number of types of portrait studios which are generally allowed to be eminently suitable for the purpose for which they are constructed. Among these are the ordinary span roof, the single slant and the high side light, which is also known as "Robinson's Studio of the Future." In these days, however, it is not easy for the photographer who is starting in business, or who has perforce to seek fresh quarters, to find premises of these orthodox types, so that it becomes necessary to consider how far less suitable rooms can be effectively used for portraiture.

In the infancy of photography we find that the Daguerreotype operators worked either in the open air or in any well-lighted room which was available, but it was not long before it was found necessary to build special rooms, mainly covered with glass to reduce the length of exposure. When wet collodion came to the fore, although it was much more rapid, the glass room was still found to be necessary, and it has survived to the present day, although it is now by no means indispensable. With the rapid plates now available extremely short exposures may be given in any well-lighted room, and if we except full-length figures, the lighting should not be inferior to that obtainable in a specially-constructed studio. As a general rule, the principal light should fall upon the head of a seated figure at an angle of forty-five degrees. This condition can be secured with a window having the top about eight feet from the floor, this height allowing the sitter to be placed at a convenient distance from the glass. The length and breadth of the room and the position of the window or windows are also important factors, for if there be only a single window in the centre of the wall the working distance will be reduced and a short-focus lens with its attendant disadvantages will be necessary. The breadth should be sufficient to allow of Rembrandt, or what our American cousins call "line," lighting to be practised. Usually, a room with two windows on one side, instead of a single window, is to be preferred; the second window will serve to give a general illumination and prevent heavy shadows. The windows need not come within three or even four feet from the floor, but should be as wide as possible, as it is difficult to obtain soft effects when using a narrow source of light. The orientation of the room has an important bearing upon its suitability for portraiture, inasmuch as it will not be possible to move the sitter to obtain suitable lighting as in an ordinary studio. If available, a northern aspect is the best, for the reasons that it gives a steady light during the greater part of the day and that little diffusion will be needed. On the other hand, a southern or western aspect is a bad one for a room studio, because much light will be lost by having to use strong diffusers which militate against crisp soft lighting.

Another type of room is often found at the top of large city buildings. In this, the illumination is furnished by a skylight, either flat or in the form of a cone. Such rooms usually make good studios, their principal fault being that owing to the distance between sitter and light, the exposures have a tendency to be rather longer than with a side light. This is not, however, serious, as it will rarely cause a greater difference than that between plates working at 350 and 500 H. and D. In top-light studios a large mirror can generally be used with good effect as a side light, while large white reflectors of the ordinary type give a softer light from the same direction. It may be necessary to point out that the efficacy of a reflector depends not only upon the reflective value of its surface but upon the volume of light which reaches it and the angle at which it impinges. In the ordinary studio there is usually a sufficiency of light falling upon the reflector, often too much, but with a single small source of light one has to be careful to use it properly. Full-length figures are difficult to render satisfactorily in a studio with a low side-light, and fortunately they are little in demand. If electric current be available a half-watt or mercury-vapour lamp placed near the ceiling will give the necessary top light. Failing this, a row of incandescent gas burners, used as a "batten light," will be a handy substitute. With a top-lighted studio it is easy to make full lengths, if the figure be judiciously placed in relation to the skylight, that is to say, not directly beneath it, or an outdoor effect will be produced.

When equipping studios of the types we have mentioned care should be taken to eliminate every unnecessary article, as nearly all variations of lighting must be obtained by moving the sitter or the camera. For this reason the floor should be kept as clear as possible, and the camera and stand should be no larger than is necessary. It is now rare in most middle-class studios for larger pictures than whole plates to be made from direct negatives, and it is foolish to block up valuable space by installing a 12 x 10 or 15 x 12 outfit when the smaller and less-costly apparatus would answer the purpose as well, if not better.

The backgrounds should be fixed upon light frames fitted with castors, and they should be no larger than is necessary. One frame 8 x 6 feet will carry a white and a very dark grey for full lengths, while smaller ones, say 6 feet by 4, will be large enough for sitting figures and heads. These smaller grounds should have a little graduation or a foliage suggestion to give relief to the figure. Diffusers may be made of cheese cloth for ordinary light, and nainsook or even calico for bright sunlight. To meet the latter contingency a white blind should be provided to cover the entire window. There is a temptation to use tracing cloth for this purpose, but this material does not prevent glare so well as an undressed fabric like nainsook.

THE LONDON SALON OF PHOTOGRAPHY.

SLOWLY, but without doubt surely, a change is taking place. It is not a change that makes an exhibition of one year different very appreciably from another; but it tells by the inevitable dropping out of the commonplace and uninspired and the gradual increase of interest in subject and treatment of pictorial and portrait photography. Of course, there is always the selecting committee filter to reckon with. This body may strain out all the bad more effectually one year than another. To receive a proper impression of the current work one should see it all—in Olympia, perhaps, for several consecutive years. Fortunately, that is not possible, but to see the bad as well as the good is the only way to determine how things are developing. Judging from the present show at the R.W.S. Galleries, the good things which have got through are healthily plentiful. Technically, the work is everywhere at a high level, and "straight" work is gaining ground. In the portraits a genuine art motive is usually evident, and the professional is claiming a large share of the space in what was once practically an amateur collection.

Mr. Crowther's Surprises.

The surprise of the season is the work of Mr. C. Pollard Crowther, in the shape of two of the most captivating portraits in the show. They are entirely different in inception and manner, and between such antitheses we may not be wrong in arguing a wide range of versatility and resource. The first of these is "Dolores" (3), a picture-portrait in the best style, of a charming lady sitter, posed naturally with a captivating turn of the head. It is in a light key of soundly gradated tones with one rich accent. The other is "The Showman's Wife" (160). What could you expect her to be? Think of Mrs. Jarley. Think of the out-of-door woman, with her experience of all sorts of people, her consequent tolerance and wisdom, her *bonhomie*, her ample physique. Here she is, every inch of all that; fat, kind, and not unhandsome in a way; the poise of her body suggesting the waddling gait, and permitting at the same time a line of unhackneyed design. Almost as good as these, but not so beautiful as the first nor so fine as the second, is "In Lat. 15° S. (at the Grand Guignol" (69), a horrible monster, with one threatening eye and a pipe too stylish for him. Here is character in full measure. "A Cavalier" (175) has "go" and dramatic force. He looks like a frightened D'Artagnan, if that is not a contradiction in terms. All these are important prints, and will certainly send up the reputation of their author.

Notable Sitters.

The good fortune that attends the portraitist who gets a social lion as sitter is so well understood that the wonder is how few of the notable people are here. Perhaps Walter Benington scores with "Professor Einstein" (45), of whom, however, he has not made anything heroic, but has chosen a representation that is almost commonplace in its homely literality. The giant of philosophy and science seems a little worried about the turmoil and confusion he has caused in the minds of men. "The Rt. Hon. Col. Harvey, U.S.A. Ambassador" (217) and "The Late C. Lovat Fraser" (219) have each their proper characteristics, the former with his ugly goggles, which no official, particularly if an American, seems able in these days to do without; the latter in costume and bearing the perfect dandy. A good bag of notabilities for Mr. Benington. "Rutland Boughton" (100), the musical composer, of Glastonbury fame, falls to Herbert Lambert, who shows him in his ingratiating mood—he has others. The design is masterly. "Mme. Lopokova (Russian Ballet)" (176) comes from Florence Vandamm. The print makes a terribly "contrasty" effect, and by being presented in conditions true to the ballet traditions has sacrificed pictorial charm. The same worker's "Mme. Tchernicheva (Russian Ballet)" (23), is, however, more engaging, and does more justice to Miss Vandamm's skill. N. E. Luboshez gives us "F. J. Mortimer" (264), looking quite a good boy, the uncomplaining martyr to unrecognised labours in photographic causes. Mr. Luboshez's other photographic lion is "Nikola Persheil" (86), whose fame rests upon portraiture of exquisite quality. Then we have Walter Thomas's new departure into professional portraiture publicly heralded by a striking picture of "The Lord Chief Justice of England" (287). Mr. Thomas here succeeds in avoiding all the "stunts" of his successful rivals. He has found a way of his own, which, it a little hard and precise, has the merits of thorough soundness. Everything is rendered with a kind of pre-raphaelite conscientiousness, wig, robes, and all. This is rather an old idea in photography, but new again to-day, and if Mr. Thomas can continue to imbue it with his taste and feeling, he will probably find it popularly acceptable. "J. S. Sargent, R.A." (386), by Sydney Carter, and "The War Correspondent, Fredk. Villiers" (336), by D. U. Jaeger, completes the list of the very eminent sitters, though there are several actors, dancers, and so forth who will be known to the average visitor.

Sitters in General.

Quiet, intensely interesting, and amazingly true in all respects, the portrait of "Sara Holm" (54) must be added to Louis Fleckenstein's past triumphs. He has always been partial to the suggestion of colour, but here, and in "Johnny" (78), he has adopted a distinct formula of coloration, using for the flesh a yellowish tone which is frankly not realistic, but which suits an aged subject. But for these suggestions of colour the show is devoid of all attempts to surpass monochrome, and in this I, for one, think that the committee have taken an advisable course.

L. J. Steele we associate with the East, but he has tripped now to the North, and gives us a striking portrait of "Kai Neilson, Danish Sculptor" (75), at work upon some immense marble figures. It is a case, however, where the sitter is rather overwhelmed and suppressed than otherwise by the environment which is supposed to be a help to the presentment of him. A rather taking idea is shown in C. Wormald's "Portrait of Miss Rhoda Henson" (99), though it is as old as Rembrandt. It is the shading of the brows, so that the eyes are submerged in tone. Photography has not hackneyed this effect so far. This is a beautiful print, with its animated expression and richness of tone in the lady's soft furs. "Miss Ruth Miller" (102), in nun's draperies, is of the nature of a character study, by J. N. Doolittle. "Portrait of Mr. G." (248) differs little in character from N. E. Luboshez's other work already mentioned, except that it shows a remarkable leaning-forward pose, with the head on the hand. W. Crooke's "Study of a Head" (255) is his usual thing. It gains by a distant view-point. Amongst single heads, Estelle's "Portrait of Miss Duffus" (283) is noteworthy for charm.

Recipes.

Styles and "stunts" come and go. Last year we were treated to a profusion of back-lighted portraits in the American manner. This year there are scarcely any, though the Earl of Carnarvon shows a damsel who catches a bright light under the chin and nowhere else. But the recipe of putting a sitter against a wall so that sharp cast-shadow accompanies the figure is still rampant. What is supposed to be its attraction, I wonder? Hugo N. van Wadenoyen, Junr., uses it in "James Whale as Slaney in 'Abraham Lincoln'" (24), L. D. Carter shows it in "Columbine" (113), Charles Borup likewise in "Happy Molly" (117), N. Muray in "Mlle. Desha" (164). L. Fleckenstein's seated figure, called "Lassitude" (227), gives it again. In the same worker's "Shadowgraph" (107), however, there is a *raison d'être* for this resource, for here a delightful figure is making the shadow

of her hands take the form of an elephant in a square patch of light upon the wall, and the whole thing is an agreeable pattern of dark and light tones.

Perhaps more pronounced still is the recipe of the dancing girl, nude or semi-nude, who bends her body back in a spine-breaking curve. It is really time the curtain was rung down on this "turn." It is only rarely that the figure is treated with grace in these acrobatic feats.

The Dancers.

Like the poor, the dancers are always with us; but to my mind they are rather a boring community—they are so dreadfully all alike. True, they range from the clothed and right-minded variety to the mad athletic nude; but we know them all perfectly well. A slight innovation this year comes from A. F. Kales, who places his "Morgan Dancers" (88) before a portal of a most worrying and nondescript style of architecture. His "War Dance" (33), a figure of a Red Indian, in every technical respect a fine thing, has also the drawback of incongruity. We do not expect Red Indians to do war dances on a carpet in a room before a roll-down background. His "Ruth St. Denis" (260) is faultless in this respect, and has a fine sense of motion. H. Borssenbrugge, E. Gropp, H. Arnold, A. Koch, N. Muray, A. Remfelt, E. P. Henry, and others all send dancing themes, some clothed, mostly nude. Some are choice prints, such as Mrs. Y. Park's three "Studies" (222, 225 and 229), and likewise N. Muray's "Abandoned" (41), but, like that example, they seem to become particularly acrobatic and bend their spines back to cracking-point when they happen to be undressed. But there are two examples that have the interest of novelty; one is F. Jay's "Will o' the Wisp" (50), showing a young girl in the midst of a violent leap. It is, I think, the first achievement of so rapid an action by an amateur photographer, of whom it postulates remarkable ingenuity and perseverance. The other novelty is by Helen Macgregor, and shows a damsel who, in voluminous skirts, is "without any visible means of support," both feet and hands being in the air. She is called "Maria Gambarelli" (312). On the whole, there is much to be said for the less volatile pose of H. J. Mettee's "The Dancer" (233), and its splendid quality.

Character Studies.

There is more human nature in the heads that are photographed by invitation, so to speak, than in figure studies. I have already referred to Mr. Crowther's Grand Guignol character, which is the most striking of all; but it is run very close by two other villains, one of whom has also the single eye as a *pièce de resistance*. This is J. N. Doolittle's "Vaqueros" (25), notable for dramatic force and true sunshine effect. Less convincing as a sunlight study, but far more noble as a composition, is Mrs. A. Ralli's "Italian Market Woman" (34), a fine, stalwart figure. This print is the climax of Mrs. Ralli's method—a firm statement of simple light and shade, generalised almost into two tones. There is much to be done with it when in such good hands as hers. W. J. Clutterbuck's old woman drinking "Bouillon" (94) is good, and is cheek by jowl with a queen, "The Great Catherine" (95), a fancy portrait, very cleverly managed, by Dr. H. B. Goodwin, though the action of the model's left arm is not clearly explained. We drop back again to the soil at "The Pedlar" (103)—a study of great merit, marred only by the agressiveness of unimportant illumination on the temple. Pierre Dubreuil sends a curiously treated head of a "Woman at San Remo" (105). She appears to be supporting some burden, of which we only see the dark under surface, and as the bust is vignetted away, a queer stalactite effect is given of a head attached to a ceiling. "Vieja Vasca" (190), by A. Koch, is a capital study of an old woman as far as her face is concerned, but the shawl which surrounds her head and shoulders seems to miss the light that falls upon her features. "Allegro" (207) is an animated figure who, by her bearing, complexion, and ample teeth, is obviously not Circassian. H. Jackson succeeds admirably with an oriental type in "A Chinese Priest" (218), whose eyes are half-closed in an excess of superciliousness. This is a very noteworthy piece of character delineation, splendidly "round" and well-modelled.

Pictorial Studies.

G. M. Brownlee's young lady is far too demure and refined to bear the name of "Audrey" (240). No Touchstone would have been unceremonious with her. "West is East" (285) is the inexplicable title given to a very luscious print by W. F. Brigham. It is a full-face head of a lady, whose eyes look through the material of her headgear—a very taking and original piece of work. "The Adventuress" (290), by Estelle, seems a far safer sort of lady to consort with. Yet her expression is a good psychological study. Is the sparkle of the eyes in the Earl of Carnarvon's pretty girl he calls "Spring" (2) a wee bit overdone? At any rate, the whites of the eyes in Bertram Park's "Study" (263) seem more assertive than they would be in nature. But it is a fine thing, beautiful in modelling, and if it is too lively, that extreme is far more pleasant than the dying girl, "Desha" (21), which N. Muray sends. The figure work of Eng.-Comr. E. J. Mowlam is very full of promise. I like it better than his war work. He has made a fine design of a girl seated on a stool, her knees in her hands; but, like his work generally, it is very gloomy in tone. The title is "Pierette" (51). Another gloomy print, but one of delightful quality, is only partly excused by its title, "The Death" (55). It represents two figures, of which the dying one, posed like the famous Marat dead in his bath, has a "spot light" upon his chest, whilst the lady behind is quite out of the limelight, and is, in consequence, repressed in tone and flattened in modelling, so that she looks more like a monumental effigy than a ministering angel. This depressing state of things is shared by Lionel Wood's otherwise beautiful "Portrait of Miss H." (63). It is finely designed, but, in spite of costly apparel, the lady appears to be in a dungeon. We get relief with the darks of A. Folkmann's "Figure Study" (121) by a stripy scheme of light and shade, helped out by the stripy material of the costume. The result is very strong and effective, because the design built-up of contrasting masses is good.

Suckling subjects have an attraction for camera artists. Perhaps it is that maternal solicitude moves them; perhaps they like to feel that they can respond to the same æsthetic stimuli as moved the old masters, who so often represented the Virgin in this elemental function. I think we can say that the religious impulse is not uppermost in photographers, and can assume, therefore, that the impulsion is a genuine desire to express parental susceptibility in terms of beauty. Certainly H. Berssenbrugge's "Motherhood" (64) is a success in this direction. It is a very fine design, and its presentment is free of all sentimentality. Its red tint gives it an old-mastery look which goes well with the subject. I don't think it has ever been better done by means of the camera. J. M. Buerba adopts the same theme in "Madre Gitana" (35). Here, however, the point of view is that of modern art—the gipsy mother is on the ground—one thinks of the French peasant-painting phase of art, and the sense of design is absent. "The Bride's Dream" (138), by F. Ziegler, is light, soft, and gauzy, with a figure charmingly posed. How different to Hugh Cecil's *apachee*-looking girl, called "Feathers" (139)! which is amazingly strong, but unlovely, and is the third example of the one eye of terror. Her feathers hang off the brim of her hat, and are a feature of the design, as they are also in C. Vandyk's "Mme. P." (155)—a delightful profile. Hugh Cecil's other print, an important work, "Mme. de Kunglo" (147), is the antithesis of his "Feathers." She assumes a demure, mock-modest pose, and is prim to a degree in her dark clothing; but it is not intended that we shall believe in her except as an actress. Another lady is called "Autumn" (156), by the Earl of Carnarvon. She is enchanting, but she has no clothes on at all under her shawl! *O tempora! O mores!* A fine "Profile Study" (196), by Yevonde, errs on the side of hardness. Angus

Basil's "Milton Rosmer" (199), a villain, and Maud Basil's "Claud Mark" (206), a sorrowful gentleman with a big guitar, are both celebrities of "the boards," I suppose. The first has too much of what the other lacks—vim. "The Second Sitting" (216) is a new kind of self-portrait, since its author, J. C. Warburg, has given us a lady sculptor at work upon a bust of the photographer which promises exceedingly well. I must direct admiration to "Estudio" (245), a charming sitter, treated in a way that recalls a powerful point-drawing: and also to Dr. H. B. Goodwin's beautiful "Girl with Mirror" (254). Those who like softness will enjoy the "Girl in Black" (269), sent by Rabinovitch. Its quality is remarkable. H. Felton has caught a momentary action capitally in "The Bromoilist Answers a Question" (270), while the thing to be noted in J. A. Gardner's "Passamaquaddy Indian" (323) is the admirable design of its lines. A word must be said, too, for J. C. Stick's dainty and subtle "Marie" (123), with her basket of flowers; the whole thing almost a silhouette.

F. C. TILNEY.

(To be concluded.)

PARIS NOTES.

THE holiday season has been, as customarily, one of inactivity among photographic societies, but I can now take up again my chronicle of events of special note.

An Exhibition of New Inventions.

On August 26 there was opened in the Esplanade des Invalides the nineteenth annual exhibition of the Association of French Lesser Manufacturers and Inventors, a fixture which is better known under the name of Concours Lepine, in reference to the well-known prefect of police who gave much encouragement to this institution in its early days. Although originally intended for the exhibition of novel toys made by Parisian workmen, the exhibition has long included extremely varied articles and almost always some photographic novelties. Two new models of magnesium lamps are shown by M. F. Pechenot. A feature of both is a very effective automatic catch by which any premature operation of the lamp is prevented. One of the models is fitted with ignition by pyrophorous metal (ferro-cerium); the other by a species of touch-paper, which is employed as a continuous band. Both lamps are provided with a light handle, allowing of holding them at arm's length, and with bushes for attaching them to the photographic tripod.

M. Ch. Dupont has devised an indicator for the speed of movement of the film in the cinematograph projector, the pointer being controlled by a device very similar to the centrifugal regulator of a steam engine. Equipment for photography from a kite is shown by M. L. P. Frantzen, and consists of a strong though light camera, which can be attached to a suitable kite, or can be hoisted up to a kite which has already been raised to the required height and brought down again after exposure of the negative.

Another photographic exhibit is that of the Stampa Company, who for about two years past have been supplying a "citra" sensitiser for application to papers, fabrics, leather or wood. They have now just begun the manufacture of sensitive tissues, and show some fine results of printing on silk and canvas.

New Electric Lamps.

The Compagnie Générale des Lampes of Paris has recently worked out, at the request of several physical laboratories, a tungsten filament lamp of cylindrical form, filled with nitrogen and having the filament constantly stretched in the axis of the cylindrical bulb by means of a spring. The intensity is much greater than that of the filament of a Nernst lamp, and these lamps are of great advantage when it is wished to obtain pencils of light of equal intensity in different directions, as, for example, in many photometric instruments used for the measurement of negatives. The lamps likewise serve for the illumination of the slits of spectrographs, and in some cases may even be used in place of a slit.

For the purpose of increasing the efficiency of the incandescent electric bulbs used for projection, a Parisian maker of projection apparatus, M. E. Mazo, has adopted with great success the plan of silvering the whole surface of the bulb with the exception of a small patch immediately facing the condenser. In consequence of the internal reflection the filament reaches a higher temperature, and, moreover, the light is projected forward in such greater measure that the efficiency of the lamp is increased by more than 50 per cent.

Studies of Ultra-Violet Light.

In the course of experiment on the influence of ozone on the absorption of solar ultra-violet rays by the atmosphere, MM. Ch. Fabry and H. Buisson have undertaken some sensitometric measurements with ultra-violet light, and have obtained some interesting results. In the case of the particular plates employed (Jougla Mauve Label), and within the spectral region studied, viz., 3,150 to 2,900 AU, the development factor or gamma has a constant value, less than half the value obtained under the same conditions of development, for the visible (blue-violet) part of the spectrum. It was also found that the gamma values were slightly different for the above region of the ultra-violet when successive exposures were made at variable intensities for a constant time, and then at a constant intensity for a variable time. The variation of photographic activity in the particular region of the solar spectrum is great; the sensitiveness at 2,975 AU being about 6,000 times greater than at 2,936 AU. Moreover, the measurements of the opacities of photographic films uniformly exposed and developed, show that the opacity is highly variable within this part of the spectrum. A film of opacity 500 in the visible violet has an opacity of only 30 at 3,130 AU, this opacity rising to 400 at about 2,500 AU. The opacity is practically constant in the same part of the spectrum after intensification with mercuric chloride and ammonia, whereby the silver image is almost completely replaced by mercurous amidochloride.

Some Recent Patents.

The recent publication of a French patent of L. Dufay (No. 520,784 of November 30, 1917) throws some light on the mystery which has surrounded the operations of the Versicolor Company, which is the concessionaire of this patent. For the production of photographs in natural colours on paper there is employed, for taking the negative, a transparent mosaic screen in three or four colours of regular geometric pattern and having its units of sufficiently intense colours for making the customary selection. A screen of the same geometric pattern is impressed upon paper but with much weaker colours, this positive screen impression being covered by a sensitive emulsion for positive printing. After development and drying of the negative obtained by exposure of a panchromatic plate through the negative screen, the negative so obtained is laid in register on the screen-coated positive paper, register being judged by the appearance, by transmitted light, of colours complementary to those of the subject. The positive print is then exposed, and, when finished, reproduces, so it is claimed, the colours of the subject.

In France, as is well known, the granting of a patent is made without any examination of the practicability or novelty

of the invention. All that is necessary is that the application and any illustrated drawings shall be made on paper of a certain size. Profiting by this state of things, an "inventor" has transcribed almost verbatim (Patent No. 522,919, of March 12, 1919, granted to M. de Gaudart d'Allaines) an article by Captain A. Calvet, published in 1911 in the "Bulletin of the French Photographic Society" (Series 3, Vol. II. pp. 329-244), on development by means of two dishes. The author of this new patent has confined himself to modifying the formulæ, but the alteration appears to be somewhat ill-judged, for the use of sodium chloride is directed as a restrainer of diamidophenol developer, apparently without recognition of the fact that this salt will then be added to that already formed in the bath by the action of the diamido phenol hydrochloride on the soda sulphite.

L. P. Clerc.

THE SPEED OF A LENS.

[Of the sub-divisions of photographic optics, those which relate to the effect of the stop are of the greatest practical importance, and, fortunately, are those which permit of explanation of the first principles by the use of mathematical symbols or formulæ of the simplest kind. In the present chapter we bring together in this simple form the relation of the stop to the "speed" of the lens. It is first shown how the familiar F. No. is derived from the action of a lens and how the F. No. varies from its nominal value when the object is relatively near to the lens. Older systems of marking the stops of lenses are explained, and the concluding part of the article deals with the two-fold cause of the falling-off of illumination towards the margins of the plate. It is hoped that an occasional article of this kind will contribute to a more exact understanding of familiar working facts and figures by those who are disinclined to include in their reading anything which they regard as "only theory."—Eds. "B.J."]

I.

Intensity of the Lens Image.

It is self-evident that the "speed" of a lens, that is to say, its degree of permitting short times of exposure, is measured by the brightness or intensity of illumination of the image formed by it. Apart from certain minor factors, viz., the number of glasses forming the lens and their colour and thickness, the intensity of the image *at or near the centre of the field* is determined by (1) the area of the diaphragm aperture and (2) the focal length (or image conjugate focal distance) of the lens. The diaphragm aperture determines the volume of the pencil of light transmitted by the lens; the focal length (or focal distance) determines the area over which this light

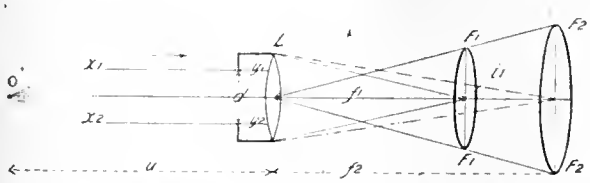

Fig. 1.—Intensity of lens-image in relation to (1) aperture of diaphragm and (2) focal length of lens.

is distributed. Fig. 1 shows how the formula for relative intensity of image is derived from these two quantities.

In fig. 1 a lens L has a diaphragm aperture of diameter d and a focal length of f_1. O represents one point in a uniform and uniformly-lighted object placed at such a distance u from the lens that rays x_1y_1, x_2y_2 are practically parallel when they reach the lens and, therefore, come to a focus at i_1.

It is clear that of all the rays emitted by O, only a cylindrical pencil of diameter d passes through the lens. Similarly from other points in the object (near to the lens axis) pencils of equal sectional area are formed by the diaphragm aperture. Hence the light transmitted by the lens is proportional to the area of the diaphragm aperture, and since the area of a circle is proportional to the square of its diameter the light transmitted is directly proportional to d^2.

Now intensity of illumination is the volume of light reaching a surface divided by the area of that surface. As has just been shown, the volume of light, from a distant uniform and uniformly lighted surface, which is passed by the aperture of a lens, varies according to the area of that aperture; that is, according to the square of its diameter, if it is a circular aperture. The area over which it is distributed depends upon the focal length of the lens.

In the case of an object at such a distance that rays from it are practically parallel when they reach the lens, the scale (linear) upon which the object is reproduced is proportional to the focal length of the lens.* Thus in fig. 1, if we represent the image of the object (or a part of it) formed by the lens L as the circle F_1F_1, the image formed by a lens of focal length f_2 and represented by the circle F_2F_2, will be of greater diameter in the proportion of f_2 to f_1. If the second lens has twice the focal length of L, the image formed by it (of a distant object) will be twice the diameter of that formed by L.

Again, the areas of the respective images are proportional to the squares of their diameters, and, therefore, to the squares of the corresponding focal lengths—that is, f_1^2 and f_2^2. Thus the relative volume of light d^2 is spread over areas which are (relatively) f_1^2 and f_2^2, and hence the relative intensities of the images are:—

$$\frac{d^2}{f_1^2} \text{ and } \frac{d^2}{f_2^2}$$

It will be seen that this holds good in a slightly different form when the object is at such lesser distance from the lens that the rays reaching the diaphragm are no longer parallel but still divergent. In this case (corresponding with the taking of photographs of objects up to within a very short distance of the lens) the illumination of the image is modified from two causes. The light reaching the lens is of greater intensity, in accordance with the law of inverse squares; that is, its intensity is inversely proportional to the squares of the distances u. At the same time the image is formed in a plane at a distance v behind the lens, v being greater than f_1 and increasing proportionately as u becomes less. The linear scale of reproduction of the image is then the ratio $v : u$, and, therefore, the area of the image relatively to the object is the ratio $v^2 : u^2$.

Thus we have:—

Amount of light transmitted by the diaphragm is proportional to $\frac{d^2}{u^2}$

Area over which this light is distributed is proportional to $\frac{v^2}{u^2}$.

Dividing relative amount of light by relative area, relative intensity of illumination of image is

$$\frac{d^2}{u^2} \div \frac{v^2}{u^2} = \frac{d^2}{v^2}.$$

* If the object is at such an immense distance that no increase in focal length magnifies the size of the image, reduction of the intensity of the image by spread of its area obviously does not come into play. The stars are such objects. Hence in stellar photography the intensity of the image is proportional simply to the area of the diaphragm (or rather to that of the telescopic lens) without regard to focal length.

The formula for the intensity of the image is thus the same as that already obtained, except that v (the focal distance when photographing a nearer object) takes the place of f, the focal length.

It is clear that if we wished to mark lenses with numbers indicating, by their greatness or smallness, the "speed" of a lens we should base them on this measure $\frac{d^2}{f^2}$ of the relative intensity of image. For example, a lens of 2-in. diaphragm and 10-in. focal length would receive a number equal to $\frac{2 \times 2}{10 \times 10} = \frac{1}{25}$. It would be twice as fast as one of 2 in. diaphragm and 14 in. focal length, and therefore rated as $\frac{2 \times 2}{14 \times 14} = \frac{4}{196} = \frac{1}{50}$ approx.—since $\frac{1}{25}$ is twice $\frac{1}{50}$.

But, with one or two exceptions, it has been the sensible practice to mark diaphragms with numbers which are related not to their relative speeds, but to the relative times of exposure required by them; which are, in fact, measures of the "slowness" of a lens, or its "inertia," as Hurter and Driffield proposed to call it. Although photographers habitually refer to the "speed" of a lens, the numbers which are commonly used for lens apertures are actually "slowness" numbers. We will return to this question directly.

Effective Diaphragm Aperture.

In the case of a lens with the diaphragm in front of it and receiving parallel rays, as shown in fig. 1, the real or effective aperture—that is, the sectional area of the largest beam of parallel rays which can pass through the lens, is the actual aperture in the diaphragm, sometimes called the nominal aperture. In other cases, however, the effective diameter is greater.

The chief cause of increase of the effective aperture, and the only one which is regularly taken into consideration in the marking of lenses with aperture numbers, is the condensing action of a positive lens placed in front of the diaphragm, as in all doublet and most compound lenses, or when a single lens is used with the diaphragm behind it. Fig. 2 illustrates both the action of a front lens in this respect and the method of measuring the effective diameter. A pencil ab of parallel rays incident on the front lens is rendered convergent by the latter, so that its diameter dd_1 at the diaphragm corresponds with its real diameter ab. In the case of many lenses of large aperture relatively to the focal length, neglect to use ab and not dd_1 as the aperture when determining the F. number may result in the "speed" of a lens being underestimated to an appreciable extent. The error will vary with the focal length

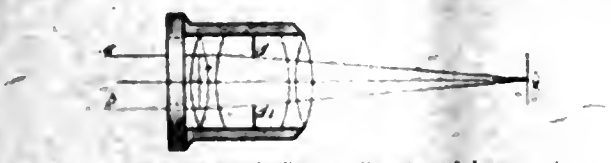

Fig 2.—Measurement of effective diameter of lens aperture

of the front element and also with the distance of the diaphragm from the front element. Miethe has given the following factor for the calculation of the effective diameter, viz., $\frac{f}{f-y}$, where f is the focal length of the front lens, and y the distance of the diaphragm behind the lens. If d is the actual diameter, the effective diameter is

$$d \times \frac{f}{f-y}$$

It is, however, preferable to make a direct measurement (fig. 2). The lens is focussed on a very distant object and the ground glass replaced by a card having a central pinhole aperture in it. In the dark room, a lighted candle or electric bulb is placed close against the pinhole. Since the latter is at the focus of parallel rays, light from the source in this position emerges as a parallel pencil of diameter ab if the diameter of the aperture is dd_1. The pencil may be allowed to impinge on a bit of ground glass pressed against the lens hood and the diameter of the bright disc measured with a pair of dividers; or a scrap of bromide paper may be fixed in the lens cap, exposed there for a few seconds, developed and the diameter of the black disc measured. The diameter so ascertained is the real or effective aperture diameter for the purpose of determining the relative aperture, as described in a subsequent paragraph.

In the case of lenses of all types the effective diameter of the diaphragm aperture, as distinguished from the actual diameter, is presumed to be employed by the makers in determining the relative aperture or f number, and since the practice shows the lens to be of higher "speed" it is not likely to be omitted.

The effect of employing the effective instead of the actual diameter of the stop is to reduce the F. No. in a proportion amounting to as much as 15 per cent. or 30 per cent. according to the type of lens. For example, an anastigmat which has a maximum aperture of $f/4.6$ on the basis of dividing the focal length by the actual diameter of the stop may really have an F. No. of $4.6 \div 1.1 = f/4.2$. The same factor of 1.1 will apply equally to all the smaller stops.

Variation of Effective Aperture with Distance of Object.

Apart from the condensing action of a lens element in front of the diaphragm, described in the preceding paragraph, the effective diameter of the aperture may vary, usually to a very

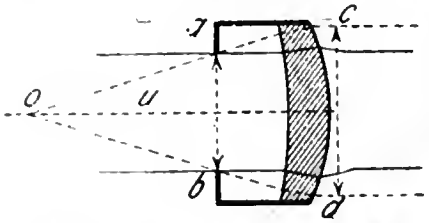

Fig. 3.—Variation of effective aperture with distance of object.

minor extent, when the object is relatively near to the lens, and the incident pencil of rays is therefore divergent. This effect, which has been called "inconstancy of aperture," arises, for example, with a single lens having the diaphragm in front (fig. 3). For practically parallel rays aa, bb from a distant object, the effective diameter is the actual diameter ab. But for rays from an object O at a relatively small distance u, the effective diameter is plainly that of the pencil of rays oc, od, in the plane of the lens, viz., cd. It will thus be seen that the effect varies directly with the distance y of the diaphragm from the lens, and inversely with the distance u of the object. According to C. Welborne Piper, who examined this question, the factor by which the effective aperture for parallel rays should be multiplied in order to give the effective aperture under given conditions is

$$1 + \frac{y}{u}.$$

Since y is usually a small quantity relatively to u, it is obvious that the error which is corrected by the application of this factor is necessarily small. In most cases it is insignificant. The circumstances in which it becomes appreciable are of rare occurrence, *e.g.*, the employment of a single lens (with diaphragm in front) for copying-enlarging direct. Generally the quantity y in the formula is the distance of the entrance pupil of the lens from the node of admission. Since, as a rule, these two imaginary places in a lens are close together, the ratio y/u becomes very small, and the factor approximates to 1. Thus in ordinary calculations relating to the effect of aperture diameter on exposure, depth of focus, etc., it is customary to neglect variations from this cause.

B

Lens Aperture Numbers: F (*i.e. f/d*) Numbers.

Since the intensity of the lens image is proportional to the square of the diaphragm aperture (d^2) and inversely proportional to the square of the focal length (f^2), it follows that, in rating lenses as regards the exposure required, the effect of these two factors needs to be exactly reversed. The exposure, with a given diaphragm aperture, will be proportional to the square of the focal length (*i.e.*, to f^2), and, with a given focal length, inversely proportional to the diaphragm aperture (*i.e.* to d^2). In other words, the measure of the relative slowness of any lens will be $\frac{f^2}{d^2}$.

Opticians, however, have not generally adopted this basis, no doubt for the reason that it yields a wide range of numbers. On this system, for example, $f/4$ would be 16 and $f/32$ would be 1024. Lower numbers and an equal facility of calculating exposures can be obtained in another way, namely, by taking as a basis the ratio f/d, instead of f^2/d^2. On this basis the times of exposure are proportional to the squares of the numbers so obtained, but the necessity of making calculations with the squares of the numbers is avoided by making the diaphragm apertures conform, as regards size, to a standard series of f/d ratios, each representing an *area* of aperture, half the next larger and double the next smaller. By this means lenses are standardised as regards their aperture numbers (with the exception, in many cases, of the largest aperture), and at the same time calculation of exposures with the different stops is made exceedingly simple.

I believe it was the Frenchman, Leon Vidal (1833-1906) who was the first to suggest, about 1860, in his *Calcul des Temps de Pose*, that lenses should be marked with the definite ratio of diaphragm-aperture/focal length. Previously the indications of "speed" were very loose, *e.g.*, "cabinet lens with 1-in. stop." Vidal's suggestion, excellently conceived as it was for making lenses comparable as regards exposure, was, however, only a half-way step. It did not provide against opticians choosing any values of d/f for the series of stops of their lenses, *e.g.*, 1/12, 1/18, 1/20. It provided a relative and comparable measure of the speed of lenses, but it did not remove the necessity of making the awkward "square" calculations when comparing the exposures required with different stops. Opticians, however, perceived the usefulness of doing this for individual lenses, and in 1881 a committee of the (now) Royal Photographic Society recommended the universal adoption of a series of specific aperture ratios; the largest, one-quarter the focal length of the lens and the smaller ones successively half the area of the next larger. Since a disc of half the area of another has a diameter of $\frac{1}{1.4}\left(=\frac{1}{\sqrt{2}}\right)$ of the latter, the series of suggested ratios were:—

$\frac{d}{f}$ (Intensity ratios)	$\frac{1}{4}$	$\frac{1}{5.6}$	$\frac{1}{8}$	$\frac{1}{11.3}$	$\frac{1}{16}$	$\frac{1}{22.6}$	$\frac{1}{32}$	$\frac{1}{45}$	$\frac{1}{64}$

Expressed the other way about, it was suggested that the apertures of all lenses should be so chosen that by dividing the diameters in turn into the focal length the numbers obtained are:—

$\frac{f}{d}$ (F. No.)	4	5.6	8	11.3	16	22.6	32	45	64
U.S. ...	(1)	(2)	(4)	(8)	(16)	(32)	(64)	(128)	(256)

It was provided that the maximum aperture, in cases where it did not happen to be in accordance with this system, should be separately calculated by dividing it into the focal length, and the F No. so obtained marked on the lens.

The Royal Photographic Society further elaborated this system by proposing that the aperture $f/d = 4$ (*i.e.*, $f/4$) should be taken as a unit and the smaller apertures given numbers proportional to the required exposures, yielding the numbers shown in brackets above. This so-called Uniform System (see below) did not become generally employed. Instead, the particular f/d numbers, which previously had been employed by some makers and users of lenses, came into more extended use.

These F. Nos., as we now call them, thus denote the "relative aperture" of a lens, the terms "aperture" or "stop" being often loosely employed as equivalent designations. The customary method of writing these aperture numbers, *e.g.*, $f/4$, $f/8$, is a symbol of the fact that the diameter of the diaphragm is one-fourth or one-eighth the focal length of the lens.

In the technical and commercial writings of Continental opticians it is usual to express this ratio in the inverse form, *i.e.*, 1:8 (*i.e.*, d/f) instead of $f/8$. This inverse value is termed the *clarté* of a lens in France, and the *Lichtstärke* in Germany. The equivalent term, *intensity ratio* and values corresponding thereto, are seldom used by English writers. Even in France and Germany these intensity ratios, in their precise form, have not been commonly marked on lenses since about 1900.

The particular feature of the R.P.S. series of ratios is that it provides apertures of successively doubled area. Hence exposures with the various stops stand in this same simple relation. $F/5.6$ requires twice the exposure of $f/4$, and $f/11.3$ eight times. Similarly, $f/8$ requires a quarter the exposure of $f/16$ and 1/32 of $f/45$.*

Successive multiplication by 2 thus replaces calculations with the squares of the numbers, except in the case of an odd number, *e.g.*, $f/6.8$, for the maximum aperture. For this it is, of course, necessary to ascertain its relation to, say, the next smaller stop on the basis of the squares of the respective numbers. Thus, compared with $f/8$, exposure required by $f/6.8$ is $\frac{6.8 \times 6.8}{8 \times 8} = \frac{46}{64}$, or very nearly $\frac{3}{4}$; whilst the exposure with $f/8$ is $\frac{4}{3}$ times $= 1\frac{1}{3}$ times that with $f/6.8$.

Before leaving the F. No. system of marking of lens apertures it may be pointed out that since the F. No. is $\frac{f}{d}$, the diameter d of the aperture is $\frac{f}{\text{F. No.}}$. It is, therefore, simple to find the diameter of aperture required for any special F. No., since, with a given focal length, the diameter varies inversely as the F. No. Thus, if an F. No. of $f/4.5$ is produced by an aperture of 2-in., the aperture for $f/5.6$ on the same lens will be $2 \times 4.5 \div 5.6 = 1.6$ in. $= 1\frac{5}{8}$ in. very nearly.

Also, the diameter of a diaphragm requiring twice the exposure of another is calculated from the relation that exposure varies inversely as the square of the diameter. If d_1 and d_2 are two diameters and E_1 and E_2 the respective exposures, then

$$\frac{E_1}{E_2} = \frac{d_2^2}{d_1^2}.$$

If E_2 is required to be twice E_1, then

$$d_2^2 = \frac{d_1^2}{2}$$

Therefore $d_2 = \frac{d_1}{\sqrt{2}} = \frac{d_1}{1.4}$

That is, a diameter aperture requires to be divided by 1.4 (multiplied by 10 and divided by 14) in order to give one requiring twice the exposure. For one requiring half the exposure, the diameter is, of course, multiplied by 1.4.

Other Systems of Aperture Numbers.

Although the Royal Photographic Society's system of marking lens apertures with specific f/d values (F. Nos.) is

* It should be noted that the rule above given does not necessarily hold good in all cases. This arises from the variation in sensitiveness exhibited by a plate according to the intensity of light acting on it. Exposure, that is the amount of light-action, is made up of intensity of light I × time, t, of action, and in some circumstances the same effects are not produced by great variations of I and t, whilst maintaining a constant product I × t. The intensities of light passed by the stops $f/4$ and $f/64$, for example, are in the proportion 256:1, but an exposure of 256 seconds at $f/64$ may not produce so great an effect as 1 sec. at $f/4$. Departure from the rule in this direction may be considerable with slow plates and feeble intensities of light, but with rapid plates exposed on outdoor subjects, that is to say, under the customary conditions of photography, variation from the rule of the F. Nos. is usually negligible

now in almost universal use, a number of other systems have come into use from time to time during the past fifty years. These might be allowed to remain in the oblivion which has overtaken them but for the fact that many lenses were issued with apertures marked according to the systems. These lenses exist to-day in the second-hand market, and their aperture markings are frequently a cause of mystification to their purchasers.

In 1881, as already stated, the (now) Royal Photographic Society proposed that a relative aperture of *f*/4 should be taken as the unit, and smaller apertures be given numbers proportional to the required exposures. This was named the "Uniform System," contracted to U.S.; as it was adopted for the longest period for Kodak cameras (made in America) its designation has been confused with "United States." Lenses by leading British and Continental makers are occasionally found with U.S. stops. The system was officially abandoned by the Royal Photographic Society in 1900, when giving its formal approval to the F. No. system already described, which, during some years previously, had been in almost universal use. F. Nos. equivalent to U.S. numbers are:—

U.S. ..	1	2	4	8	16	32	64	128
F. Nos. ..	*f*/4	*f*/5.6	*f*/8	*f*/11.3	*f*/16	*f*/22.6	*f*/32	*f*/45

In 1899 an International Congress of Photography, held in Paris, proposed *f*/10 as the unit aperture, apparently out of respect for the alleged benefits of decimalism. Larger and smaller apertures received numbers proportional to the required exposures, those for the former, therefore, being fractions. It seems that many French lenses were marked according to this system, equivalent values of which are:—

Paris Congress	.125	.15	.25	.3	.5
F. Nos.	*f*/3.5	*f*/3.9	*f*/5	*f*/5.5	*f*/7

Paris Congress ..	1	2	4	8	16	32
F. Nos.	*f*/10	*f*/14	*f*/20	*f*/28	*f*/40	*f*/56

A unit aperture of $f/\sqrt{10} = f/3.16$ was formerly adopted by the firms of Dallmeyer, Goerz and Voigtländer. Smaller apertures were chosen proportional to the required exposures, but differently by the respective makers. As far as can be ascertained, this system was employed by these firms for lenses issued, respectively, in the following periods:—Dallmeyer, 1886-1898; Voigtländer, about 1889-1907; and Goerz, about the same period. The dates may sometimes be of service in approximately fixing the age of a lens. Equivalent F. Nos. are:—

Dallmeyer..	.5	.75	1	1.5	2	2.5	3	3.5	4	5
F. Nos. ..	*f*/2.2	*f*/2.7	*f*/3.16	*f*/3.9	*f*/4.5	*f*/5	*f*/5.5	*f*/5.9	*f*/6.3	*f*/7

Dallmeyer..	5.5	6.5	7.5	10	15	20	25
F. Nos. ..	*f*/7.4	*f*/8.1	*f*/8.7	*f*/10	*f*/12.2	*f*/14.1	*f*/15.8

Dallmeyer	30	40	50	75	100	150	200	250	300	400
F. Nos. ..	*f*/17.3	*f*/20	*f*/22.4	*f*/27.9	*f*/31.6	*f*/38.7	*f*/44.7	*f*/50	*f*/54	*f*/63.6

Goerz ..	2.3	4	6	9	12	24	48	96	192	384	768
F. Nos. ..	*f*/4.8	*f*/6.3	*f*/7.7	*f*/9.5	*f*/11	*f*/15.5	*f*/22	*f*/31	*f*/45	*f*/62	*f*/87.6

Voigtländer	1	1.6	2	4	6	8	16	32
F. Nos. ..	*f*/3.16	*f*/4	*f*/4.5	*f*/6.3	*f*/7.7	*f*/9	*f*/12.6	*f*/18

Voigtländer	64	128	256
F. Nos. ..	*f*/25.3	*f*/36	*f*/50.6

All the above systems resemble that of F. Nos. in being measures of slowness: the lower the aperture number the faster the lens. One system, apart from that of intensity ratio (*clarté* or *Lichtstärke*, *vide ante*) has been used according to which diaphragms were marked with numbers proportional to the relative intensity of the image and, therefore, inversely proportional to the required exposures. In 1890 the firm of Zeiss adopted *f*/100 as the unit aperture (marked No. 1), larger apertures (requiring successively ½, ¼ the exposure, and so on), being marked No. 2, No. 4, No. 8, and so on. Equivalent F. Nos. are:—

Zeiss *f*/100 unit	1	2	4	8	16	32	64
F. Nos. ..	*f*/100	*f*/70.7	*f*/50	*f*/35	*f*/25	*f*/17.5	*f*/12.5

Zeiss *f*/100 unit	128	200	256	320	512	600
F. Nos. ..	*f*/8.8	*f*/7.1	*f*/6.3	*f*/5.6	*f*/4.4	*f*/3.6

Subsequently apertures were marked according to the same system, but with *f*/50 as unit. Equivalent apertures are:—

Zeiss *f*/50 unit	1	2	4	8	16	32
F. Nos. ..	*f*/50	*f*/35	*f*/25	*f*/17.5	*f*/12.5	*f*/8.8

Zeiss *f*/50 unit	64	80	100	128	160	200
F. Nos. ..	*f*/6.3	*f*/5.6	*f*/5	*f*/4.2	*f*/4	*f*/3.5

According to Messrs. Zeiss, lenses marked with these intensity or exposure Nos. were issued only for a few years during the early period of their manufacture of lenses.

Aperture Number Conversion Rules.

To Convert from U.S. Nos. to f/Nos.—Multiply square root of U.S. No. by 4, *e.g.*, U.S. No. 64. $\sqrt{64} = 8$. $8 \times 4 = f/32$.

To Convert from International Congress (C.I.) Nos. to f/Nos.—Multiply square root of I.C. No. by 10, *e.g.*, I.C. No. 16. $\sqrt{16} = 4$. $4 \times 10 = f/40$.

To Convert from Dallmeyer, Goerz or Voigtländer Nos. to f/Nos.—Multiply square root of the Dallmeyer, etc., No. by 3.16, *e.g.*, Dallmeyer No. 100. $\sqrt{100} = 10$. $10 \times 3.16 = f/31.6$.

To Convert from Zeiss Nos. (Unit f/100) to f/Nos.—Divide 100 by square root of Zeiss No., *e.g.*, Zeiss No. 16. $\sqrt{16} = 4$. $100 \div 4 = f/25$.

To Convert Zeiss Nos. (Unit f/50) to f/Nos.—Divide 50 by square root of Zeiss No., *e.g.*, Zeiss No. 16. $\sqrt{16} = 4$. $50 \div 4 = f/12.5$.

Variation of Relative Aperture with Scale of Reproduction.

As has already been shown, if an object is at a comparatively small distance from the lens, such that its image is formed at a distance v from the lens, the relative intensity of the image is $\frac{d^2}{v^2}$. If the object is at such a distance that rays from it are practically parallel at the lens, the intensity is greater, and is $\frac{d^2}{f^2}$. This arises from the fact that in the former case the image is spread over an area which is greater in the proportion of v^2 to f^2.

Hence the exposure required, with a given F. No., varies in the proportion of $v^2 : f^2$ when photographing objects on any scale of reproduction, inclusive of enlarging, with lenses of different focal lengths, but used at the same nominal relative aperture.

There are two methods of making allowance for this fact in calculating times of exposure when copying originals or copying-enlarging. One is to give to the relative aperture the actual value corresponding with the conditions by replacing f by v in the ratio (F. No.) f/d (that is, by dividing the camera extension v by the diameter of the stop), and then to calculate the exposure according to the usual rule that the required exposure is proportional to the square of the F. No. This is inconvenient since the effective diameter may not be known. It is better to use the alternative plan, viz., to base the exposure on the nominal F. No. (as marked on the lens), increasing it according to the camera extension v by multiplying by $\frac{v^2}{f^2}$.

But, as a rule, these calculations are needed when using the same lens and the same stop for different scales of reduction or enlargement, ranging from, say, 1/10 reduction to about 10 times enlargement. In such circumstances it is usual to take as a standard the exposure required when copying an original "same size," and to draw up a scale of the shorter exposures when copying on a reduced scale and of the longer exposures when copying-enlarging. Since in much copying work there is not the necessity to know the scale of reproduction, it is convenient in practical work to mark the camera baseboard so that the extension is an indicator of the exposure which is required compared with that when copying same size.

This is very readily done on the basis that in same-size copying the plate is two focal lengths from the lens, and the

exposure is therefore four times that when copying an original at, say, thirty focal lengths from the lens. With the camera set in focus for same size, a distance equal to the focal length of the lens is measured on the baseboard from the surface of the plate. This is the zero point, *i.e.*, the focus for distant objects. If, now, from this point we make marks at intervals of, say, 1 in. towards the rear (supposing the camera is, as it should be, of the rear-focussing pattern) the exposures required at the various extension marks will be proportional to $(f + 1)^2$, $(f + 2)^2$, and so on. If each of the numbers so obtained is divided by $4f^2$, the result in each case is the number of times of exposure compared with that for same-size copying. An example with a 5-in. lens will make this clear:—

Distance behind focus for distant objects.	Focal Extension.	Relative times of exposure.	Times of exposure compared with that for same size.
inches.	inches.		
1	5 + 1 = 6	$6^2 = 36$	.36
2	5 + 2 = 7	$7^2 = 49$	.49
* *	* * *	* * *	* * *
5 (= *f*)	5 + 5 = 10	$10^2 = 100$	1.0
6	5 + 6 = 11	$11^2 = 121$	1.2
7	5 + 7 = 12	$12^2 = 144$	1.4

But here we are straying somewhat away from the effect of the diaphragm into that of scale of reproduction, and must return to consider another cause of variation in diaphragm aperture, namely, angle of the rays falling on the lens.

G. E. B.

(To be continued.)

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

PHOTOGRAPHIC INSTRUCTION IN MANCHESTER.—The prospectus of the printing and photographic department of the Manchester Municipal College of Technology for the session 1921-22 has just been published, and may be obtained on application to the head of the department, Mr Charles W. Gamble, O.B.E., M.Sc. The department provides a series of courses of instruction in photography and photo-mechanical processes for both those who can attend only in the evenings and those who can undertake systematic study in the day-time. For the latter a full course has been arranged, extending over two sessions, each of 40 weeks, for the purpose of providing thorough preliminary training of those intending to follow some branch of the industry of photography. This course consists of lectures and practical work, and in addition includes instruction at the Manchester High School of Commerce in the elements of business practice. Special emphasis deserves to be laid upon the value of a systematic course of this kind to those intending to earn a livelihood in almost any branch of photography. There must be a great many within, say, twenty miles of Manchester who are between the ages of, say, 17 and 21, and are intending to qualify themselves by a knowledge of the principles and practice of photography. This full-time course provides the means of doing so for an extremely moderate sum. For the classes in particular subjects, such as negative making, portraiture, retouching, bromide printing, etc., and also for those in half-tone and line photo-engraving, the prospectus of the Department should be consulted. The session begins on Monday, October 3.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, August 29 to September 3:—

VIEW-FINDERS.—No. 23,478. View-finders for photographic cameras. W. J. D. Walker.

ELECTRIC PRINTERS.—No. 22,825. Electric photographic printing or copying machines. J. B. Halden and J. Halden and Co., Ltd.

PROJECTION SYSTEMS.—No. 23,461. Optical projection systems. A. Warmisham.

CINEMATOGRAPHY.—No. 23,425. Motion-picture apparatus. J. Mery.

PHONOGRAPHIC FILMS.—No. 23,275. Production of tone films. P. Dresla and W. Graaff.

CINEMATOGRAPHY.—No. 22,841. Moving-picture machines. F. F. Abbott.

CINEMATOGRAPH-PHONOGRAPH.—No. 23,273. Cinematographic and phonetic machines. P. Dresla and W. Graaff.

CINEMATOGRAPH-PHONOGRAPH.—No. 23,276. Apparatus for taking animated pictures and recording tone oscillations. P. Dresla and W. Graaff.

SOUND-RECORDS.—Nos. 23,118 and 23,120. Photographic apparatus for recording sound. H. G. Matthews.

SOUND-RECORDS.—No. 23,119. Photographic apparatus for reproducing sound. H. G. Matthews.

STEREOSCOPY.—No. 23,440. Means for obtaining stereoscopic pictures. E. H. Wright.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

PATHÉ.—No. 411,956. Cinematograph films, cinematograph apparatus and accessories thereto, all being goods included in class 8. Pathé Frères Cinema, Ltd., 103-109, Wardour Street, London, W.1, merchants and manufacturers.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

LUXURIA.—No. 384,285. Photographic sensitised paper. Paget Prize Plate Co., Ltd., 132, St. Alban's Road, Watford, photographic plate and paper manufacturers. Class 39.

NILTONA.—No. 384,284. Photographic sensitised paper. Paget Prize Plate Co., Ltd., 132, St. Alban's Road, Watford, photographic plate and paper manufacturers. Class 39.

EPCOTAR.—No. 360,701. Carl Zeiss. (Applied for April, 1914.) In class 8.

REGISTRATIONS RENEWED.

ACIFIX.—No. 294,316. John J. Griffin and Sons, Ltd. Registered in 1907 in class 1.

AEROGRAPH.—No. 294,308. The Aerograph Co., Ltd. Registered in 1907 in class 6.

CITOL.—No. 293,546.—Chemische Fabrik auf Actien (vorm E. Schering). Registered in 1907 in class 1.

ILFORD.—No. 294,706. Ilford, Ltd. Registered in 1907 in class 1.

ILFORD.—No. 294,707.—Ilford, Ltd. Registered in 1907 in class 8.

ILFORD.—No. 294,708. Ilford, Ltd. Registered in 1907 in class 39.

IMPERIAL.—No. 293,654. The Imperial Dry Plate Co., Ltd. Registered in 1907 in class 1.

IMPÉRIAL.—No. 294,497. The Imperial Dry Plate Co., Ltd. Registered in 1907 in class 39.

RAJAR.—No. 287,481. Rajar, Ltd. Registered in 1906 in class 39.

SCALOL.—No. 293,843. Johnson and Sons, Manufacturing Chemists, Ltd. Registered 1907 in class 1.

SEPIANA.—No. 294,375. Ilford, Ltd. Registered in 1907 in class 39.

SILVAMAR.—No. 294,685. Carl Zeiss. Registered in 1907 in class 8.

VERICHROME.—No. 293,413. Wratten and Wainwright, Ltd. Registered in 1907 in class 1.

TRADE MARKS REMOVED FROM REGISTER.

In the official language of the "Trade Marks Journal" the following trade marks have been "removed from the register through non-payment of renewal fees" Such non-payment is of course the method adopted by a firm having no further occasion for the use of a mark.

N (HANGING SIGN).—No. 291,997. Houghtons, Ltd. Registered in 1907 in class 1.

ROTONA.—No. 292,948. The Rotary Photographic Co., Ltd. Registered in 1907 in class 39.

CARBOGRAPH.—No. 292,947. The Rotary Photographic Co., Ltd. Registered in 1907 in class 39.

ULTILUX.—No. 294,317. John J Griffin and Sons, Ltd. Registered in 1907 in class 8.

WELLINGTON SPEEDY (LABEL DESIGN).—No. 294,456. Wellington and Ward. Registered in 1907 in class 1.

PUSHASE.—No. 291,795. Fuerst Bros., Ltd. Registered in 1907 in class 1.

ALLOCHROME.—No. 293,412. Wratten and Wainwright, Ltd. Registered in 1907 in class 1.

New Materials.

Etching-Brown Kodura Developing Paper. Made by Kodak, Ltd., Kingsway, London, W.C.

In this new paper the Kodak Company have sought to provide the portrait photographer with a printing material which, as regards speed, comes between the two grades of Kodura at present on the market, namely, that designated in the one case by single letters, A, B, C, etc., and that issued as BB, CC, etc.

A distinctive feature of the new material is the colour of the prints—a cool brown or warm black, as one may equally describe it. This is obtained directly in the developer by the use of a metol-hydroquinone formula, which differs from those commonly employed only in containing a somewhat greater proportion of bromide. The latter, however, owing to the characteristic quality of the emulsion, does not prolong the time of development. On the contrary, prints on the new paper obtain full depth in about two minutes when using the developer preferably somewhat warmer than is the general rule, namely, at a temperature of 68 deg. F.

Compared with bromide paper, Etching-Brown Kodura is, of course, a relatively slow paper. Using a fairly quick-printing negative, we found that we got correctly exposed prints when giving a time of about 10 seconds at a distance of about 18 inches from a 120 c.p. half-watt lamp. It will thus be seen that fairly ample provision of lamp-power in the printing box is required for short exposures, particularly if the negatives incline towards density.

The formula for the developer is:—

Elon (or metol)	60 grs
Soda sulphite, cryst.	3½ ozs
Hydroquinone	240 grs.
Soda carbonate, cryst.	3½ ozs
Potass. bromide, 10 per cent. solution	1 oz. fl
Water, to make	80 ozs

Equal parts of this stock solution and water are mixed to form the working developer.

The results upon the papers, as regards pleasing colour, brilliancy, range of gradation, and surface texture are excellent. It is evident that while giving users the benefit of considerably greater sensitiveness, the makers have succeeded in producing a paper which is highly responsive to the quality in the negative, and in that sense possesses the quality of latitude so much desired in a printing paper.

The paper is made in four varieties, all of thick substance, but two of smooth texture and two of rough. The smooth papers correspond in surface approximately with what is called "velvet" or semi-glossy surface; the rough excellently simulates the natural surface of a paper somewhat resembling that of a good drawing paper. In each surface the paper may be obtained either white or cream, the cream tint enhancing to a remarkable degree the warm colour of the image. There is no doubt that professional photographers will have a great interest in making trial of this new printing medium.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, SEPTEMBER 18.

North Middlesex P.S. Outing—Somewhere in London.

MONDAY, SEPTEMBER 19.

Society of Photographic Writers, Liverpool. Members meet at 8 p.m., at 31, August Road.

South London Phot. Soc. "Story of a Photographer with two Lenses." A. Dordan Pyke.

TUESDAY, SEPTEMBER 20.

Hackney P.S. "General Hints to Beginners." J. J. Beasley.

Manchester Amateur Phot. Soc. "Rothenburg and its Festival Play." Jas. Shaw.

THURSDAY, SEPTEMBER 22.

Hammersmith Hampshire House P.S. "A Four Hundred Mile Walk in Dolomite Tyrol." Jas. Shaw, F.R.P.S.

North Middlesex P.S. "Ireland." C. H. Oakden, F.R.P.S.

SATURDAY, SEPTEMBER 24.

City of London and Cripplegate P.S. Outing to Bankside.

Hackney P.S. City Outing. H. E. Wood.

CROYDON CAMERA CLUB.

The notice-board last week plaintively inquired "Will Somebody Oblige?" All responsible officials were absent, including the president on a walking tour in Devon. He wrote, saying "his movements were uncertain," doubtless not appreciating this would be attributed by members to the virtue of Plymouth gin. Later the secretary drifted in, but revealed nothing in the nature of a fixture. He was told to take off his hat, and otherwise spoken to severely.

They then cast about for a subject, and eventually settled down to a consideration of the exciting circumstances leading up to the threatened extinction of the dry-plate, and it may be recorded in advance that it was unanimously agreed it would survive for many a long day, with or without monkey-gland. All available bearing on the subject was first read—Messrs. Kodak's announcement, Mr. Lambert's letter in the "B.J.," a recent editorial in the "A.P." (so far as it went, considered much to the point), and Messrs. Wellington's jocular counterblast.

Candour, as is usual, marked the discussion, and Mr. Hibbert, who opened it, said that although Messrs. Kodak had ceased to supply or make Eastman plates, Wratten plates at least continued to be manufactured. Possibly the various dry-plates produced by the latter firm met all practical requirements, and if this were so, Messrs. Kodak, in first-class style, had secured a first-class advertisement for a first-class film, at the same time relieving themselves of multiplicity of brands in dry-plates. He had nothing but praise for the Kodak "portrait film," but several, to his knowledge, who had given it a good trial, had reverted to dry-plates for various reasons. For one thing, many retouchers strongly objected to the film.

Mr. Berry said the quality of the film was superb, but in speed it could not compare with the modern ultra-fast dry-plate, a boon, if not an actual necessity, when taking children in the studio. Ease of storage and minimum of weight were also strong points in favour of the later comer. On the other hand, he had found the manipulations more troublesome, and varnishing presented difficulties. He had never worked larger sizes than whole-plate, fearing the slight curvature of the film with long-focus large-aperture portrait lenses might lead to trouble, for here exact coincidence of the sensitive surface and the focussing screen was of great im-

portance. He had also found that if the films were retouched by an artificial light, which gave perceptible heat, they cockled badly if not quite dry. Mr. Hibbert pointed out that if the special contrivances sold for use with the film were employed—somewhat expensive, by the way—manipulations were as simple as with glass plates. Mr. Berry said he had not used them.

The ever-cheerful Mr. Keifer apprehended an immediate declaration of war between the U.S.A. and this country, with the battle-cry "Films *versus* Plates!" Mr. Sellors failed to understand what all the hullabaloo was about. Messrs. Kodak had a perfect right to give up making dry-plates if they so chose, and photographers had an equal right to use what they preferred. Personally, he should continue in the dear old senile way. He agreed with Mr. Berry that the films were easily stored, a direct incentive to professionals to carry a larger stock of old negatives than would be the case with the far more bulky glass plates. When the fire insurance companies tumbled to the fact that thousands of celluloid negatives might be on the shelves, they would certainly have something to say. Mr. Salt endorsed the favourable opinions expressed about the portrait film, and had an equally good word for the "commercial" brand. He had been much interested in Mr. Hibbert's opening remarks. If the facts were as stated, it seemed that a good many unsuspecting souls were having their legs badly pulled. Others also spoke; some to the point. The debate closed at a somewhat late hour, the chairman, Mr. F. C. Reynolds, proposing a hearty vote of thanks to all who had not contributed to it.

News and Notes.

KALOSAT LENSES.—A prospectus of these quartz soft-focus lenses of the Hanovia Chemical and Manufacturing Co., Newark, N.J., comes to us from Ad. Harz, Weggiss, Switzerland, sole agent for the lenses in Europe.

CITY GUILDS MEDAL.—The silver medal offered in the final examination in photography held by the City and Guilds of London Institute, in May last, has been awarded to Mr. Philip Brain, a member of the Royal Photographic Society and a student in the photographic school of the Regent Street Polytechnic.

STOLEN KODAK.—An Autographic Kodak, No. 5,593, Special No. 1, fitted with Bausch Kodak *f*/6.3 anastigmat in Velosto shutter and contained in a velvet-lined leather case, was stolen from an omnibus in London last week. Any dealer to whom the camera may be offered is asked to communicate with Captain Donald, 21, Rotherwick Road, London, N.W.11.

AIR BRUSH CONTROLLED BY SLOPE.—An American scientific journal states that an air brush that atomises its liquid contents in the usual manner by means of compressed air, has a special feature of control that depends entirely upon the manner in which the brush is held. The intensity of the spray is regulated by inclining the brush, more or less, according to the pressure required. The greater the angle of inclination the more will the colour be divided. The spray is stopped by simply restoring the brush to its normal position.

PHOTOGRAPHS TO PROVE PROPER PACKING.—A machinery-manufacturing concern in Massachusetts has found a new use for photography. Before putting on the cover of a box the contents are photographed to show that they are securely and properly packed. One of the prints is kept by the shipper, while the other is forwarded to the consignee. In the event of damage in transit, both the shipper and the customer have proof that it was not due to negligence in packing. The consignee's print is valuable, also, as a guide in unpacking complicated machinery.

THE BEST LONDON VIEWS.—During a correspondence in the London newspapers last week, in which the most pictorial scenes to be found in London were discussed, the "Daily Graphic" published some little known views taken in the Parks. These landscapes must have come as a pleasant surprise even to those who claim to know London well; one of the views taken in Kensington Gardens near by Lancaster Gate was most picturesque, reminding one of Versailles. Publishers of picture postcards will no doubt benefit by the correspondence and the publication of the pictures.

ALDIS SOFT-FOCUS ATTACHMENT.—Messrs. Aldis Bros., Sarehole Road, Sparkhill, Birmingham, offer to send for stamps sufficient to cover postage a booklet containing an actual photograph showing the soft-focus effect obtained by the diffusion device which can be fitted to the larger lenses of the *f*/4.5 Series I. at the extra cost of 22s. over the price of the lens in ordinary iris mount. The attachment is of considerable value in portraiture, and has the further advantage of giving pleasantly diffused landscape negatives whilst using a lens which is of the light and compact type convenient for outdoor work.

FOUR HUNDRED PORTRAITS OF WOULD-BE BRIDES.—Matrimonial agencies and beauty shows have their opponents, but one must admit that they bring grist to the photographer's mill. Last week's newspapers told of a man in far away Vancouver who wrote to the Mayor of Brighton asking him to find him a wife. The letter to the Mayor was published in the Press, and four hundred letters from would-be brides were sent to Brighton, and the letters, with all the enclosed photographs ("some of them very pretty girls," says the Mayor) are to be sent to Vancouver, where the lonely young man will be for some time busily engaged in reading the letters and examining the many photographs.

COSTLY PROMISES.—So few photographers keep their promises to send snapshots, that it is quite refreshing to hear of one who has. A writer in the "Star" says:—"Photography is certainly a delightful hobby, but don't let it run away with you. This year on my holiday I took snaps of everything and everybody, and thought what a delightful lot of little pictures I should be able to paste in my holiday memory book kept for that purpose. But, alack and alas! everyone 'snapped' wants a print, and not having the time to develop or even print my own films, I find myself faced with a stupendous bill and the trouble of sending the snaps away to the various people who figure therein. Verily I shall think before I snap another year!"

DYE-PRINTING PAPER.—A recent German patent, No. 337,173, of the Badische Anilin Company, describes the preparation of a sensitive printing paper by means of the compounds obtained by precipitating certain acid dyes with aromatic paradiamino componnds. According to the specification, the coating mixture is made by mixing together 100 parts of 30 per cent. blanc fixe paste (barium sulphate) and 10 parts calcined soda, with 100 parts of water. To this is added a solution of 20 parts eosine A (free from salt) in 2,000 parts of water, and 880 parts of 2 per cent. benzidine hydrochloride added. A solution of 40 parts manganese nitrate in 40 parts of water is added to the mixture, which is coated on to glass or paper by means of a binding medium, such as gelatine or albumen. After exposure to light the image is fixed with borax or sodium phosphate or barium hydrate. Bluish red prints are obtained, which may be changed to a red chalk colour by means of a weak solution of calorine.

Commercial & Legal Intelligence.

NEW COMPANIES.

ART PRODUCTS, LTD.—This private company was registered on September 6, with a capital of £1,000 in £1 shares (500 "A" and 500 "B" ord.). Objects: To carry on the business of manufacturers or retail dealers in art reproductions, picture frames, prints, photogravures and engravings, photographic and cinematographic goods, etc. The first directors are: D. B. Buckland, 14, Aeroville, Colindale Avenue, Hendon, N.W.; H. J. Buckland, The Gables, Wantage Road, Lee. S.E., art dealer; S. A. Hart, 23a, Holford Square, W.C. electro plater; Samuel Reinish, 134, Bedford Street, E., sculptor. Secretary: D. B. Buckland. Registered office: 43, Clerkenwell Road, E.C.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

FILMS VERSUS PLATES.

To the Editors.

Gentlemen,—It seems to me that the policy of Messrs. Kodak of giving up the manufacture of dry plates in favour of flat films is their own private affair and need not trouble photographers very much. They ought to know better than we possibly can whether their new venture will pay them. But the place where the films are made does seem to be some concern of ours, for I fancy many of us would prefer to buy British goods if we can, price and quality being equal, so that I hope the flat film will be eventually made at Harrow, and that if it is not, those who wish can use other flat films "made in England."

The advantages of glass plates, or celluloid films, as the support of the negative image, will no doubt be a theme for discussion for a long time. Both have their good and bad points. On the whole, I am inclined to think the balance of advantage is with the films, but they have certain disadvantages. None that I have used are as rapid as the quickest plates, and in winter for children we have often been obliged to use dry plates. This disadvantage can be overcome no doubt.

Then there is the great difficulty of holding films rigid and flat during exposure. This is not a great difficulty in sizes up to half-plate, but above that size it is a serious disadvantage, and so far I have seen nothing on the market that would hold a 12 x 10, for instance. This again may be overcome in time.

Several of the difficulties mentioned by your correspondents have not troubled me, and I have been using the films for quite two years; we have found no difficulty in retouching if a black card with a hole in it is laid on the film while in the desk. This is an old arrangement we have used for a good many years when retouching a large group negative; it is an excellent device for preventing eyestrain. At first it is true retouchers complained of the film, but now they prefer them to a glass negative; they like the slight spring of the film.

When wet, the films need a little more care to prevent scratching, but a good dose of alum as soon as possible after fixing saves many defects, and also helps to hasten drying in damp weather. I think the alum prevents a good deal of damage to both back and front in the way of scratches and finger marks, and I think also a well-hardened film resists damp and wear better than one not hardened. I have not been troubled with scratches after the surface is dry, nor with damp, but I can imagine, if placed in an enlarging lantern with a condenser, they might suffer from the heat of the lantern, especially in winter, unless the film was quite free from damp.

This points to one of the disadvantages of the film, namely, the difficulty of protecting the surface with a good varnish; so far, I have found nothing quite satisfactory. Dipping in water-varnish made with borax and shellac, so as to protect both sides, proved a failure, as in a month or two the shellac turned white and opaque in patches. Gold size thinned with turpentine was not a success.

The power to work on back and front of the negative is a great advantage, and also to print from either side; but if it is necessary to use matt varnish the film must be attached to glass. Another advantage is the possibility of cutting negatives up to make a composite; the block makers find this very useful, I believe.

We do not find any difficulty in fastening them down when vignetting; a narrow strip of surgical rubber plaster will hold them firmly, and it can be peeled off without making any mark. Their lightness and unbreakableness (what a word) is another gain in storage and in sending by post. On the whole then, I think I should be sorry to have to give them up, but the proposed new regulations for the storage of celluloid, as set forth on pp. 540, 541 of your issue of September 9, if carried out, will put the users of films in a very difficult position. We are told the "stocks of celluloid shall be kept in a suitable place outside the workrooms plainly marked 'celluloid store.' *Stocks exceeding one hundredweight shall only be kept in a chamber of fire-resisting materials, in which no open light or fire shall be allowed, and which shall not be used for any other purpose than the storage of celluloid.*"

A comparatively small business would soon accumulate a hundredweight of film negatives, but how many such establishments could afford to set up a fireproof room devoted entirely to the storage of negatives?

Even now the storage of a small quantity of film negatives may invalidate an insurance policy. These new regulations if they come into force, and there seems no reason to doubt that they may, will make many professional photographers hesitate before giving up glass plates in favour of films, and those who are using films will have to consider, very seriously, whether they will be able to continue doing so.—Yours truly.

HAROLD BAKER.

Birmingham, September 10.

To the Editors.

Gentlemen,—Noticing your letter signed Mr. Andrew C. Glover, I would like to point out that I have been a constant user of the film since its advent on the market, using not one grosa but grosses. I cannot agree with Mr. Glover when he states that the film is a "nuisance to retouch." On the contrary, it is a pleasure to do so in comparison to a plate, and owing to the fineness of the grain of the film there is less modelling to be done as compared with plates. In respect to scratches and picking up dirt, this can only be caused by careless working (which, alas, applies to plates). I am simply writing this letter as a fair criticism of Mr. Glover's letter.—Yours faithfully, ALEX. S. WARD.

Boston Studios, 38, Newington Butts, S.E.11.
September 12.

To the Editors.

Gentlemen,—I have read with interest the letters in the "B.J." re Kodak film. I write as an enthusiastic user of Eastman Portrait Films, which I have used over a year, and find infinitely superior to glass plates as regards a delightful rendering of half-tones, loss of halation, portability and saving of storage space, but the one serious drawback is their inflammability. I have not yet decided the safest method of storage; also I begin to wonder how one is to get rid of "back numbers." Will the dustman reject them; if so, what is to become of them?—Yours truly,

(MISS) VIOLET K. BLAIKLOCK.

18, Elsworthy Rd., South Hampstead, N.W.3.
September 12.

To the Editors.

Gentlemen,—It would be interesting to learn what justification exists for the implication conveyed in Mr. Mallinson's letter that films are slower than plates, so much so, indeed, that he expresses pity for the photographer who has to use them in dull weather. I see no reason why an emulsion should be slower on a film than on a plate, and, in my own experience, I have not found it so. Moreover, I know of a large, high-class establishment with a specialty for child portraiture where films have ousted plates for some time past.

Perhaps because my experience with plates has been so much larger than with films, I have not found the manipulation so easy with the films, but the freedom from halation more than compensates for this. The evil of halation is not confined to weakening or fogging of adjacent dark shadows, but shows itself also in light drapery, and even on the face, where delicate half-tones are filled up, or obscured and all sparkle destroyed, by light reflected from the back of the plate.

Irradiation, as differentiated from halation, may exist in a film, as in a plate; but in a plate, unless thoroughly well backed, you may have the two evils instead of the one.—Yours faithfully,

Hampstead, W. E. DEBENHAM.
September 12.

THE KODAK MANUFACTURING POLICY.

To the Editors.

Gentlemen,—Why are your contributors up against progress? Surely a firm like Kodak, Ltd., would not discontinue plate manufacture if their portrait films were not giving results far superior to those obtainable on glass plates. Are not the points raised trivial? They are easy to retouch, and both sides are usable for this process. I have no trouble with the retouching, as films lie flat under four small clips which are attached to the desk. Why be troubled with damp if each film is bagged properly? And as to dirt attaching, whose fault is this? Has your correspondent tried benzine for cleaning? Why clean at all, if proper care has been taken during developing, etc.? As to lighting in the studio, can your correspondents obtain negatives, giving correct renderings of detail under all conditions, on glass plates? I doubt it. In conclusion, I may mention I do not tank films, nor do I use clips, etc.; it is quite easy to develop two dozen portrait films in a 12 × 10 dish at one time, and obtain negatives entirely free from scratches. Anyhow, films are "it" all the time, and a boon to all artistic workers.—Yours faithfully,

E. E. CARTER.

Cottage Studio, Romford, September 9.

To the Editors.

Gentlemen,—Personally, I always feel grateful to the Kodak Co. for all their pioneer work for the profession, and I will say this for their advertising matter: Never once have I found them making a statement that was not supported by scientific facts.

I have used the Eastman portrait film for nearly two years, with the greatest satisfaction. I prefer film to glass, because, in my hands, it is easier to do the best work on it, and the cost in cash and *time* is less all the way through.

So far, the faults found with film appear to be almost childish. The correspondent who scratches his films and then allows the dust to get in should learn how not to scratch them. The man who, by "careful" lighting, never gets halation on glass plates is deluding himself.

I prefer to knife or pencil a film, and have found no difficulty in making many hundreds of negatives free from all flaws. I honestly advise all photographers to take up film. Just a little care in adapting one's method of working is all that is necessary, remembering that nothing is perfect in this world, whether it is made of glass, celluloid, or gelatine.

I well remember an old wet-plate man, who, when I made him a negative on a dry plate, fetched his focussing glass to show me the "grain." Was he old-fashioned?—Yours faithfully,

PAUL COE.

Eastgate Street, Gloucester, September 8.

SYSTEMATIC BROMIDE PRINTING.

To the Editors.

Gentlemen,—I am very much obliged to Mr. Harold Baker and Mr. Ainger Hall for their remarks concerning my paper. With the former I am in disagreement in reference to his suggestion of adopting "a standard period for the total time of development," together with a suggested minimum of three minutes. It is impossible to adopt a fixed time of development, because of the influence of temperature, developer variations, and paper peculiarities as between different makes of paper and different batches of the same make. I have had a specimen of Kodak bromide paper which was fully developed with amidol in 1 minute at 65 deg. F., and which toned to a cold sepia. A specimen of Criterion bromide paper developed in amidol of the same strength at 45 deg. F. took 14 minutes to reach the *same* degree of development and tone subsequently to a very similar sepia. It is because of this extreme variation in the total time of development required under varying conditions that I have advocated factorial development as the only satisfactory substitute for either inspection or pure time methods. It is as unsound to adopt a fixed time of development for bromide paper as it is in the case of plates. I can tell Mr. Baker what would be the colour of the prints (when toned) whose measurements were given in Table II., "B.J.," September 2, p. 519. Print E would have been yellow, F warm sepia, G cool sepia, and H very cold sepia. The following factors, amongst others, influence the colour of the print upon toning:—(a) The type of negative (b) the make of bromide paper, (c) the batch of bromide paper (d) the type of bleacher, (e) the degree of development. Factors (b) and (c) admit of no control on the part of the photographer he has to take what the manufacturer gives him. Factors (a) (d), and (e) are under fairly satisfactory control. Factor (e) is best controlled by developing factorially. A short development (low factor) helps to yield a warm sepia. A long development (high factor) helps to yield a cold sepia upon toning. The low factor for amidol (Kodak formula) is 10, and the high factor about 20. The former factor requires double the exposure of the latter in order to yield a print of the same depth. It is sufficient to express the *degree* of development, and let the exposure look after itself. With the high degree of development, the exposure must of necessity be short, or else the print would be black all over, or, at any rate, too dark; and similarly with a short development time, the exposure must of necessity be full, or else the print will be too light. I prefer to describe the ultimate sepia tone as dependent upon the degree of development, and not upon the amount of exposure, since a description of the degree of development is also a very precise description of the amount of exposure for any stipulated depth of print (see rule 2, "B.J.," September 2, p. 520, col. ii). In my experience, the only way to ensure a repetition of the same shade of sepia in prints made upon the same paper from the same negative is to develop each print to exactly the same Watkins factor. The choice of a fixed total time of development cannot accomplish this. If in this latter statement I am wrong, then it follows that the amount of exposure and the degree of development have neither of them anything to do with the final tone of sepia. By common consent they do influence the final tone.

Mr. Hall's trial exposure strip of 5, 7, 10, 15, 25, and 40 seconds is a very wide one. If perchance the 5 seconds exposure were the correct one, then the time of first appearance of the image would be that of the 40 seconds exposure, or eight times normal. Such a wide trial strip should be regarded as a guide to another trial strip rather than a guide to the final print. In my own practice I make a trial strip upon which three exposures are included, one about half what I guess should be about right, another coinciding with my guess, and the third double the guessed exposure. In such a range of exposures (1—3) there is very little difference between the time of appearance of the highest and lowest exposures on the trial strip. The prints quoted in Table II., already referred to, illustrate this. Let us assume that the exposures given to prints F, G, and H were upon one trial strip, namely, 30, 15, and 10 seconds respectively, and let us assume that 15 seconds was about right. The time of first appearance would be that of the 30-second exposure = print F = 6 seconds (Table II.). To be a correct guide to the development of the 15-second exposure it should have been 8 seconds, as in print G (Table II.). With a Watkins factor of 12, this is an error of 24 seconds in a total development time of 96 seconds, or about 25 per cent.—very different to Mr. Hall's suggested "latitude of several hundreds per cent. in estimating the time of development." To be a reasonably good guide to the exposure for the final print, a trial strip must be fairly near the mark, and must not include a very gross over-exposure. If it proves, upon development to the chosen Watkins factor, to be badly out at the over-exposure end, then obviously it must simply serve as a guide to another trial strip.

I had hoped, gentlemen, that your challenge of my statement that within certain limits the product of the exposure given and the time of development required to produce a print of the same depth and appearance is a constant, would have produced some comment. I claim it to be true, and I believe that the first hint of its truth appeared in the parallel curves yielded by bromide paper when the exposures are plotted against the reflection densities, attention to which was called by Messrs. Mees, Nutting, and Jones in 1915. If during development the inertia of the paper shows regression and the paper curves maintain the same slope, then obviously exposure and development can, within limits, take the place of one another. And it happens to be a practical fact that they can do so in a regular manner, so that their product for a succession of prints of the same depth is a constant. That rule bridges the gap between the expert and the beginner, and it can be communicated from the former to the latter in a precise and definite manner. I

lieve it to be a completely satisfactory substitute for "flair," so far as we are concerned, in making straight prints, the best at the negative will yield by the straightforward exposure and velopment of bromide printing paper. I am also satisfied that it not only a rule which is near enough for ordinary practical work, t has an accuracy and precision far beyond ordinary requirements. If my letter is not already unbearably long, I may perhaps be lowed to tell two stories in substantiation of this claim. I had ade a set of prints from one negative. They were all developed ctorially to the same factor. On the following evening I wanted ore prints from the same negative of exactly the same depth. he same exposures (in point of time) were given, and development rried on to the same Watkins factor. All the prints made on the cond night proved to be of less depth. That meant that they ust have had less exposure. As the time of exposure was the me, then the light (electric) must have been of less intensity. pon further trial I found that 30 per cent. more exposure was quired on the second night compared with the first. I rang up e local power station, and they told me that my conclusion was rrect, for they were on that second night having trouble with a rnamo. The second story is similar. I was lecturing before a ub on factorial bromide work. I had my own negative, paper, veloper, and also my own electric exposing lamp. My exposure ad to be about 25 per cent. more (I am writing from memory) this club than at home. Upon inquiry, I found that their cur- nt was 210 volts and mine at home was 230 volts. On both occa- ons the result of factorial development was an accurate indication f the amount of exposure given. There is a precision about it hich is not possessed by any other ordinary photographic opera- on, and it is a power in our possession almost entirely neglected.—

ours faithfully,

B. T. J. GLOVER.

The Cliff Hotel, Trearddur Bay, Holyhead.
September 10, 1921.

CAMERA FITTINGS.

To the Editors.

Gentlemen,—In your leader of September 2 on camera fittings, suggestion is made that adapters of brass should be fitted to mera by the optician, to enable a lens to be fitted on different meras. The idea is good, but these brass adapters are very avy; aluminium would be lighter, but metal adapters are expen- ive, and I think not so convenient as a method I have used for long time, by which any lens that is small can be used on any mera in the place.

I get some three-ply mahogany and cut it into panels, either ith a fine dovetail saw, or a sharp knife and a steel straight dge, to fit the various cameras. The largest lens panel is on the udio camera, so I make one to fit that, and fasten strips of wood n it to take, say, my 12 x 10 rectilinear lens, and a hole is bored ith an expanding bit to suit the lens. Four turn buttons are crewed on, two screwed up tight and two made movable to fasten he 12 x 10 lens board in. This lens board now becomes the tandard, and another panel is made to fit it of the three-ply wood. hole of suitable size is bored in it, and strips of wood glued and prigged on to fit a smaller lens board, which originally belonged o the half-plate field camera, but all the smaller lenses, even the 2 x 10 wide angle, are fitted on boards of this size, so that all he small lenses can be used on the half-plate field camera, whole- late studio camera, copying camera, or enlarger.

The copying camera is made to take the lens board of the 2 x 10 rectilinear, so are the enlarger and the whole-plate. By ing the adapting panel any of the smaller lenses can be used on ny of these cameras, also including the studio camera. One of hese adapter panels should be fitted to each camera, except the alf-plate outdoor one. They are easy to make and look quite eat if painted with "Nigrogene" or any other dead black. Of ourse, it is possible to manage with one adapter panel, but it is nnoying sometimes to find just when it is wanted badly for some ork in the studio that an assistant has got it with him on an utdoor job.

I think this is a better plan than heavy metal adapter flanges, hich involve screwing and unscrewing, which is a nuisance, especially for outdoor work. If neither the photographer nor his assistants are handy men (but very few are not), the local cabinet-maker would make them—I was going to say at a trifling cost, but in these days when the British working man expects to get three times his pre-war wages and does less than a third of his pre-war work, we don't get anything at a trifling cost. So I find it comes cheaper to do all the odd carpentering jobs myself that I can, and being a bit of a "messer," as the "competent domestic authority" calls me, I rather enjoy doing it.

I had some difficulty in getting a cheap expanding bit, but found that a washer-cutter answered just as well. I was told by the man who sold it me that in some places it is known as a "wimble."

—Yours truly.

BIFOCAL.

EARLY PHOTOGRAPHY BY MAGNESIUM LIGHT.

To the Editors.

Gentlemen,—In the "British Journal of Photography" of August 19, 1921, p. 497, Mr. E. J. Wall criticises my "Geschichte der Photographie" (History of Photography). In doing so, however, he quotes from the latter only a fragment of the treatment accorded to photography by megnesium light, and removes from its context that portion which related to Gaedicke and Miethe. In this way the wrong impression is created that I did not record the priority of the discovery of an explosive flash powder by J. Traill Taylor in 1865. This, however, is not the case, for I wrote ("Geschichte der Photographie," 1905, p. 330): "The first data for the production of a quick-burning mixture containing magnesium powder were given by Traill Taylor in the year 1865 (mixture of potassium chlorate, sulphur and antimony sulphide). These experiments, however, did not lead to any practical use in portrait photography on account of the small sensitiveness of the wet collodion plate and the high cost of magnesum. An attempt by Larkin to burn magnesium in a lamp proved unsuccessful. The next attempt to employ mixtures containing magnesium powder and pure potassium chlorate were made by Kenyon in 1883. . . . Photography with magnesium powder in the form of flashlight was first brought to a successful issue by Gaedicke and Miethe in Berlin in 1887. . . . Shortly after the Gaedicke-Miethe flash powder became known Armstrong showed that pure magnesium powder when blown through a flame gave an intense light."

What other account would Mr. Wall have? I set forth the work of Taylor, Larkin and Kenyon in correct historical sequence, and then the patents and publications by Gaedicke and Miethe in 1887. I *did not say* that Gaedicke and Miethe were the first to have employed an explosive magnesium flash powder, as Mr. Wall represents me to have done on page 497 of the "British Journal."

It is chronologically correct to say that the discovery made by Taylor was afterwards made successful by Gaedicke and Miethe, since during the interval the electro-chemical production of magnesium had greatly reduced the price, and the dry plate had come into use, so that Gaedicke and Miethe arrived at the appropriate moment and provided a successful impulse to this branch of work.

Historically my account is correct. But it is incorrect, as Mr. Walls seeks to persuade the readers of the "British Journal," that I described the Gaedicke-Miethe flash powder patent as "epochmachend." Mr. Wall is profuse in hie use of italics for the purpose of giving prominence to something which I have never written.

"Thus is history made," says Mr. Wall, in reference to my historical work on this matter. He writes this, whilst suppressing the first part of what I have written and whilst giving an account of the middle part (relating to Miethe and Gaedicke) in a manner to distort the sense. Finally, he incorrectly puts in the phrase "epochmachenden," and thereby destroys the objective character of the historical treatment in the minds of less informed readers, whereas this character was most fully and carefully preserved in my account of the history of the magnesium light.

I shall be very much obliged if you will publish this reply to Mr. E. J. Wall.—Yours faithfully,

J. M. EDER.

Vienna, September 8.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply, 5-cent International Coupon, from readers abroad

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

H. C.—We suppose you are using the customary method of dipping the prints in alcohol and hot rolling. The only alternative to this which we know is the use of a cement made by Messrs. Rheinlander and Son, Rodney Road, New Maldon, Surrey.

F. A.—You should apply to the Registrar of Trade Marks and Names, 25, Southampton Buildings, London, W.C.2, for circular of instructions for application for a trade mark. We believe, as a rule, that a month or two elapses between the time of applying for a mark and its placing on the Register.

A. A.—We think you are not using enough paramidophenol in proportion to the carbonate, and also are using too much bromide. The formula in the "Almanac" would give good results, providing that the paramidophenol-hydrochloride is of reasonable quality. We are sorry that we cannot undertake to test developing materials, and have returned your sample.

G. C.—We think the markings are fixing stains, that is to say due to partly soluble emulsion, which has been left in the prints. We advise using a fixing bath of 1½ lbs. of hypo in 80 ozs. of water, and preferably passing prints through two fixing baths, No. 2 being kept reasonably fresh and replacing No. 1 as soon as a considerable number of prints have been passed through it.

E. H. N. W.—The Kodak amidol formula for bromide paper is:—

Sodium sulphite, cryst.	1 oz.
Water	20 ozs.
Amidol	60 grs.
Potass. bromide, 10 per cent. solution.	20 drops.

The amidol is dissolved immediately before the developer is to be used.

D. D.—All the swing taps that we have used begin to leak fairly soon when used on the ordinary main water pressure. The only way out of the difficulty is to have a tank fitted up a few feet above the dark-room sink and to connect the swing tap with that, getting the plumber to provide the tank with a ball valve, which keeps it constantly full and prevents overflow, as is done in the ordinary tanks placed on the top floor in a house.

E. D.—About the best stain remover for xylonite dishes is a solution of permanganate of potash, say 10 grs. or 20 grs. in a pint of water, with, say, 1 oz. of strong sulphuric acid added. This will clear off almost any stain, but is liable to leave a brown deposit from the permanganate. In the case of earthenware dishes this can be cleared off by a little bisulphite of soda, but we would not say that that could be done in the case of xylonite. At any rate, the permanganate will make the dish chemically clean for photographic use.

E. L. W.—Answering your specific questions, the camera would be quite suitable for groups out of doors or in the studio. It is a bad camera for copying owing to its short extension. The lens is a slow one, one-quarter the speed of the ordinary portrait lens. It is not a very good lens for Autochrome work, since for this latter a better degree of correction is advisable than was obtained with these old rapid rectilinear lenses; and also the general experience is that the best Autochromes are made with an aperture not smaller than *f*/6.

C. D. V.—(1) We have no doubt acetylene could be used for heating a dry-mounting press, but the burner would have to be specially designed and made, and we should think it would not be the easiest matter to keep the press at a uniform temperature. As regards the burner, you could not do better than write to Mr. R. J. Moss, 98, Snow Hill, Birmingham, stating your requirements. (2) You can reduce the intensified negative with Farmer's reducer. (3) Metol-hydroquinone, owing to its containing alkali and sometimes caustic soda, is much more likely to produce frilling. You had better stick to amidol.

J. LADE.—(1) An oven is not hot enough. You should heat t damp chloride in an old iron saucepan over the fire. If y keep the dry chloride in a biscuit tin with a well-fitting lid, will keep dry for a reasonable time; for much longer if you se the lid with a band of surgical plaster. (2) We do not think is, but try Tanner and Co., Ltd., Dorset Street, Salisbury Squar London, E.C.4. (3) For good drawing, we would prefer a co siderably longer focus, say 10 to 12 inches. (4) The plan reducing the contrast simply by bleaching the negative in sol tion of mercury bichloride is a very old one. It is of considerab benefit to negatives which are of very harsh contrast.

A. B.—There is no disadvantage in having the lens of a refle camera in a focussing mount, and it does in fact provide add tional extension to the amount of an inch or two. Of course, i buying a new lens for a reflex of anything like decent extensio it is an altogether unnecessary expense. Using the most rapi plates and *f*/4.5 aperture, we should think you might give a exposure of about half a second in the studio. If really goo rendering of gradation is to be obtained, we do not think the is much to be said for the suggestion of making snap exposur of the sitter of whom a bust or three-quarter length portrait being taken.

J M. DUNN.—Brightness of illumination and safety for a give kind of material are opposite qualities, and, therefore, th making of a light to secure both is always a matter of com promise. Mr. Howard Farmer, who introduced the bichromat lamp, used to add a little eosine (red dye) to the solution i order to make the light safer, but although we have not tried it we should think that the eosine is oxidised in course of tim by the bichromate. In making up solutions with dyes only the most suitable dyes for the purpose are tartrazine (or brillian yellow or naphthol yellow or auramine) for yellow light; tartra bine and rose bengal for red light, with addition of methyl viole for orthochromatic plates.

CAMERA AS LUGGAGE.—While travelling on the G.W.R. last week with a 8½ × 6½ camera and tripod, the ticket collector demanded excess fare, on the grounds that a camera was not personal luggage; I refused to pay, and he then took my name and address, and said the company would make me pay. Do you know if a railway company can make a photographer pay for his apparatus? I have carried a camera for a great many years, and this is the first time that I have been asked to do so. It was not an excursion train, and my total baggage, including camera, was about 40 lbs.—H. K.

There is the authority of the Ministry of Transport that the charge for a camera as non-personal luggage is contrary to the railway regulations. We referred to an actual case of the same kind in our issues of April 30 and June 11, 1920.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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Contents.

SUMMARY.

The exhibition of the Royal Photographic Society opened on Monday last at 35, Russell Square, and remains open until October 29. Mr. F. C. Tilney contributes a preliminary review of the pictorial section. (P. 563). The most notable exhibit in the technical section is the example of the stereo-photo-synthesis of M. Louis Lumière in the shape of a portrait of the Postmaster-General. (P. 564.)

The exhibition contains some remarkably fine examples of the Autochrome process by Mr. Henry Irving (p. 565), and, in addition to a fine collection of prints by manufacturers, has a further exhibit of interest, namely, the cameras employed by Fox Talbot in his pioneer experiments. (P. 565.)

Mr. Pirie Macdonald, the New York "photographer of men," at present on a visit to England, was entertained to dinner last week by the Professional Photographers' Association, and delivered an eloquent address, of which the running sentiment was a plea for a closer personal knowledge of each other by American and British photographers. Mr. Macdonald said a little on the mental attitude of his own, to which he attributed any merits which his portraits might possess. (P. 566.)

Mr. Macdonald referred, in the course of a subsequent informal talk, to the system of community advertising, which had had beneficial effects in centres of population containing a number of photographers. (P. 561.)

In the concluding portion of his review of the London Salon, now open at 5a, Pall Mall East, Mr. Tilney deals chiefly with portraits of children and with aspects of the landscape photographs. (P. 569.)

In a leading article we draw attention to the practical objections to an ideal system of projection for the purposes of enlargement of negatives. Partial or almost complete diffusion of light is greatly preferable in practice to the use of a point source of light. We deal with the forms which the practical systems may advantageously take. (P. 562.)

The recently passed Safeguarding of Industries Act imposes a duty of 33⅓ per cent. on certain photographic goods entering this country. The chief of these goods are lenses and cameras, optical lanterns and cinematographs, and photographic developers. (P. 562.)

Mr. T. C. Turner defends himself against critics of his photography of the disaster to the R.38 airship. (P. 572.)

Particulars of courses of instruction in photography within the London area will be found on pp. 571-572.

A bogus canvasser for photographic enlargements was sentenced to two years' imprisonment last week. (P. 571.)

Further correspondence on the respective merits of plates and film will be found on pp. 574-575.

Failure to mix the developing solution thoroughly in its tank is responsible for some of the irregular markings found to occur when using this system of development. (P. 562.)

EX CATHEDRA.

Pirie Macdonald. The eloquent address delivered by Mr. Pirie Macdonald at the dinner arranged in his honour last week by the Professional Photographers' Association represents only a small part of the many things which the distinguished New York "photographer of men" said on the occasion. The formalities of the toast and its reply having been disposed of, a most enjoyable hour or two were passed in conversation on topics of professional photographic portraiture which have a common interest for photographers on both sides of the Atlantic. You cannot listen to Mr. Macdonald for very long without coming under the spell of his personality. As will be seen from his address on another page, he himself has a very simple formula for his philosophy of life. Herein we think he is mistaken; if his formula of seeking to discover some reason or other for liking a man represented his attitude to life in the degree which he asked us to believe it did, he would be very different from the strong, human, complex character that he is. It requires a good deal more than the expressed amiable desire to be blind to people's failings to account for the big broad personality of Mr. Macdonald or his great and healthy influence upon photographers in his own country. We could do with more men of his calibre here, and it is to be hoped that it may be possible for him to take part in a future Congress of the Professional Photographers' Association.

* * *

Community Advertising. One of the topics on which Mr. Macdonald touched in his post-prandial talk was the system which has been adopted with great success by photographers in many of the large centres of population in the United States for approaching the public, on a co-operative basis, with offers of photographic portraiture. In many towns, during the month or two before Christmas, the photographers in a town have joined together in discontinuing their individual advertising in the newspapers and in replacing it by a series of announcements advertising, not themselves collectively, but photographic portraits pure and simple. In the case of some, the individual cost will be a little greater than on the individual system; in the case of others, a little less. And as regards the returns, it has been definitely found that the business brought to the studios by thus pooling the advertising effort has been greater than that when photographers were advertising in competition. In this country we have had occasionally communal efforts of this kind, for example, in regard to closing of the studios in a town for the same period of a summer holiday; and, spurred by the incursions of free sitting firms, Edinburgh photographers, not long ago, united in a similar manner for the purpose of warning the public. But in its application to the everyday purpose of bringing sitters to the

studios, the system, so far as we know, has not been given the opportunity of proving its success on the scale which has been accorded to it in the United States.

* * *

Mixing Tank Developer. Those photographers who practise tank development and employ one of the single-solution concentrated developing agents used very dilute, should make quite sure that the solution is thoroughly mixed before pouring it into the tank, for if this point has not been attended to curious irregular patches of unequal density may appear upon the negatives. Recently, we were shown a negative suffering from this defect, which is very like that produced through failure to agitate the solution in one of the vertical tanks. The worker had in this case moved the tank several times during the time development was in progress. What actually caused the marking in question was the fact that the developer had been mixed some time beforehand in a large jug and poured directly into the tank. Being imperfectly mixed, the agent got to work at some parts of the plate more quickly than at others. The harm had in this case been done in the initial stages of development. Tank development is one of those operations that demands every care if the results are to be free from defects, and though an improperly-mixed developer may do its work satisfactorily nine times out of ten, the tenth time it may happen to spoil an irreplaceable negative.

* * *

Duties on Photographic Imports. From October 1 next certain photographic goods coming into this country from countries overseas, which are not part of the British Empire, will be subject to the payment of a duty equal to one-third of the value of the goods. This provision is authorised by the Safeguarding of Industries Act, which, after much debate and revision in the House of Commons, received the Royal Assent during August last. The schedule of the Act specifies certain classes of goods to which the provision of the Act shall apply, and the Board of Trade, at the end of last week, issued a 73-page list of particular articles which are defined by the Board as falling within the respective classes to which the Act applies. In class A (optical glass and optical elements) unmounted photographic and projection lenses are included, also unmounted condenser lenses and optical light-filters. In class B (optical instruments), photographic cameras, with or without lenses, finders, optical lanterns and cinematographs, stereoscopes, and photo-micrographic apparatus are included; also mounted photographic lenses and condensers. The chief part of the list, however, is occupied by the names of chemical substances, subject to the 33 1-3 per cent. duty, in consequence of their being synthetic organic chemicals or chemical substances of special purity as required, for example, in analysis. Inasmuch as the commonly used developers, such as amidol, glycin, hydroquinone, metol, paramidophenol, and pyrogallic acid come within one or other of these definitions, they are subject to the duty. The Act is put forward as a measure for the safeguarding of certain special industries against the effects of the current depreciation of foreign currencies, and it is provided that it shall continue in force for a period limited to five years. Part I. of the Act, which deals with the imposition of the 33 1-3 duty on goods of the classes set forth in the schedule, does not, however, discriminate between countries the currency of which is depreciated in reference to that of Great Britain and those the currency of which is not depreciated. At any rate, we can see nothing in this part of the Act in the nature of such discrimination. Plainly the duty will apply to goods imported from the United States equally to those from countries such as France and Germany, in which currency is greatly depreciated. The value of any imported goods for the purposes of the Act is taken as the price which an importer would give for the goods if the goods were delivered to him, freight and insurance paid, at the port of importation, and duty is to be paid on that value as fixed by the Commissioners.

ILLUMINANTS IN ENLARGING.

Most writers upon the subject of projected images have assumed that the optical system of the lantern is practically perfect and that the source of light approaches the theoretical point. This is far from the case in practice, and consequently it is generally necessary to overlook theory and to make the best of the condensers, lenses and lights as they are usually found. The production of an optically perfect condenser of, say, 8½ in. in diameter would be such a costly process that few people could afford to purchase it, and consequently it becomes necessary to make the best of such as can be procured at a reasonable price. Fortunately the fact that rather larger sources of light than the electric arc are available makes the task rather simpler than it would otherwise be. The electric arc, which from its small area would appear to be an ideal illuminant for enlarging, is perhaps the most difficult to handle in practice, the chief difficulty being the erratic burning of the arcs in most automatic lamps. In these the carbons are necessarily in line, and the slightest variation in the composition of these causes the arc to shift in a most aggravating manner. It has been found in actual practice that the effective exposure may be halved or doubled as the case may be when making two exposures from the same negative in quick succession, this being due to the fact that at one time the arc is burning on the side nearest the condensers, while a few moments later it has veered round to the farther side or vice versa. The only arc free from this objection is that obtained by placing the carbons at right angles, but as this can only be obtained with a hand feed it is not so convenient for enlarging where there are more distractions than in lantern-slide projection. The lamps used in cinematograph projectors are steady in burning by reason of the shortness of the arc and the large size of the carbons, but these, too, need constant attention, and may be dismissed as unsuitable for photographic work.

It is therefore necessary to fall back upon less powerful sources of illumination, such as the incandescent electric light, acetylene, and incandescent gas. Good work has been done with ordinary petroleum lamps in the past, but few of these are now in use. The incandescent electric lamp, and particularly the gas-filled or half-watt type, is probably the best form of illuminant where electric current is available. The most suitable form of lamp is one in which the metallic filament is compressed within a small area, such lamps being made for motor-car lights that are usually for low voltages only and cannot be used upon circuits of 100 to 240 volts. There is a hope that they will shortly be obtainable for higher voltages. The ordinary small half-watt lamps, in spite of their widely-spread filaments, are, however, quite suitable if the point of light idea is discarded and a finely-ground glass diffuser placed as near the bulb as is possible. This diffuser should be no larger than is necessary to cover the filament, as by reducing the area the risk of fracture by uneven heating is minimised. A frosted globe would be even more convenient, but as clear globes are more easily

obtained, the independent diffuser is, upon the whole, to be preferred. The object of the diffuser is, of course, to prevent the projection of a more or less sharply-defined image of the filament upon the focussing board. It has been a common practice to interpose a ground-glass screen between the light and condenser, or even to place it between the lenses of the condenser, but the nearer it is to the light the less loss of illumination occurs.

The incandescent gas mantle is next in merit to the electric light, and will be found amply sufficient for all but the greatest magnifications. Here, again, the ground-glass diffuser is necessary to prevent the texture of the mantle from showing. The inverted form is preferable to the upright, but the latter will answer well if a diaphragm with a diameter of about 1¼ in. is placed close up, so as to cut out the upper and lower portions. This greatly improves the definition.

Acetylene is a satisfactory illuminant and, as a rule, can be used without a diffuser. The dark room should, however, be well ventilated, as the fumes are apt to cause headache and nausea in a confined space.

The effect upon the functioning of the lens diaphragm which results from variation of the size of the illuminant must not be overlooked. If a very small source of light, such as an arc burning carbons less than a quarter of an inch in diameter, be used, the lens may be stopped down to quite a small aperture without there being an appreciable difference between this and the full opening of the lens; but if a diffuser be interposed, the effect of reduction of aperture is at once perceptible. The conditions are the same if a large unscreened light, such as the incandescent mantle or an acetylene or oil flame, be used.

In some modern enlargers a rising and falling front, similar to that of a camera, has been fitted, the idea being to facilitate adjusting the image upon the screen. This is totally wrong in principle, as the centres of the light, condenser and lens should always be in a straight line. If the light be out of position, an improvement in illumination may be obtained by moving the front, but the proper course is to adjust the light and leave the optical system undisturbed.

Enlargements of very fine quality may be obtained without using a condenser, but at the expense of much longer exposures. Three methods are generally employed, the most effective being the illumination of the negative by a gridiron pattern of mercury-vapour lamp placed behind a sheet of ground glass. Another is the use of a large facetted reflector having an ordinary metallic filament lamp in the centre, a diffusing screen being interposed between this and the negative. The third and most usual in this country is the use of a powerfully-illuminated white screen, which reflects light from screened lamps through the negative. The exposures by this system were usually too long for commercial use, but the introduction of the half-watt lamp has made a great difference in this respect.

THE ROYAL PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The sixty-sixth exhibition of the Royal Photographic Society opened on Monday last at the Society's house, 35, Russell Square, where it remains open daily from 11 a.m. to 9 p.m. until October 29. As was the case last year, the pictorial section, which is accommodated in the Society's lecture hall, is illuminated entirely by artificial light. The natural lighting of the room is very unfavourable for the viewing of pictures, and though one could wish to dispense with artificial light for the showing of a collection of photographs, at any rate the Society is fortunate that its exhibition was not held during the recent hot summer, for had this been the case a visit to it would have been a somewhat trying experience. During the present cool weather, there is nothing to complain of in the temperature or ventilation of the gallery.

Mr. Tilney, in the article which appears below, reviews the pictorial section, which, again, is hung entirely under glass provided by the Society, and strikes a note of brightness and lightness by the preponderance of light mounts.

The technical and colour photography sections are by no means up to the standard of recent years. We refer below to the very interesting exhibit, in the former, of the relief effect portrait by M. Louis Lumière, which is the chief exhibit of novelty in the technical section.

In the rear library, on the ground floor, is an exceedingly fine collection of X-ray negatives made on Eastman Duplitized film, and confined particularly to radiographs of the stomach and teeth. This collection has been arranged by Mr. N. E. Luboshey, who at intervals during the exhibition is giving demonstrations of radiography with an exceedingly simple and compact outfit of the Thomson-Houston Company, fitted with one of the small Coolidge tubes. The degree to which the technique of making X-ray exposures has been simplified by the use of an outfit of this kind is particularly worthy of attention.

Lectures are given on the Tuesday and Friday evenings of each week during the period of the exhibition. To-night, September 23, Mr. James Shaw, of Manchester, will lecture on "Picturesque Cities of France." On Tuesday next Capt. C. W. R. Knight, M.C., will recount "Further Adventures among the Tree Tops," and on Friday, to-morrow week, the lecturer is Mr. J. Dudley Johnston, and his subject, "Wonderlands of the Western World." All these are lantern lectures, and are held at 8 p.m. Visitors should, therefore, note that it is not possible to examine the pictorial collection after this hour on these evenings, since the exhibits are arranged in the lecture hall.

THE PICTORIAL SECTION.

Reluctant as one must be to cry over spilt milk, it is almost impossible to avoid an expressed regret that so good a show as there is in Russell Square could not have been housed in a gallery built for exhibition purposes. The room is spacious and noble, but its unfitteelness for a display of pictures is a serious bar to their due appreciation. The plan of last year is still followed, namely the shutting out of daylight and the illumination by electric lamps. But to come out of the broad light of day into these nocturnal conditions is to experience a visual groping for the first half-hour until one's eyes have settled down to make the best of a bad job. Even then the reflections in the glasses from the bright ceiling and frieze is a constant embarrassment. The finer nuances of tone are sacrificed, and the works lose the delicacy and relative values they actually possess. Surely some daylight would be better than none. Making allowance for these drawbacks the impression is that of a very worthy exhibition; not surpassing that of last year, but perhaps no less good. The landscapes are in the majority, and number some unusually fine examples from the faithful Fellows and members who, to their credit be it said, stand staunchly by Alma Mater.

Of the portraits there are, perhaps, half a dozen excellent

things almost all within the first page of the catalogue. Some leading professional photographers are chiefly responsible for these. Mr. W. Thomas, who sends a duplicate of "The Lord Chief Justice of England" (10), which figures at the Salon; Mr. Herbert Lambert, who shows another version of the little girl whom here he calls "Tousel Head" (69), and presents as a half-length nude; and his "Mary" (77), another little girl standing at profile and treated in an oval. This is a print of much charm, and perhaps his best in this collection. Mr. C. Pollard Crowther likewise sends a variation of a Salon subject, "In Latitude 15.S." (149), a rather less horrific villain than the Grand Guignol gentleman at Pall Mall.

One of the most taking portraits is "Mrs. M. W." (2), by E. Drummond Young. The subject is half the victory here, but happy lines and masses of fascinating textures in the costume complete a most pleasing result. A very forceful head comes from Horace Jackson, who calls it "Out of the Blackness" (3), which, indeed, it is. Only half the lady's face has come out; all the rest is blackness, which, however, makes an effective pattern in the design. Mrs. Maud Basil's best work is "Ferdinand Flodin, of Stockholm" (4), a most spontaneous looking portrait at full face and about life-size. Another work of strong effect is Edward Weston's "Head of an Italian Girl" (9). This is most forcefully modelled and posed so that a very dramatic effect is derived from the part of an uplifted arm, which the close trimming allows to be seen.

N. E. Luboshey has also duplicated a Salon print, which there appears as "Nikola Persheid," and here as "Nicola Perschiede, Esq." (61), an unfair trap for the critic. His portrait of the president, "G. H. Rodman, Esq., M.D." (64), though a good likeness and well posed, is quite unnecessarily dark—not the dark of legitimate shade, but the swarthiness of a leathery brown skin, which is not true to the sitter. Miss Alice Boughton is to be commended for resisting the temptation of making something sensational of "Gilbert K. Chesterton, Esq." (113), who is usually regarded as a lion who should be made to perform in public.

Other outstanding works come within the classification of figure subjects. One such is Louis Fleckenstein's "Cave Woman" (162), a head and shoulders in sunlight, having dense shadows proper to the absence of reflected light from the cave at the entrance of which she appears to stand. There is undoubtedly something primeval about this head which justifies the title. Another is Mrs. Ralli's "Umbrella Maker" (160), probably umbrella mender is intended. He is an old perambulating jobber sitting in the blazing sun against a bright wall in Mrs. Ralli's usual manner for a strong effect. Dr. Geo. H. Rodman's portrait of "Herbert Lambert, Esq." (68), is quiet and accomplished, although the sitter seems to be gripping a lens without any photographic purpose. In "Geo. Eastman, Esq." (65), Mr. Luboshey also adopts the quiet and restrained style. It is distinguished, although it has not the richness of tone that Nicola Perscheid possesses.

For landscape and street scenes the exhibition is, on the whole, more noteworthy than for figure work. There is a capital bromoil print by Joseph Petrocelli, whose name is new to me. Its title is "The Curb Market, New York City" (52), and its subject is a narrow street between tall houses, and crowded with people. The pavement is flooded with rain, umbrellas are up, mist is in the air, and a dim light drops down from the sky which seems far away above the narrow gorge of buildings. Of its kind there is little to beat it in the show. Beautiful quality, and an imposing and simple design characterise Hector Murchison's "Southwark Bridge in the Remaking" (51). The same merits are shown by Thos. H. B. Scott in "Evening: Chichester" (55), where a corner of the cathedral is selected to make a noble design. Quite different material is utilised by Arthur C. Banfield, who finds inspiration in the ultra commonplace of wooden erections and brick shafts for his "Generating Station" (152), but by virtue of good composition, simple tonality and exquisite gradation has produced a thing of much poetry.

Pure out-of-door countryside feeling is seen in one or two works by Bertram Cox, of which it is difficult to say which is best. Fred Judge sends two transfer prints, in his inimitable style, that of "Newcastle" (92) being remarkable for fine breadth of effect and luminosity in the sky. Thomas Bell shows the poetry of the Thames in his "London" (100), a capitally composed view, with dark piles in the foreground, and St. Magnus tower beyond. A good picture has also been made out of smoke and turmoil by George F. Prior, in "Ship Repairs, Ramsgate Harbour" (146). Further prints well worthy of notice will be dealt with in another article.

There is, of course, a large proportion of American work, but it does not seem to preponderate, as it did last year, and that is something to the credit of British workers who, after all, should make the exhibition of the Royal Photographic Society of Great Britain a show of British work primarily.

F. C. Tilney.

SCIENTIFIC AND TECHNICAL SECTION.

Both in the number and the interest of the exhibits this section shows a distinct falling off compared with the last year or two; and these latter were far below those of the palmy days of the Society's exhibitions in the New Gallery. Apparently the war has had the effect of disturbing the lines of communication between the Society and many of those in overseas countries who were notable contributors to the scientific section in pre-war days. Re-establishment takes time, but it is evident that a good deal of spade work requires to be done in order to bring every autumn to the house of the Society examples of the varied work in scientific investigation, manufacture, exploration, process work and printing (to name only a few departments of work) which *is* being done by photographic methods.

The exhibit of chief interest in the technical section is an example (367) of the photographic method of reproducing objects with the illusion of natural form or relief, devised by M. Louis Lumière. A note in the catalogue describes the practical means adopted in the process, and usefully supplements the scientific exposition by M. Lumière, which we translated into these pages a few months ago. M. Lumière's example of a "solid object" is the Postmaster-General, Mr. F. G. Kellaway, M.P. The many members of the public who pay double and triple postal rates for a service of efficiency in inverse proportion may, perhaps, be excused if they look without enthusiasm upon this realistic portrait of the Postmaster-General. However, from some mistaken notion, the exhibit, which consists of several positive transparencies, one behind another, illuminated by transmitted light, has been boxed in a brown-paper structure, so that it cannot be viewed at a nearer distance than 40 or 50 inches. As it is evident that in taking the photographs M. Lumière employed a focal length of lens very much less than this distance, the relief in the portrait, as seen from the enforced distance, is enormously reduced. Although it is necessary that the observer should take up a correct position in viewing the transparencies, we think it would be better to remove the brown-paper enclosure, or at any rate shorten it, to allow of viewing from a very much closer standpoint. The exhibit is an exceedingly interesting one, and under correct viewing the appearance of relief and solidity is extremely striking.

Next in interest are the photographs of natural history subjects made with the aid of flashlight by O. J. Wilkinson. The subjects (253—255) include spiders, butterflies, and moths, one series recording the pupation of the Painted Lady butterfly. When it is mentioned that most of the subjects are photographed on a unit scale of reproduction, and with a lens working at *f*/32, it will be understood that Mr. Wilkinson has certainly explored with very great success a new technical branch of nature photography. Almost without exception his

prints are photographically excellent in every way. He receives a medal.

Hugh Main, B.Sc., contributes some examples of his always interesting studies of insects and reptiles (258—261). He and F. Martin Duncan, F.R.M.S., are almost the only two exhibitors of work which comes within the so-called category of "Nature photography."

Radiography is represented by some fine work, among which must be mentioned the radiographs of the thorax (268 and 270) made at King's College, and shown by N. E. Luboshey. The location of disease and mechanical treatment in teeth by means of radiographs, is well illustrated in Nos. 271 to 275 by J. King, of Paris. Among the industrial applications of X-ray photography a remarkable example is the pair of prints (279—280) by the Sunic Research Laboratories, showing the great difference between genuine and imitation Wedgwood ware.

In photo-micrography the work of outstanding merit is that of John H. Pledge, F.R.M.S., a series of photo-micrographs (293—301) at thirty magnifications, of the pedipalps of spiders. E. H. Ellis contributes a good series illustrating the germination of orchid seeds (310).

In astronomical and meteorological photography the chief exhibits are those of sun spots, by the Astronomer Royal (313—358), and the cloud studies of G. A. Clarke (296). The pair of prints of a water-spout in the Black Sea (293—294) are interesting records of this phenomenon.

In a glass case are some small specimens (364—366) of the photo-sculpture process of Howard M. Edmonds, of which some details were recently given in the "Amateur Photographer." Apparently Mr. Edmonds photographs the sitter whilst at the same time obliquely projecting upon the face a transparency consisting of an extremely fine spiral curve. The different directions assumed by the images of the lines, according to the inclination of the particular part of the face to the axis of the projection system is employed in some way as a guide in drilling out the material of the relief with a fine high-speed drill. It would seem that the mechanical appliances required (which we are informed weigh more than a ton) are somewhat out of proportion to the quality and size of the two small examples which are shown. However, Mr. Edmonds is to lecture before the Society during the month of December on his process, so that there will be the opportunity of learning more about it.

COLOUR PHOTOGRAPHY.

Among the colour transparencies by the Autochrome and Paget processes, those by Henry Irving exhibit a perfection of technique miles ahead of any others. We say this even though the collection includes Autochromes by such accomplished workers as Miss Helen Messinger Murdoch, Walter Stoneman, and Louis J. Steele. The exhibition is deserving of a visit if only to see and admire Mr. Irving's work, which is characterised by a most beautiful rendering of colour in lights and shadows and by a remarkable transparency. The medal is awarded to "Apples" (414), but it is difficult to draw comparisons between this piece of work and others, in particular "Rosebuds Opening" (419), "Flowers in the Corn" (434), "Flowers and Gorse" (448), and "Sycamore Fruits" (449), all by the same worker. The judges must have felt themselves on the horns of a dilemma in selecting one or other of these for the distinction of a medal.

Louis J. Steele's work is, perhaps, not quite as high in quality as in previous years. A medal goes to his "Chewing the Cud" (445), a clever impressionistic study of recumbent cows in a sunlit orchard. Miss Murdoch's large Autochromes illustrate her travels, and include studies of "Natives at the Zoo, Rangoon" (394), "The Palace of Taj Mahal, Agra" (405), "Nile Boats, Luxor" (424), and "Elephants Bathing, Ceylon" (427). All these are transparencies of a very high degree of technique. Mr. Stoneman's work ranges from woodlands and gardens to portraiture, and includes a fine study (438) of a woman, whose vivd red-brown hair makes a clash of colour with the spotty pattern of a sunshade.

Next to the work of these exhibitors, the Autochrome of chief interest is "With Apologies to Sir William Orpen" (400), by N. E. Luboshey, a clever skit on the famous painting at the last Academy. Mr. Luboshey describes it as a "combination Autochrome," which apparently means that, in accordance with his inevitable tendency to wizardry in photographic manipulation, he has registered a black-and-white positive against the Autochrome image.

There are only a few examples of the Paget process in the collection, but these are very good. They are chiefly by W. E. Unwin, whose "Dancers" (396) is a pretty trifle. The reproductions of pictures by Chinese artists painted on rice paper (403 and 404) are also excellent. A variety of the Paget process is represented by the clever instantaneous colour photographs of stage scenes by T. J. Offer, who, it will be remembered, described his process in the "Colour Photography Supplement" about a year ago. He shows the results obtained in this way from "Afgar," "Chu Chin Chow," and other performances (409, 422, and 450). A somewhat mediocre Autochrome (406) by W. Smoker is described in the catalogue by a curious footnote to the effect that "light reflected from a tarred shed appears as a glass conservatory." We have tried in vain to imagine what light looks like when impersonating a glass conservatory. If we could imagine it, it would give credence to the police-court story (from Penge) a few years ago, according to which a burglar escaped detection by impersonating a small dustbin!

In writing of the colour transparencies, it seems pertinent to ask whether in future exhibitions these transparencies cannot be shown more satisfactorily. The method at present adopted, of illuminating them from above and viewing their reflections in a mirror, is not bad so far as illumination is concerned, but has the distressing objection of showing a double image in the case of almost every transparency, due to reflection both from the front glass surface and from the rear metal coating of the mirror. The Scientific and Technical Group, which is now taking a great share in the progress of the Society, might perhaps find it possible to arrange a better system between now and the next exhibition.

The colour prints are very few in number. H. J. Campbell sends a specimen (459) of the Raydex process which by no means exhibits this method at its best, and H. S. Becke contributes a Bromoil print (460), the colours in which can scarcely be said to be produced by a process of colour photography. Four prints (455-458) by H. Ryser, showing the growth of the horse-chestnut, are presumably examples of local toning or tinting. Lastly, there are a number of exhibits illustrating a method for improving reproduction by the three-colour process devised by A. E. Bawtree. It appears to be suggested that a system of modifying the colours of an original by means of an auxiliary colour screen when making the colour-sensation negative serves for correcting the departures of the printing inks from the theoretical requirements.

THE FOX TALBOT RELICS.

The collection of apparatus and prints which has recently been acquired by the Society from the granddaughter of Fox Talbot is shown in a glass case in the museum on the second floor. It includes a number of models of early cameras employed for the Calotype process, and taking pictures ranging from 2 × 2¼ in. to 5 × 5 in. It is interesting to notice the development of Fox Talbot's methods for arranging and focussing the picture. In the early models there is a hole in the front of the camera through which the image can be viewed, and which is closed with a cork stopper before making

the exposure; in later models the picture can be arranged on a removable focussing screen. There are also shown the iron boxes, presumably to hold hot water, which Fox Talbot applied to the back of his Calotype paper during exposure in order to increase its sensitiveness. Apparatus used by Talbot for the Daguerreotype process is included in this collection, in which also are some recent photographs of Lacock Abbey by Mr. Herbert Lambert and Dr. G. H. Rodman.

TRADE EXHIBITS.

Although the Society's house does not provide accommodation for trade stands, the wall displays by leading firms draw attention to a considerable variety of photographic requisites. In the entrance hall Messrs. W. Butcher and Sons, Ltd., illustrate the employment of their "Pressman" reflex camera for telephotography. Messrs. Kodak, Ltd., show a striking collection of prints made with the "Cirkut" panoramic camera. Messrs. Amalgamated Photographic Manufacturers, Ltd., show examples of work made with the plates and papers of their constituent firms—namely, Marion and Co., the Rajar Co., and the Paget Prize Plate Co. Messrs. Thomas Illingworth and Co. devote their display exclusively to prints, by leading professional photographers on their lately introduced professional paper, "Zona." The Autotype Co. make a feature of enlargements produced in a wide range of colours by the improved Carbro process.

Messrs. John J. Griffin and Sons exhibit a large toned enlargement made on their Art-Rough A1 bromide paper, and prints on "Noctona" (gaslight) and "Goldona" (self-toning) papers. The exhibit of Messrs. Wellington and Ward consists of a striking display of prints, from negatives on Wellington plates, made on the firm's well-known grades of bromide, S.C.P., P.O.P., and self-toning papers. This exhibit is continued on the staircase communicating with the first floor. On the gallery of the latter Messrs. Kodak, Ltd., show examples of prints on the Etching-Brown Kodura paper reviewed in our columns last week. It is scarcely necessary to add that the prints are from negatives on Eastman Portrait film.

On the staircase leading from the first to the second floor Messrs. Kosmas Photographics, Ltd., have brought together quite a picture-gallery in itself of prints on their "Vitegas" paper and "Novex" gaslight paper. Mr. Foster Brigham, Mr. Herbert Lambert, and Mr. Edwin Hadley are contributors to this collection. The gaslight prints include some interesting sets illustrating the great latitude of "Novex" paper.

PIRIE MACDONALD IN LONDON.

Proceedings at a Complimentary Dinner given by the Professional Photographers' Association.

The Council of the Professional Photographers' Association took advantage of the presence of Mr. Pirie Macdonald, of New York, in London, to invite him to a complimentary dinner. This happy function took place at Gatti's Restaurant on September 14. Mr. Alfred Ellis (Past President and Chairman of Council) presided, and the following members of Council were present:—Messrs. Marcus Adams, Angus Basil, Frank Brown, Alex. Corbett, R. Haines, Herbert Lambert, R. N. Speaight, H. C. Spink, and W. H. Wedlake, and Lang Sims (secretary). Others present were Messrs. R. Child Bayley and F. J. Mortimer (respectively Editor and Art Editor of "The Amateur Photographer and Photography"), G. E. Brown (Editor, "British Journal of Photography"), T. Bell (Editor, "The Professional Photographer"), C. P. Crowther, and Bertram Park.

Cordial messages were read from the following members of Council, who, to their great regret, were unable to be present:—Messrs. Chaplin, Chapman, Gordon Chase, Chidley, Dickinson, Gray, Illingworth, Read, Turner, Wakefield, and Wheeler. The President of the Association (Mr. Swan Watson, of Edinburgh) sent a telegraphic message to the gathering, conveying to Mr. Macdonald a Scottish greeting, which was excellently intoned by Mr. Lang Sims, though he confessed that, not being a Scotsman, he did not know what it meant!

The Chairman, in proposing Mr. Macdonald's health, said that their New York colleague did not come to them as a stranger. Some of them had met him twelve years ago when he came to London, but all of them were acquainted with him through his writings, his messages, and his photographic work. His fame as a photographer of men was world-wide—(hear, hear)—but it was not so much on that account that they welcomed him, as for the fact that they knew him for the whole-hearted, right-minded, sound man that he was. (Applause.) He was one who had always cheerfully helped and advised any photographer with whom he had come in contact, and had done his level best to keep up the status and the dignity of the profession. He (Mr. Macdonald) had always believed in the giving forth of such information as he had himself acquired from others or by his own experiment; he did not keep it in a hole-and-corner fashion as some might do. It was because he had thus endeared himself to them that they were only too pleased and too anxious to gather round him and give him the heartiest possible welcome that Englishmen could give. One of his principal reasons for coming over, the speaker believed, was to try and bring about a better understanding between English and American photographers. Something of this kind was suggested at the last Congress, when a member said that he hoped to see at future Congresses not only photographers from various parts of this country, but also representatives from other countries. The time was felt to be ripe for the experiment of extending the Congresses, and giving them a wider character, and he thought he could assure Mr. Macdonald that such an idea would find an excellent backing from the Council and members of the Association. He regretted, for his own part, that he could not aspire to Mr. Macdonald's eloquence, and, indeed, he had often wished for an Englishman who could talk to English photographers as Mr. Macdonald talked to American. But his own halting speech must not be taken as a measure of the warmth with which he submitted the toast of the health, happiness and long life of Pirie Macdonald. (Loud applause.)

The toast was drunk with enthusiasm, and was given musical honours, and there was also a special cheer for Mrs. Macdonald.

Mr. Pirie Macdonald said: Twelve years or so ago, through the kind offices of Snowden Ward, I had the pleasure of meeting some of the gentlemen who are here to-night, and the only regret I have is that some two or three of the others have "passed on." It is a queer thing that as we get older the people we would like most to have enjoy what has come to our part seem to have gone on ahead of us. But that is, as my friend, the Chairman and I discussed to-night, the inevitable.

Snowden Ward was a friend of mine for a great many years, and he took it on himself to introduce me to the British

photographer. I felt at that time as though I was being received, not for any merit of my own, but simply as a friend of Snowden Ward. I felt that the respect and kindness which I received were not elicited by me, because I was a stranger, but were due to the affection which so many of you accorded our dear, old Snowden Ward. To-night I feel much the same thing. Even with the kind and generous words of your Chairman fresh in my ears, I feel again to-night as though I were being accepted, not for myself, but that much of this goodness that you are giving is being extended to me more or less vicariously, because for the moment I am the medium, the person who stands between, the link that connects you with the American end of our fraternity.

In the name of the American photographer I accept, friends, all that you have said and done. I am glad that it is so. I am infinitely more pleased to stand here as the representative of American photography than as one whom you were personally honouring. I feel this especially because now is the time—it is more to the point now than it has ever been before—that the American photographer and the British photographer—yes, and the American man and the British man—should come into touch and understand one another. (Applause.)

You have your time-honoured institutions; we are a new country. We are composed of a heterogeneous set of peoples; we have not a common sentiment as you have. We have not been a nation as long as you have, and therefore your institutions have a certain quality which ours lack. Take, for example your "Royal"—the like of that we have not in America; we have not lived long enough. We have no means of instituting such a brotherhood as the Fellowship of the "Royal." You are fortunate here in having an institution which represents, as it does, achievement, and all that goes with time. We, in America, feel that we are represented, as it were, by wooden buildings, and you by stone. We feel as though you had your feet rooted in the ground, while we are merely striving to find a place where we may stay for a while until we, too, may become homogeneous and stable. But, friends, we are much of the same type. (Applause.)

We, in America, have felt for a number of years that you have something that we should *join* with. And it has been the regret of a number of my friends—a number, if I may say it, of the more distinguished members of the craft in America—that your Congress is held at a time of the year when, owing to our commerce and our customs, it is almost impossible for them to attend. We find, in the course of our commerce, that the months of July and August, thanks to the particular variety of climate that we have, are almost impossible for the prosecution of a successful business, and the result is that—in some degree, I am afraid, the habit may be attributed to me, because I started it—you find many men who close their shops during the month of July, and others during the month of August, and some during both those months.

Let me tell you how it began. You will bear in mind that, while my name is that of a Scot, I had an English mother who was tinctured with Irish blood, and I find, curiously enough that, whether you like it or not, or whether I like it or not, there is something about me that is cantankerously Irish. (Laughter.) When I was about forty I woke up to the fact that I had been working for many years at an average of fifteen, sixteen, or eighteen hours a day, and I got a bit shaky, and things did not look right, and I thought I would "cut it out" for a little while. I telephoned up to the wife and said, "Bring me down two weeks' clothes in a bag." "Why," she laughed, "you haven't got such a thing as a bag. You've never been away except for an odd night. Of course, there's the daughter's suit case, and I have got a bag—we can *loan* you one for a week." I had bought a ticket to London—to Tilbury—and when I said, "I am going over to London for a week," the wife, being the kind of woman one can live with for thirty-two years and still like her, made no demur, but packed up the stuff, met me at a quarter before twelve, took the money that would last her through the summer, and a kiss, went away with a smile, And I came to London.

I was away a month, and when I came back I saw things differently. I had, of course, the backing of the experience of former years, but what I had seen in your country had opened my eyes. Bear in mind, of course, that we have a hundred millions of people in America, and a good deal of talent and "go" amongst them. In the State of Ohio, for instance, we have a set of photographers that, for the same area, cannot be beaten anywhere in the world. Moreover, we have a climate that makes you work. Nevertheless, on my return, I had a something in me that I had never had before, and I realised that what I had gotten from your hands was a settling-down quality—something which came from the men themselves whom I had met here. Let a man make a million pounds, if he likes, and be bereft of his friends, and the money is worthless. Let a man go to the top of Mount Everest, and put up a castle there, and have it steam heated, and put in a wine cellar, and do all the absurd things he likes that can be done with money, but prevent him looking into the eyes of a human, and it is all worth nothing.

As a result of my visit I got something of the British character back again. I got it through coming over here and shaking hands with you. And at the end of the fiscal year I found that we had even done a bit more business in eleven months than ever we had done in twelve. So thereafter I took a month off a year, and when I got to forty-five I went further and took off two months a year, and when I got to fifty I went further still and took off three months a year. Next January I am going to be fifty-five, and after that I shall take off four months a year, and when I get to sixty I shall take off still another month, and when I am sixty-five I shall work only half the year. But I am going to keep on working (because I just jolly well can't help it).

A man must not let his business absorb him to the extent of crushing out his feeling for his fellows. I am an enthusiast. I believe what I believe, because I believe so essentially in Man. I believe in man—in mankind. I believe that men are essentially square. I believe that in the main they are decent and pure and right. Now and again a man takes a match between his fingers and sets light to something in the madness of youth, and now and again a man is diseased, but those cases are rare. Men as a whole are right.

I have talked "the British man" to our American photographers for a long time. Ten years ago it was debated as to our sending a representative to Great Britain to your Congress, and if it had not been for the unfortunate season of the year in which you hold your congresses you would have been seeing many of us by this time

A very fortunate circumstance occurred this year. An Englishman suddenly made up his mind to visit the United States. He had the call to go, and most happily he carried with him the approval of British photographers. He went as their representative, and in Buffalo we were able to welcome Mr. Reginald Haines. (Applause.) We were glad to welcome Mr. Haines, entirely apart from himself, because as a sporting proposition we admire an outfit which can get one in ahead of us. We welcomed him also because he brought to us and left in our keeping the most sacred thing you have. He gave to us, in token of friendship and trust, an emblem that you all take to your hearts, and that we have accepted with the implied promise that we hold it as sacred as you hold it. He brought a Union Jack and gave it to us. (Applause.) That Union Jack is going to do a lot of good. It was a token from you. You gave us the best thing that you had, and we feel very deeply the trust that you put upon us that we may keep it clean and undefiled and wrapped round with friendship. (Applause.)

We want to know you better. We are going to know you better. You must arrange your affairs so that it is possible that our better people can come to you. It is true that if an American photographer were to leave in April or May when you have your Congress he would very likely lose the better part of a thousand "quid" by coming over, and our photo-

graphers cannot afford that. It is beyond nature to ask a man to cut into the middle of his year's business. But the time is going to come! You are going to want us enough, just as we want you, and you will arrange the date so that we can come over. Nothing will give me more pleasure than to come to you in one of your Congresses and give you the best that I have. (Applause.) And I promise that if the way is open to us I will send you ten men, better than I am, one after the other, year after year, and by the time we have used up the first ten we will have bred another ten to take their place. You need us, just exactly as we need you. The time is come when we who use the English tongue must remember that we stand alone before the world—we, of the English tongue—and that means that we of the English tongue must be knitted together, indissolubly, and this can only come about through genuineness and truth, and honesty and honour and friendship.

I do not know where Augustine Birrell got the story, but it runs to this effect. Madame de Staël was sitting beside Sir John Mackintosh on one occasion, when the subject of conversation was Napoleon, and the lady said, in her grandiloquent way, "Sir John, you know, Napoleon—Napoleon was not a man, Napoleon was a system." And Sir John said, "Magnificent, madam; magnificent." But it was only a moment later when he turned to his neighbour on the other side, and said, "But what did she mean?" Now, in this matter of friendship, what do I mean? I mean this. The most difficult thing in the world is for a man to hate another man that he has known—truly known. He can dislike him, in parts, but to hate a man whom you really know is difficult. If you have never met a man you can loathe him, but if you have met him face to face, and have seen deep into his eyes, that which might have been hatred between strangers becomes something that does have a human element in it. It may be a bitter sweet, but, after all, it does have a sweetness. And the way to arrange this matter of knitting together friends is to see the other man straight in the eyes and know him.

Years ago I was like most young men. I was not abnormal in anything—I was young. But I found that nobody absolutely agreed with me, and that I disagreed with everybody. My work was not good, and I knew it, but they told me so! (Laughter.) I found that I was becoming very disagreeable, not only to other people (which was bad enough) but to myself, which was much worse. I realised that something must be done, and here is where the Scot came in. One afternoon I "chucked the job" and went out into the country. I had an Irish terrier—and a good one, too—and he went with me. I sat down on a fence corner, lighted my pipe and had the dog at my feet, and I stayed there till after dark. But I beat the thing out, and I came to this conclusion, the basis of the entire philosophy of my life—and if it is no good I am an unutterable failure—that as long as I live I am going to find in man—in every man and woman and child I meet—a something that I can like, and I will take that to my heart and cherish it and I will never mind about the things I don't like. Now, time and again I run across a man whom I find to have views diametrically opposed to mine, and I cannot abide him easily, and, because I am not going to have him upset my humour for the next fifteen friends I meet, I simply side-step him and leave him alone: I let him "gang his gait" and leave him alone. But put your arms around the man you can like! I believe that if there is anything in those photographs of mine that is of any value, it is that the men look out of them as though they like the person that looked at the photograph. The only possible value there can be in a photograph that is made for a woman is to have the man look out of the photograph as though he loved her. You can make things as craftily as you choose, and as beautiful as you like; you can have them pass ten thousand juries, but if the photograph you made was intended for the man's mother, and it does not make the man's mother want to take the thing to her heart, it is not of any value. That photograph must have in it the appealing power of love. And we must bear in mind that that which we utter is returned to us in kind. If you are a grouch, everybody grouches with you; if you are a miser, everbody—well, everybody is most careful. If you really like a man, he is a hard one that don't come across and like you *some*. If there is anything in my photographs it lies in the fact that I like the man I am portraying. (Applause.)

About three years ago a man came into see me who had made his money in a sweat shop. He was fat under the chin through eating goose-liver patties and that sort of thing. He had been driving a bunch of girls, sweating them down, getting the last farthing out of them. He sat down in the chair I indicated and I asked him to move this way or that. "Just as I am," he said. "Yes," I said, "just as you are, but——" "But nothing," he said, "I want it made as I am." "Well," I said, "you can have it made in exactly the damn way you like, and right down at the end of the hall, to the left, is the door, and up and down the street there you can find a bunch of people who will make you the way you wish to be made, and I will wish you a very good morning." (Laughter.) I wasn't going to break up my temper for the whole day on his account, nor spoil the seven or eight sittings I had to follow in order that I might get money out of that beast. He could jolly well keep it if he wanted. (Laughter.) That is the way I treat the problem, but I assure you that it happens very rarely, for, as a rule, people do respond.

There are some of you, beyond doubt, who have not met a sufficient number of Americans, and you are probably possessed of an idea that Americans, as a whole, are difficult. From some point of view they may be, but you are going to find them just the same kind of men as you are if you will take the trouble to go after them and meet them; and, remember, for every step you take towards them they will take two towards you. It is the climate we live in. We have got the adventurousness of Great Britain over there. That spirit of adventure, combined with the climate, does bring with it certain rawnesses; but we have got it, and it is this fact which makes Americans take the two steps towards you. Every now and again you are going to find an American "blighter"—a bad one. When you have met him, and he annoys you sufficiently that you are uncomfortable, don't say, "He is an American"—don't say that. The thing to do is this: don't say anything, close your eyes and think of a British "blighter" that you know who is just as bad as he is, *pair them off*, and then forget about them. (Laughter and applause.)

Great Britain has always been the clearing-house for adventure and ideas. For centuries she has been a clearing-house. Here is the logical centre—right here! Not Milwaukee, St. Louis, Kansas City—*here* is the place where you should have the talent of the world come. If you want us we Americans will do our share; you make things so that we can come and we will come. (Applause.) I have come here, not only to talk to you, but to talk to the Rotary Clubs as well. I have been trying to get Englishmen, who have lived on a little island, to realise the people who have lived on a great range of country—people with rather different dispositions, due to environment. I have come here to try to get them to reconcile themselves to one another, bearing in mind that we have got one great thing under us all—we speak the English tongue.

I do not want to go away without stimulating in one or more of you the idea that you must come over and see us—that you ought to come over and be a part of us, as we are a part of you. I have not any better sentiment than that.

I have not anything more to say except that, coming here as representative of the American photographer, it has given me infinite pleasure to be with you. I am able to speak for as sporting a set of men as there is in the world, and in their name I try to tell of the pleasure it gives me to speak to these—(with the exception of the fact that I happen to

be a naturalised American)—to these, my fellow countrymen. (Loud applause, after which Mr. Macdonald's health was again drunk with enthusiasm.)

The Chairman then presented to Mr. Macdonald a souvenir of the occasion to convey to Mrs. Macdonald, and also a small British and a small American flag. Mr. Macdonald made a happy acknowledgment of the gifts, and said that, coming from friends of his, he knew exactly what "the little woman now waiting in the hotel" would say when he handed the souvenir to her.

THE LONDON SALON OF PHOTOGRAPHY.

(*Concluded from page* 549.)

The Child Portrait.

Without any disparagement of the freedom and accidental character of the photographic, as against the traditional portrait, it must be admitted that in capable hands the latter secures something in the way of rightness and charm which the former is apt to miss. One sees this in the traditional method of the mezzotint portrait which Mr. Marcus Adams adopts with a very unerring sense of style in "Bubbles' Sister" (80), "Rosemary, Daughter of Lady Lucas Tooth" (33) and (92), and other examples. Sometimes the oval border is adopted, which, together with the peculiar softness of texture and equableness of dark passages, reproduces the character of the mezzotint engraving very successfully.

The reverse of these traditional conditions is seen in the extremely interesting child portrait which L. Fleckenstein calls "His First Overcoat" (210), thus giving it claims to *genre* work as well as portraiture. The little fellow stands just within a sunbeam which falls upon the wall and floor, and the effect of this sunshine is surprisingly convincing; in fact, sunshine is not better rendered in any figure subject in the gallery, though J. A. Lomax runs it close in "Sun Jazz" (27), where the motive seems to be more the shadows of a pergola or railing structure cast upon a sloping wall than the presentment of the child, who catches some of the effect. Herbert Lambert's "Denis" (19) comes half-way between old traditions and new methods with a print in a high key of a captivating little boy, at half figure nude and with rather "beady" eyes. Even better is his "Ruth" (116), whose hair *à la* Golliwog and taking smile of controlled self-consciousness is quite irresistible. Angus Basil's "Child" (44) shows skilful lighting and well-caught expression. The light scheme adopted by W. Harold House in "Boy and Shadow" (59) belongs to the photographic era, although its originator, Mr. Wm. Cadby, might have been inspired by pencil or silver-point drawings. But though a later resource in camera work, it looks a little old-fashioned to-day, when the tendency is to produce rich and strong work. J. Beardsworth sends "A Dirty Little Rogue" (82) in a vignetted setting, which is puzzling at first sight until one has discovered that the baby is not in foamy water just below the edge of a quay, but peacefully reclining on some texturous material beneath the apron of a "pram." A Longman's meditative baby is very humorous. Its name is "Eunice" (288), and its pose is unique. Amongst Mr. Marcus Adams's collection of children one of the most striking is "Dorothy and June, Daughters of Mrs. Clifford Grey" (131). The younger seems more like a baby boy than a daughter. This little composition is extremely successful, and the nude flesh of the little ones is given with much plastic realism. Another group in a different manner is "Meddlesome Matties" (110), by Janet Allen. It shows three little girls busy at some mischief.

Whilst speaking of groups, I must distinguish Dora Head's charmingly animated girls of different ages in "Stories" (241), of which the arrangement is both ingenious and delightful. An out-of-door group of much skill likewise, and comprising a quantity of figures, is "The Quarrel" (327), in which Walter Lee has quite succeeded in making a lot of schoolboys act with commendable effect and lack of self-consciousness. "The Good Story-teller" (257) is another clever piece of grouping—a bevy of lively girls hero-worshipping a young man.

Nudes.

As usual, Bertam Park excels in the nudes. He has the right sense. He knows why the figure is good pictorially, and he never makes a mistake. All his examples have beautiful lines and exquisite modelling. As a rule, he has adopted this year a delicate scheme of rather flat lighting, which gives his gleaming bodies an alabaster quality rather new to camera work. But in "Nude" (17), a highly modelled girl sitting on a table, he supplies a forcible contrast to this general rule. In No. 72 he adopts a low tone. The upright standing (98) is evidence of Mr. Park's good fortune in models. There is in this example a rare physiological condition, tight and well-braced skin and integuments which make relaxed and pendulous flesh impossible, and so the figure escapes associations of realistic undressedness and secures a classic ideality. The squatting and weeping "Figure Study" (85), by H. A. Neumann, has also a touch of this classic grace and sculpturesqueness. It should be stated, however, that Angus Basil's "Nude" (161) is in a style of modelled flatness similar to the best of Mr. Park's, and is very prettily posed. Other figure studies are smaller, and used very effectively sometimes as accessories to landscape ideas, whilst what remain are in the category of dancers and gymnasts. One or two figures half clothed are skilful examples of pictorial work in this class, noticeably Dr. H. B. Goodwin's "Figure Study" (185), and W. Eide's "Illustration for a Fairy" (129), whilst Francis Jay's "En Plein Air" (168) is a remarkably clever combination of nude damsels and a sea shore, and eminently pictorial and bright.

Landscapes.

It cannot be said that landscape is a strong section of the show, because the proclivities of the selecting committee were evidently towards figure work; but what there is of landscape includes some first-rate work. Perhaps the things that stand out are Charles Job's bright and rich "On the South Downs" (163), its great merit being superb sky-luminosity; G. F. Prior's well-composed "As the Evening Shadows Lengthen" (251), a river-side street, having much quality and truth and a fine sky; and S. Brigden's "England" (304), a noble composition of a sunny lane crossed by shadows. F. O. Libby's landscapes are finely conceived, but he often gets off the mark with his suns and moons, and he persists in using an unpleasant blue tint for his prints. "The Lake Below the Hills" (203) is perhaps his best work from the point of view of tone values and recession of planes, because the subject lends itself to force in these directions, but "The Slow Moon Climbs" (108) has fine gradation, though the moon itself is unconvincing.

J. H. Anderson's "Windmill" (22) is an excellent composition, but its tone-values are not easily explicable. A bald and flat effect and a poor composition cannot rob the interest from "The Moon of the Red Gods" (31), in which Laura Gilpin has bravely carried through a new idea in making luminosity an all-sufficient subject in itself. A. G. Buckham makes a highly effective landscape out of great cumulus clouds (43), very dramatic in their force, a peep of fields far away down and an

aeroplane. Lionel Wood gets interest into his rather empty "Edge of the Beyond" (77) by the introduction of a little nude figure. These edges of foreground hills with no beyonds to speak of have been often tried, but no landscape is really pleasing without middle and distant vertical planes. Dr. R. S. Lovejoy also uses a figure—a clothed climber—to give force to the awful feeling of the vastness of his beyond in "The Abyss" (78). The finest of Alex. Keighley's several landscapes is "An Old Château" (87), because in that he preserves the true effect of sun and shadow on the building; in "The Monastery" (81) he puts his highest light, and it is very high, upon the roadway, though the sky is dark comparatively. His new departure in subject matter, "A Swirl of Waters" (90), is a very fine thing. Mr. Keighley's other subjects are good compositions with the life and interest knocked out of them by a treatment of monotony and departure from natural justness of values. "White Birches" (101) is a good subject by N. P. Moerdyke in the ugly blue tint beloved of American workers. The lines of H. N. van Wadenoyen's "Cliffs at Aberdaron" (118) are splendid and its sky and general tones are fine. Another striking work is "The Cloud Majestic" (122) chiefly because of its effective low horizon. "Evening Quiet" (130), by W. B. Bradford, is true and has an intense mood. Some real pictures of sunlight are noteworthy, particularly T. O. Sheckell's gateway into which two little people are entering whom he calls "The Adventurers" (136); and likewise his lovely "Paths of Youth" (262) with its two children. L. Misonne sends a nice collection of his very individual work, of which I prefer "Dans la Lumière" (209), because it is so satisfactorily centralised; but "Promenade Matinale" (208) is nice and sunny. Sunny also is "An Outback Australian Home" (223), which would be better if there were "a way out" at the back. Hugo van Wadenoyen, jun., has triumphed with the broad masses of light and shade in his "Houses at Cowbridge" (234). Indeed, houses and street scenes are very amenable to sun effects by photography. J. A. Lomax profits by this fact in his excellent "Shadow of a Chimney" (252) on the side of a white building. "The Shadow" (282) is another example, by T. J. Lewis, of the pictorial possibilities of a wall or two in the matter of light and texture. In "Terror" (302) we have not only splendid light but a dramatic composition of figures and rocks by H. A. Avery. "The Staithe, Whitby" (409), is a print of fine quality wherein H. Bairstow has dealt with light in the distance seen through the dark beams of the wooden erection in the foreground. In a quieter mood is his "Lonely Calvary" (435), an impressive mountain scene.

Quiet also, and dignified compositions, are two works by J. M. Whitehead, "A Dream of Raploch" (371) and "Craig Millar" (368), which has a fine sky. Were there more light in the sky of S. W. Shore's "Summer Evening by the River" (383) it would be a most successful landscape—a new departure for this well-known portraitist. E. M. Pratt's "Canyon of the Metropolis" (331) is noble and romantic, and so is Bertram Cox's splendid view of the Admiralty Arch called "A City Portal" (256). He has never surpassed this bright and busy vista, showing superbly through the architectural grandeur of the arch. A similar classic breadth and magnificence is in A. H. Blake's "Liverpool" views (47 and 171). A. C. Banfield's "Piccadilly" (152) seen from a reasonable distance is a capital London impression of a bright yet misty day. Another splendid London scene is "By St. Paul's, Covent Garden" (9), by G. F. Prior, proving in a remarkable way how a keen observation guided by a beauty sense can find glorious pictures in the most unthought of places.

To turn to moonlight we have "The Quiet Traffic Hour" (20), E. M. Pratt, a street empty but for cabs seen from a high standpoint; "Nocturne" (66), by Karl Struss, a wonderfully true effect also, with its gleaming lamps, and very decorative except for the aggressive line of the great bridge. Hector Murchison in "The Pit" (244) and "Tubs" (157) gets the fascination that lurks in great industrial works. H. C. Torrance does the same in his wilderness of trucks in "Pittsburg Steel Works" (365). It was to be expected that somebody would photograph the tower of St. Magnus as revealed by the demolition of the Pearl Society Building at London Bridge, and M. E. Selby has done it splendidly in "The Old Order Changeth" (291). One or two exceptionally good skies remain to be noted; "The Foot of the Downs" (299), by Bertram Cox—a fine subject; T. O. Shekell's "Banks of Drifted Snow" (261); "Winter Landscape" (253), by L. A. Olsen; and "Pepper Tree" (276), by J. P. Edwards.

Amongst marine subjects there is also a notable sky in "Surf Canoeing" (37), a beautifully choice print by Arthur Ford. It is very lively, as is F. J. Mortimer's vivid yachting piece called "Life" (42). "The Sea Road" (89) is another good thing, the best perhaps of F. O. Libby's works. There is also life and sparkle in Rev. J. V. Haswell's "Rings" (141)—a surf scene, the rings being made by four girls in the water and the foamy waves around them. John H. Anderson gets sparkle on the water beneath the dark sails in his "Luggers" (153); but his finest picture is the beautifully tender "Close of Day" (149), with its calm mists and colourful sky. Perhaps the strength of F. J. Mortimer's sky detracts a little from the interest of his battleship in "Scrapped" (162). His "August" (170) is the limit of liveliness—a bird's-eye view of the sands at Ramsgate or Blackpool or some equally reposeful spot. L. J. Steele's Venetian views (56 and 179) are a contrast to this in their quiet peace, but they are sparkling and rich nevertheless. The "Sand Dunes" (220) of J. A. Lomax are soft and sweet with one sharp accent of some thistle-like growth in the foreground.

More than one exhibitor has succumbed to the romantic eeriness of dark woods and gaunt dead trees. These pictures are all good in idea and treatment. "The Enchanted Wood" (230), J. E. Paton, relies on a forceful light and shade. "Skeleton of the Forest" (236), E. M. Pratt, is a gruesome stump, and another is "Sentinel of the Night" (281), by Ernest Williams.

I have not yet spoken of a fine landscape design by N. P. Moerdyke called "Eucalypts" (143), in the blue tint unfortunately; nor have I mentioned a first rate architectural subject by M. N. Bremon, "The Portico" (154), which has all the style and grandeur of a Piranesi design. The exquisite quality of L. J. Smith's back-yard scene, "The Water Butt" (259), certainly deserves mention, and it would be a shame to conclude a notice of the Salon without reference to the works by R. Polak, which whilst no longer new, are as good as ever. Some I know to have been done years ago though shewn for the first time here. "The Message" (189) is perhaps the best. In "Back from Market" (188) I think the pail the maid is holding smacks of an anachronism—a rare thing indeed in M. Polak's studied reconstructions.

F. C. Tilney.

Radiographs at the R.P.S.—Mr. N. E. Luboshey asks us to say a few words of explanation in regard to the many examples of X-ray photography which appear under his name in the R.P.S. Exhibition. Although the exhibits have been brought together by him, most of them represent the work of hospitals, in particular King's College Hospital, and he is obtaining permission to identify the exhibits (by inscriptions thereon) with the individual authors more closely than is done in the catalogue.

An M.P.'s Cameras.—Sir Richard Cooper, the Member for Walsall, has looked forward to the Parliamentary holiday because it gives him leisure to devote himself to photography. He has, the "Evening News" tells us, a fine collection of cameras, and always when he takes a holiday you will find two or three of them among his luggage. He is not content merely with taking pictures. He likes to develop them himself. Recently he has launched into cinematography.

Houghton's Bulletin for September contains particulars of new styles in mounts and mounting materials, and an announcement of a reduction in the price of a series of sketch boards. Any portrait photographer whose name is not on Messrs. Houghton's books for the receipt of the Bulletin may obtain it by sending a postcard to 88-89, High Holborn, London, W.C.1.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, SEPTEMBER 25.

Hammersmith (Hampshire House) P.S. Outing to Chertsey.

MONDAY, SEPTEMBER 26.

Bowes Park and Dist. P.S. "Transferotype." J. Brown.
Society of Photographic Writers, Liverpool.
South London P.S. "Birds and their Nests." F. P. Bayne.

TUESDAY, SEPTEMBER 27.

Hackney P.S. "Easter Holiday at Harlow." A. J. Linford.
Manchester Amateur P.S. "Un Impressione Italiano." H. E. Johnson.
Morley Photographic Society. "Enlarging." H. Grainger.
Scottish C.W.S.C.C. (Glasgow). "Trimming and Mounting."

THURSDAY, SEPTEMBER 29.

Hammersmith (Hampshire House) P.S. "An Ancient Order of Chivalry." H. W. Fincham, F.S.A.
Kiuning Park Co-op. Soc. Open Night.
North Middlesex P.S. "Epping Forest and Neighbourhood." F. G. Emler.

SATURDAY, OCTOBER 1.

Glasgow and W. of Scot. Amateur P.A. Excursion to Inverkip.
Hammersmith (Hampshire House) P.S. Outing to Oxhey Woods.
Scottish C.W.S.C.C. (Glasgow). Outing to Glasgow Harbour.

CROYDON CAMERA CLUB.

Mr. F. C. Reynolds gave a highly interesting chat on "Nickel Coinage," contrasting it favourably with the weighty copper of this country. Apart from nickel coins being liable to be mistaken for silver by the product of modern methods of education, there is a lot to be said in their favour. A central hole, adopted in some countries, ensures their not being confused with silver.

Many nickel coins of all countries were passed round, and, owing to the nature of the metal returned in safety. Speaking generally, they would meet with approval with any cult of the ugly. In the discussion, Mr. Harpur said he invariably carried in his pockets sundry copper coins which were a safeguard against rheumatism, and he doubted whether nickel would be so effective. Others thought this metal would be equally potent.

Commercial & Legal Intelligence.

CANVASSING FRAUDS.—At the Essex Quarter Sessions last week, Sidney Meider, 36, described as an artist, of Morris Road, Leytonstone, was indicted on four counts for obtaining money by false pretences from persons living at Woodford, Balham, and Walthamstow. Mr. C. E. Jones said prisoner's method appeared to be to call on various people in the district representing that he was a discharged soldier trying to earn an honest living, and promising to enlarge photographs, free of charge, on condition the customers purchased frames for the enlargements. In the four cases in question money was paid for the frames, but none were received, and it was alleged that the prisoner had no means of making the frames. When arrested by Detective Sergt. Hider prisoner said: "I am done. That is the worst of having a big family. They take all the money." Prisoner, on oath, said the frames were not delivered in consequence of his orders being cancelled on account of the coal strike. He told his customers he was a discharged soldier, but he had never worn a silver badge. He had seven children. He had every intention of carrying out his bargain. Prisoner was found guilty, and it was stated that he was a deserter from the Army. There was a conviction for a similar offence, prisoner calling upon people shortly after the Silvertown explosion and asking to execute enlargements of photographs of people killed. The Chairman said the prisoner had been convicted of a series of contemptible frauds. He would be sentenced to two years' imprisonment.

NEW COMPANIES.

CINEMA ART, LTD.—This private company was registered on September 12 with a capital of £750 in £1 shares. Objects: To carry on the business of makers of and dealers in artistic photographs for the use of or re-sale by printers, publishers, stationers, booksellers, lithographers, stereotypers, photographers, engravers, die-sinkers, etc., and to adopt an agreement with Ralph Aaron Solomon. The subscribers (each with one ordinary share) are: Ralph Aaron Solomon, Ranfurly, 136, Walm Lane, Cricklewood, N.W.2; Stanley A. Jarrett, 21, Macfarlane Rd., Shepherds Bush, W. 12, solicitor's clerk. The first directors are: Ralph Aaron Solomon (permanent managing director), David Albert Abrahams and Alfred Edward Boudy. Registered office: 25, Shaftesbury Avenue, W.1.

W. DALBY, LTD.—This private company was registered on September 10, with a capital of £1,000 in £1 shares. Objects: To carry on the business of opticians, photographic supplies dealers, etc. The first directors are:—W. Dalby, 167, Charnwood Street, Leicester; K. C. Biggs, 51, Highfield Street, Leicester. Qualification: 1 share. Registered office: 167, Charnwood Street, Leicester.

C. WINSTON AND CO., LTD.—This private company was registered on September 7 with a capital of £500 in £1 shares. Objects: To carry on the business of opticians, sight testers, lens makers, manufacturers, importers and exporters of and dealers in optical instruments, photographic apparatus. The first directors are: Herman Cahal, 53, Herbert Street, Cheetham, Manchester; Mrs. Mary Winston, 367, Bury New Road, Manchester. Qualification: £150. Secretary: C. Winston. Registered office: 367, Bury New Road, Higher Broughton, Salford.

News and Notes.

DEATH OF MR. THOMAS WHITE.—We regret to record the death of Mr. Thomas White, of Biggin Hill, Kent, a former Mayor of Lewisham, which occurred at the age of 68. Locally he was widely known as Liberal Registration agent, as a Borough Councillor and in many other capacities. Born in Southampton, Mr. White came to London in 1869. After establishing a business as a photographer in Southwark, he went to live in Lewisham in 1882, and with a studio in the High Street continued his photographic work for many years.

CAMERAS ON THE "QUEST."—On Saturday last the "Quest," under the command of Sir Ernest Shackleton, sailed from the Thames on her 30,000 miles voyage to the Antarctic, and the little-known islands of the Pacific. We are told that the number of cameras produced at the last moment was, considering the dock regulations, prodigious. Hundreds of cameras clicked on land, while on board the official photographer, Mr. J. C. Bee Mason, was turning the handle of his cinematograph, and Mr. Rowett and half-a-dozen others were snapping the scenes from the bridge.

THE POLYTECHNIC SCHOOL OF PHOTOGRAPHY.—The session of the classes at the School of Photography, Regent Street Polytechnic, begins on Monday, September 26 next. The evening classes include a series of lectures on the optical and chemical principles of photography by Mr. L. J. Hibbert, each lecture being followed by a class in which students will carry out practical experiments bearing on the subjects of the lectures. Courses of practical instruction in studio portraiture by daylight and by artificial light are given by Messrs. Edgar Clifton, H. C. Standish, and Robert Johnson, whilst the technique of negative making and printing is the subject of a practical course by Mr. H. G. Harrison. Enlarging in bromide, platinum, and carbon is the subject of a special course by Mr. Clifton, and training for the photographic retoucher and colourist is provided by classes under the direction of Mr. A. J. Lyddon, Mr. R. W. Wicks, Mr. F. W. Harrison, and Mr. Johnson. A course of training in the methods of commercial photography is provided by the classes under the case of Mr. W. A. Sivyer, and Mr. Johnson instructs in the making of life-model studies for advertisement purposes. When it is added that the school also offers a course of instruction in photo-engraving and three-colour block making taught by Mr. G. C. Laws, it will be seen that the whole field of professional and technical photography is included

within the curriculum. Individual students may obtain lessons privately in any special subject during the daytime. The prospectus of the evening classes is now published, and may be obtained on application to the Polytechnic, 307, Regent Street, London, W.1.

CLASSES IN PHOTOGRAPHY.—A course of instruction in photography, consisting of twenty-four lectures and demonstrations, begins at the Borough Polytechnic Institute, Borough Road, London, S.E.1, on Monday next, September 26. The class, which is under the charge of Mr. Robert Coombs, is held from 7.30 to 9.30, and the course provides instruction in all the ordinary processes of negative making and printing. For students under the age of 18 the fee is 10s.; 20s. for those above that age.

At the Battersea Polytechnic, Battersea Park Road, London, S.W.11, Mr. E. Senior again superintends the courses of elementary and advanced instruction in photography. The former is held on Tuesday evenings, beginning September 27; the latter on Thursday evenings, in each case from 7.30 to 10 o'clock. The first hour is devoted to a lecture, and the remaining hour and a half to practical training. The fee for each class is £1. Mr. Senior also conducts a special course on Tuesday evenings, from 7.30 to 9.30, in enlarging. The fee for twelve lessons is 10s.

At the South-Western Polytechnic Institute, Manresa Road, Chelsea, London, S.W.3, Mr. Senior is also the lecturer on photography and superintendent of a practical class which is held on Monday evenings, beginning September 26, from 7.30 to 10 o'clock. As at Battersea, each evening is occupied by an hour's lecture and subsequent practical class instruction. The fee for the course is £1. Those interested in photo-micrography should note that a course of eight practical demonstrations in this branch of work, including the photographing of etched surfaces of metals and alloys, will be given by Mr. Senior at the South-Western Polytechnic, beginning Monday, May 1, 1922. The fee for the course is 5s.

IDEAL HOMES EXHIBITION.—The awards in the photographic competition organised in connection with the Ideal Homes Exhibition, at Glasgow, have been made, the judges expressing the opinion that the standard in classes I, 2, and 3 was very high. They were, however, disappointed with the entries of contact prints, particularly in class 5. Altogether over 3,000 prints were submitted for adjudication. The awards were as follows:—Class 1. (Landscape and Seascape): First prize (£10 10s.), Charles A. Allan, Kilmarnock, 'The Sentinel"; second prize (£5 5s.), John G. Pratt, Greenock, "At Break of Day"; third prize (£3 3s.), J. Arthur Lomax, Cardiff, "Sunlit." The following extra awards, each of £1 1s. were made to:—H. G. Allan, Southport, "The Lye Mun Pass"; Dan Dunlop, Motherwell, "A Normandy Crucifix"; Miss Stella Malcolm, Edinburgh, "In Old Dinan"; G. F. Prior, Chingford, "April Sunshine"; Louis F. Steele, Portsmouth, "A Venetian Study"; John A. Stewart, Glasgow, "Duntreath and Dungoyne."

Class 2 (Portraiture and Figure Studies): First prize (£10 10s.), Mrs. G. A. Barton, Sutton Coldfield, "Mother and Child"; second prize (£5 5s.), J. Arthur Lomax, Cardiff, "Girl Drinking"; third prize (£3 3s.), H. Y. Summons, Virginia Water, "Ambition." The following extra awards, each of £1 1s., were made to:—Angus Basil, London, "Nude Study"; Maud Basil, London, "A. A."; Bruce Cameron, Milngavie, "The Toiler"; D. J. Donovan, Frinton-on-Sea, "Little Women"; Dan Dunlop, Motherwell, "The Smiddy."

Class 3 (Architecture): First prize (£10 10s.), H. Y. Summons, Virginia Water, "Thebes"; second prize (£5 5s.), Dan Dunlop, Motherwell, "St. Jargues"; third prize (£3 3s.), Bruce Cameron, Milngavie, "St. Pierre." The following extra awards, each of £1 1s., were made to:—H. G. Allan, Southport, "The White Tower"; W. Bailey, Leicester, "In the Tudor Period"; W. S. Crocket, Glasgow, "Mars Work, Stirling"; J. H. Leighton, Bradford, "Hurstmonceaux"; W. H. Reece, Walthamstow, "The Admiralty Arch."

Class 4. Any subject (three contact prints of quarter-plate size or under on one mount): First prize (£10 10s.), Rev. J. V. Hascold, Huddersfield; second prize (£5 5s.), H. Y. Summons, Virginia Water; third prize (£3 3s.), Mrs. G. A. Barton, Sutton Coldfield.

Class 5, for amateurs who had previously received no award. Prizes of £10 10s., £5 5s., and £3 3s. were awarded in the following sections:—A, for six pictures of a happy holiday: 1, W. M. Bishop, Motherwell; 2, J. M. Duncan, Paisley; 3, Peter F. Harper, Glasgow. B, for three prints of any subject: 1, James Miller, Paisley; 2, W. J. Clutterbuck, Norwich; 3, Arch. Weir, Glasgow. C, for three landscapes or seascape prints: 1, James Londsay, Glasgow; 2, Robert Clark, Glasgow; 3, W. C. Wood, Glasgow.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

R38 DISASTER PHOTOGRAPHS.

To the Editors.

Gentlemen,—Mr. T. C. Turner's remarkable experiences, and his claim to have taken the first pictures of the R38 disaster, have created a smile among the actual Press photographers of Hull. We flatly deny that Mr. Turner was first on the scene, and we can prove this statement if necessary. It would be interesting to ascertain exactly how many pictures taken by this well-known studio photographer appeared in the Press. The undersigned include the staff photographer of the "Hull Daily Mail," a well-known professional, and the operator of a Hull Press photographic agency, who were all quite equal to the occasion. We were unquestionably the first on the scene and secured the best pictures that were obtained, both from a journalistic and technical point of view. The fact that some of us were making subsequent trips to the scene of the wreck when Mr. Turner saw us does not justify Mr. Turner's ridiculous and incorrect claim, and we strongly object to it.—With compliments, we are, yours, etc.,

G. H. HARNESS, F. OVERTON, E. W. WATSON (Watson Bros.).

To the Editors.

Gentlemen,—Professional friends have pointed out to me a somewhat remarkable article in a recent issue of your paper by Mr. T. C. Turner, photographer, of Hull. On perusing this, one finds some amazing reflections upon the Press photographers, and also the editors of the newspapers in London, together with a suggestion that Mr. Turner was the first on the scene, and so created something in the nature of a feat of which to be proud. He says the Pressmen just managed to record a picture an hour after the occurrence. This statement is not true and an unfair one. I am prepared to prove that I was there with a reflex camera no later than 15 minutes after. I was in a taxi which I directed down side streets to avoid the crowds that were rushing to the scene.

For the information of your readers, I may point out that Mr. Turner is essentially a studio worker and a portraitist. His work in this direction is greatly admired by many, including myself. Personally, I am essentially a focal-plane worker. All photographers know what a wide gulf there is between action photography and portrait work. An event like the disaster to the R38 is not a studio job. It would be interesting to know how many of Mr. Turner's wonder photographs ever saw the light of day in the Press. "The proof of the pudding is in the eating." We always welcome competition, but I am prepared to state that the pictures which were issued by my agency were vastly superior both from a journalistic and technical point of view to any of Mr. Turner's taking. They ought to have been, too, seeing that this is my line. My work is known in Fleet Street, where pictures are only selected on their merits. It is for this reason that when Mr. Turner makes the suggestion that the Press photographers were not equal to the occasion I, along with other professional colleagues, raise our hands in protest.

Let me inform Mr. Turner that it was my duty as the appointed and recognised special photographic correspondent of the principal London and provincial picture papers, dailies and periodicals, to be there first, and I was. I am sure that I have no desire to make a song about being there first. The police might

just as well write an article about the wonderful work that they did and send it up to their periodical. Mr. Turner, in raising this point, is showing very bad taste, I think. Surely those brave airmen did not meet such an awful death just to provide Mr. Turner with something to crow about. Genuine Press photographers can always be identified on these sad occasions by the quiet way, despite technical difficulties, in which they carry out their duties of recording the scene so that (in this case) the whole world may see what had happened to the world's greatest airship. I am a member of the Institute of Journalists; Mr. Turner is, of course, not. The recognised pressman has a right to be there. The studio man has not. What right had Mr. Turner to be there at all? What paper does he represent? Let Mr. Turner in future stick to his studio work and leave the Press photographers alone. The disaster was far too terrible to be the mere subject of pictures for Mr. Turner's windows with the lights burning till a late hour as an advertisement. That is the sole reason Mr. Turner went out to the wreck for, and I do not think it is very creditable. Yours, etc.,

EDWARD W. WATSON,
Proprietor of Watson Bros., Press photographers.
12, Charlotte Street, Hull.

[As these letters reached us too late for insertion in our issue of last week, we submitted proof of them to Mr. T. C. Turner, whose reply appears below. We think the absence of salvage vessels (and of men on the envelope) from Mr. Turner's photographs is sufficient evidence of their production at an earlier time than those by Mr. Overton, which are sent to us by Mr. Overton in accompaniment of the further letter which appears below. The viewpoints from which the floating wreck was photographed differ considerably, but it is possible to say with reasonable correctness that the last of Mr. Turner's photographs to be taken shows the wreck in approximately the same state as does the first of Mr. Overton's.—EDS., "B.J."]

To the Editors.

Gentlemen,—I am obliged for a copy of the letter sent to you by Mr. Overton and endorsed by two other local Press photographers, Messrs. Harness and Watson. I called upon Mr. Overton for an explanation of his letter and purchased a set of his pictures, which he assured me were his *earliest* after the disaster. You will see by these prints that his contention cannot be maintained, but as he has apologised there is an end as far as he and I are concerned.

Mr. Harness, the only one of these gentlemen I knew, is a Press photographer of repute in the district and a staff photographer of the "Hull Daily Mail." This paper published the night after the tragedy, and above my firm's name, the large broadside view "being the first photograph to be taken after the disaster."

Mr. Harness did not see the accident, but says that after receiving a telephone message he cycled to the pier, secured a rowing boat, and in it reached the scene of the wreck. "He thought it was from 2 to 2½ miles away." If this had been a correct guess it would prove a long and arduous row.

Now I had actually witnessed the accident in all its dreadful detail, knew exactly where to find the wreckage, and when, after a race to the pier, I sprang on the already moving tug, I was quite sure the advantages were all on my side. I certainly saw no trace of photographic activity in the boats near the wreck, and very great enlargement of the negatives has failed to reveal the figure either of Mr. Harness or of Mr. Watson.

The matter is scarcely of sufficient interest to intrude on your valuable space, but for Mr. Watson's greatest share in the letter, and his suggestion of antagonism between Press and studio photographers. He appears to have been the actual author. I could not at first obtain his address from the other two signatories, but after an arduous search I discovered his establishment at the top of a building in Central Hull. On a door labelled Watson Bros. was a notice "out" and a paper clock face announced "return at 12. Please put messages under door." As no member of the firm had turned up by 12.30 I had to leave my card under the door with a request for an interview at my own place.

When Mr. Watson called I asked him to substantiate his contention by producing his own pictures and by showing me his journalistic account of the catastrophe.

It seemed a simple affair; the photographs themselves would prove the position of the tide and the gradually collapsing wreckage must tell its own story. Mr. Watson refused both requests and somewhat discounted the claim to the best "from a journalistic and technical point of view" by saying he had not witnessed the accident himself. He had jumped into a taxi—a rare bit of luck to find there and then—and on reaching the pier he too had secured a rowing boat! As Mr. Watson neither apologises nor is willing to establish his case in the only possible way, I fear there is nothing more to be said. Your readers will form their own opinion on the fairness or otherwise of this attack.

I sent my account of the disaster to the "British Journal" and to my friends of the P.P.A. and the profession generally because I thought it would interest you and them, coming from a *photographer on the spot*, the very, very spot where the fatal curve was made. I entirely disclaim any intention of wounding the susceptibilities of the local Press photographers by stating I made the first exposures of the wreck from the Humber, a claim which I venture to think is still holding good.

The writer of the second letter, Mr. Edward W. Watson, of Charlotte Street, Hull, is also the author of the first signed by Messrs. Overton, Harness and Watson. When his letter is not positively childish it is rude, and evidently written to produce the impression that in giving the account of the airship disaster my motive was to attack Press photographers. Anyone of average intelligence would see that outside the simple narrative itself my comments were directed to criticising the unfairness of those newspaper editors who leave out a professional's name and address, accepting at the same time offers of service at "fees which in *many cases* are almost beneath contempt."

Who is Mr. Watson to take up this position? I resent his interference, because there is no cause for it. He asks a good many questions which I would be happy enough to answer were they of a less personal character or at all interesting to my confrères.

Quoting from his last letter, "All photographers know what a wide gulf there is between action-photography and portrait work. An event like the disaster to the R38 is not a studio job." I suppose Mr. Watson is trying to say a Press worker possesses some quality a man of the studio does not. Ridiculous! Is there any *live* man of decent education, good eyesight, and possessed of suitable apparatus, who is not a better *Press* photographer if to his knowledge of focal plane work he adds an expert's training in studio work?

The established studio worker has also other advantages. As a business man, a citizen well known in his city, probably paying heavy rates for a prominent position, enjoying the resources of a well-appointed centre—artificial light apparatus of every kind, enlarging rooms, artists and staff of assistants—he must be in a better position than the average Pressman, often of limited means or limited space to work in.

Then the very system which is forcing the Pressman to work *anonymously* and *unrecognised* is against the best work.

There are moments of crisis when success is often bound up with prompt and kind co-operation shown by officials and others, and who are more likely to command these advantages than he who day after day comes into contact (as a studio worker) with people of authority and influence in his district? He has a much greater chance of making his personality tell when it is most wanted.

My professional friends will so well understand this that I almost apologise for stating it. The fact is, all "studio" men are "Press" men at times. It has always been a part of their business. In the 30 years of life in this my adopted city I have always striven to keep a photographic record, not merely of men and women, but of interesting *events*.

There are few occasions when local history has been in the making when the cameras of Regent House have not been busy, and any modest claim I may have to remembrance by citizens of future generations will rest, not on countless thousands of studio portraits, but on keeping careful records and writing the history of the air raids on Hull during the great war.

But if it is to be said that the studio worker is a pirate on the Press photographers' domain, what about the activities of certain ultra-modern snapshotters with whom we are continually becoming acquainted at weddings and other social functions! How often is the professional, who has been engaged by the family, annoyed by the sudden irruption of Pressmen, who, under the excuse that they represent this or that local paper, ignore the fact that they are uninvited, and proceed in the most ill-mannered way to jeopardise the success of the whole grouping by distracting interference. The public begins to recognise what the game means, and that it is a deliberate attempt to oust by cheapness and unfinished work the better but necessarily more expensive portraiture of the established professional.

Is this genuine Press photography? Of course it is not, and the only way to meet it is by giving the local paper a print to reproduce without fee, but with acknowledgment, and arranging previously with one's clients a fee for attendance and so many copies. An editor almost invariably chooses professional work, and sitters, especially the ladies, show a rooted objection to the hard sun-bathed results of the Press worker out of his proper element.

I am sorry I have taken so much space, but when a Press photographer goes out of his way to conjure up imaginary affronts and injuries it seems the time has arrived to present the other side, as it appears to a man who is "essentially a studio worker and a portraitist."—I am yours, etc.,

T. C. TURNER

Regent House, Anlaby Road, Hull.
September 19.

To the Editors,

Gentlemen,—I find that the letter *re* above, signed by Mr. Harness, Mr. Watson and myself, contains the following statement: "We were unquestionably the first on the scene, and secured the best pictures," etc., etc. The correct and intended rendering is: Two of us were unquestionably the first on the scene, and collectively we secured the best pictures, etc., etc.

I have never intentionally claimed that I was there before Mr. Turner. For this mistake (which in the haste of composing the letter went unchecked) I am personally very sorry, and beg Mr. Turner to accept my sincere apology as regards that regrettable mistake.

I enclose a few of my own photographs of the wreck, numbered in the order in which they were taken. They show the complete alteration in appearance that occurred during the half hour I was present. I make no claim that these are the first photographs taken, but they do prove that other photographers were there before the wreck broke up into fantastic shapes. Is there, may I ask, a complete and very striking difference as regards the position of the wreck between No. 2 of mine and the one taken by Mr. Turner?—Yours truly,

F. OVERTON.

85, Prospect Street, Hull.
September 17.

PLATES v. FILM.

To the Editors

Gentlemen,—Would it not be possible to turn this somewhat acrimonious correspondence into a useful and illuminating debate on the relative merits of plates and films? That, after all, is, or should be, the chief interest of the present discussion to most photographers. I would suggest two simple rules that should be strictly observed:—

1. A clear statement to be given by the writer of the length of his personal experience of the product he discusses.

2. An absolute avoidance of personalities, innendoes, and prophecies of all kinds.

Under Rule 1 Mr. Mallinson's letter in your last issue would have been barred, for he fails to state his qualifications as a judge of portrait film. Indeed, his remarks on working it seem to point to his never having got beyond the first preliminary trials, for most of the drawbacks he names are easily avoided by those who are really familiar with the film. And even if a careless worker succeeds in getting scratches on the back, he has a very big compensation, as any portraitist will tell him, in possessing the two surfaces for retouching.

Under Rule 2 we should have been spared Mr. Mallinson's droll confidences as to what he imagines Messrs. Kodak are up to, and his letter would not have lost the sympathy of readers.

I have used portrait film in Switzerland for the last four seasons (summer and winter) on most difficult lightings, often ranging from dark green foregrounds to snow-capped distant mountains, and in portrait work at home, and know from experience that the quality is exceptional owing to its absolute non-halation. There is no doubt about its convenience; one can develop half a dozen at once in the dark-room, or even in the hotel bedroom, as simple a performance as toning prints, pin them up to dry, and they store in a very small space and are unbreakable.

But their primary claim is for quality. So long as the sun is not actually shining in the lens, there is no effect, indoors or out, be it ever so daring, that they are not equal to, and for this same quality I would sacrifice all the minor advantages if it were necessary, for nothing but the best is worth carrying so far afield as the Swiss mountains.—Yours truly,

WILL CADBY

Borough Green, Kent.
Sept. 14.

To the Editors.

Gentlemen,—Since we commenced to use the Eastman portrait film, in April, 1914, we have always recognised that it is a product of sterling quality, and it has proved itself, in our hands, far superior to the plate for every class of work in studio and outdoor.

When using film one has the satisfaction of knowing that, however difficult the lighting, halation is non-existent, also it is much preferred by our retouchers to the plate, because of the extra amount of work that can be put on it with ease.

We have never had any trouble with markings of any description, and for filing purposes it is ideal.

Sometime ago we installed a set of Eastman tanks, with hangers, etc., and we found that this system proved itself most useful for the development of large batches of film negatives, and also the cost of developer, and time was reduced by at least 50 per cent.

Also good negatives are produced with ease and certainty.

We feel sure, however, that when one is taking a progressive step, conservatism should be put on one side, and the product tested on its merits.

If this is done in the case of the Eastman film, one cannot help but be delighted with the results, as, speaking personally, we really cannot see any disadvantages, but heaps of advantages in the use of this product of progress.

We are praising the film on its merits, and not because we are anyway interested in Kodak, Ltd.—Faithfully yours,

K. AND S. DARBY.

Canton Studios, New Street, West Bromwich.
September 14.

To the Editors.

Gentlemen,—Old combative times are recalled by reading the correspondence in your last issue on "films *versus* plates," and the policy of the Kodak Co., not by the particular subject, but by the spirit of controversy aroused. True, Mr. Harold Baker and others weigh pros and cons in impartial and helpful manner, but obvious special pleading is resorted to by one or two, and partisanship is evident.

Now for many a long year I have been interested in the printing quality of negatives, and many thousands from foremost studios in town and country have passed through my hands. I see consistently mediocre work turned out by some firms on the "portrait" film (still worse on plates), and note on rare occasions violent halation, or possibly "irradiation" alluded to by Mr. W. E. Debenham. On the other hand, work of the very finest class is consistently achieved by others on the film.

Personally, I believe that in many cases halation is the primary cause of loss of quality when it occurs, and with the films the operator not highly skilled is largely protected against himself, and, therefore, the production of good negatives is rendered easier. On the other hand, it is only just to say that the studio I should place easily first for turning out negatives of superb

quality with the greatest regularity employs ultra-fast dry-plates. Posing and lighting are right, exposure is correct, and development is stopped at just the right point for the printing process in view. In fact, skilled craftsmanship from start to finish. I emphatically assert that not one out of the very large number of film negatives I have seen has *beaten* the best of these dry-plate negatives for beautiful printing quality, though many a film negative has equalled them.

Not infrequently the "portrait" film is contrasted with an emulsion on glass of far higher speed, which is hardly fair. Apparently the English dry-plates makers have concentrated on the production of a plate combining the maximum of speed with a long range of gentle gradation, and admirably they have succeeded, but the ultra-fast brand remains a more delicate tool to work with than a film or plate coated with a slower emulsion. Mr. Debenham may "see no reason why an emulsion should be slower on a film than on a plate." Nor do I, but there may be a good and sufficient reason for not coating celluloid with an emulsion of extreme rapidity. Certainly there appears to be no doubt that the Kodak portrait film, although of ample rapidity to meet most requirements, does not attain the speed furnished by modern ultra-fast dry-plates.

In conclusion, I may add that unhappily I have not the faintest commercial interest in the manufacture of either plates or films, but admit a bias in favour of the film for occasional work. This does not justify depreciation of the dry-plate, which would be both silly and fatuous.—Yours truly,

"FAIR PLAY."

To the Editors.

Gentlemen,—I have read the letters, *re* above, with interest. We all know that an ounce of practice is worth a pound of theory, may I be allowed to state some of the advantages of films from my own practical use.

I have used them ever since Messrs. Kodak brought them out, and the advantages I have found over plates are as follows:—

1st, economy.—I can develop, and have developed, 24 flat films, ½-plate size, in a 10 x 8 dish at a cost of 3d. for the 24, including fixing, and every one a perfect negative.

2nd, rapidity.—I took a wedding group the other day in a very dull light; in fact, it was raining; stopped my lens to *f*/16 and gave 1 second exposure (as there were some tiny bridesmaids in it). Result, a negative full of detail and most brilliant.

3rd, portability.—12 films can be sent by post to be retouched at a cost of 4d.; 12 plates would cost over 1s. Again, 6 slides loaded with 12 plates weigh 7¼ lbs.; 6 slides loaded with 12 flat films weigh not quite 6 lbs. only, a great boon if you are going any distance, for weight tells.

I do not hold any brief for Messrs. Kodak, neither am I a shareholder (wish I was), but I think honour should be given where honour is due. One of their kind and courteous gentlemen who has the bad luck to have to call upon me showed me the other day a marvellous slide made to take plates or films. As soon as I can save up enough coppers in these hard times I am going to have 12 of those slides.

Again, how about the developing and printing of films for the amateur, which we do as a side-line. Don't we owe Messrs. Kodak something for that?—Yours faithfully,

W. ADAMS.

The Studio, Witney, Oxon.

To the Editors.

Gentlemen,—With reference to use of films, I have found the chrome-alum in fixing bath recommended by Messrs. Kodak, Ltd., exceedingly good for hardening the surface, while for varnish I think there is nothing better than celluloid. This is easily and economically made by dissolving scraps of film in amyl acetate until of the consistency of syrup. It should then be strained through fine net, and can be applied with a pledget of cotton wool, forming a very efficient protection from damp.

With those films having the bare celluloid on one side, careful application is required to the gelatine side only.—Yours faithfully,

F. S. WELLS,
Works Manager, The Doncaster Rotophoto Co., Ltd.

Doncaster.
September 16.

SYSTEMATIC BROMIDE PRINTING.

To the Editors.

Gentlemen,—It has been interesting to me to read what Dr. Glover has to say on bromide printing; also the letters of Mr. Baker and Mr. Hall. Dr. Glover's system, while no doubt excellent in itself, I consider unsuitable for a busy printer, but Mr. Baker and Mr. Hall seem to have been working on similar lines to myself.

In the early days of the war I, in common with most photographers, was troubled with the lack of competent bromide printers. I had several men who were supposed to be printers, but who, in practice, never managed to get a dozen prints of an order alike. To overcome this, I tried the following system:—3½ minutes was adopted as a standard time of development, using amidol, the temperature of the developer being raised in cold weather by a hot-water jacket, and kept to summer level. A trial print was made and developed for this standard time. If correct, any number of identical prints could be made by giving the same exposure. If too dark or too light, an extra piece of tissue paper was added to or taken from the printing box, or if the error was very slight, the exposure was altered ½ a second or 1 second. I arranged the light for a standard exposure of about 5 seconds, it being found that 4, 4½, 5, 5½, and 6 seconds covered practically every negative without altering the tissue paper. Nothing was left to guesswork; the thermometer was used for the developer temperature and the clock for exposure and development. By adhering strictly to this system, a youth who knew practically nothing about bromide printing was able to turn out remarkably good and regular batches of prints. A system of this sort immensely reduces the fatigue of a day's printing, so much of the personal element of judgment being obviated.—Yours faithfully,

GEO. WILKINSON.

849, High Road, Leytonstone, E.11.

To the Editors.

Gentlemen,—I am glad that the letters on bromide-printing have induced Dr. Glover to give us more information, as I am sure nothing but good can arise from a serious discussion of the subject, especially if others will give us the benefit of their experience. But I wish Dr. Glover had made experiments with other developers besides amidol, because excellent as that developer is, I do not think it is used to so great an extent as metol-hydroquinone by professional photographers. I may be wrong in this assumption, but I cannot call to mind any of my professional friends who are using it. I find that it generally needs a stronger negative than other developers, and often turn to it when a negative of more than usual hardness has to be printed. Its great virtue, to my mind, is that it will give almost the same sepia colour, when greatly varying exposures and prolonged development have been given, but the colour it gives is usually colder than I like, and there is always the objection that it so soon becomes exhausted.

In recommending the three-minute minimum of development, I, perhaps, over-emphasised the importance of the time mentioned. What I should have said was that I find three minutes a valuable standard, allowing for all the variations in paper, negative, temperature, etc., and that each should find for himself the standard average time which produces the result desired. This method is not as scientific as Dr. Glover's, but I think it is better than having no system of timing, and easier for everyday work than Dr. Glover's method, which, I am afraid, we should have difficulty in persuading assistants to adopt.

I do not think it is possible to handle a large number of prints successfully with a shorter time of development than three minutes.

As to the colour of the print when toned, I think we are both agreed that long or full exposure, and short development gives warmer colours, especially when using any other developer than amidol. But I think that Dr. Glover's claim that increased time of development will compensate for decreased exposure, and produce a similar is not confirmed by my own experience. It may be possible to do this, but within a very limited range.

Dr. Glover's two stories seem to me arguments against the success of his system. I am writing without being able to refer to his article, but if my memory is correct he claims that his method is more reliable than inspection, but if his claim that prolonged development compensated for reduced exposure is right, then in these

two cases where the exposure was accidently reduced, prolonged development, which would have been suggested by inspection, should have put matters right.

I hope Dr. Glover will continue his experiments with other developers, and give us the benefit of his results.

I am afraid many of us are like the tailor in Punch, who, when a customer complained of the fit of his clothes said: "I must ask you bear in mind, sir, the tailoring is not yet reduced to the level of an exact science." A good many photographers are inclined to say the same of photography, but I am sure we are greatly helped when investigators like Dr. Glover bring some exact science to bear on the problems that confront us in our daily work.—Yours truly, HAROLD BAKER.

"THE DEATH" AT THE SALON.

To the Editors.

Gentlemen,—In criticising my picture "The Death" (No. 55) in his review, in your issue of September 16, of the present Exhibition of the London Salon of Photography, Mr. Tilney appears to have taken the two figures to be human beings when he writes that the dying figure is posed and the lady behind looks more like a monumental effigy. I should like to inform Mr. Tilney that the subject is the Shelley Monument in Christchurch Priory.—Yours truly, AUBREY G. RAYMOND.

32, Eastland Road, Neath, South Wales.
September 19.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply, 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C. G. ROSENBERG.—We are sorry we cannot give you any information regarding developers which give a finer grain in the negatives than the original grain. So far as we know this property is not possessed by developers, which, in other respects are of practical value in the making of negatives.

T. H. LEGGE.—With a properly restrained developer you ought to have no difficulty in getting white margins when using a mask on the enlarging easel. In any event could you not give the enlargement a quick rub over with weak iodine cyanide reducer on cotton wool, which would remove any slight veil of silver deposit?

J. LADE.—(1) Best to develop for only about a minute, fix, wash thoroughly, and then intensify with the uranium intensifier. (2) Rather out of our province. We think the pads are simply made of cotton fabric with cotton padding inside. (3) It is the best pattern you can get. (4) No, you can use a lens at a larger stop than when copying on a reduced scale.

J. S.—It is not beyond the capacity of a careful worker to albumenise and sensitise paper. The very fullest instructions (and these are necessary) are contained in the manual, "Photographic and Photo-Mechanical Printing Processes," by W. K. Burton, which you can buy from Messrs. Foyle, 121-123, Charing Cross Road, London, W.C.2, for a shilling or two.

F. B.—Even supposing that copyright still exists in the picture (we think it is quite possible that copyright has expired) there would not be any infringement in your making a photograph in which a child of similar appearance is posed in the manner of the painting. The law is rather peculiar on this point, but we think you may take it that you are practically secure in considering that the owners of the picture would not think you were infringing their copyright.

F. W.—(1) The only lamp is that of the Blanchard Lamp Co., 151, Farringdon Road, London, E.C.1. It burns ordinary paraffin and costs, or used to cost, about £10 to £15. (2) Billcliff's Camera Works, Richmond Street, Boundary Lane, Manchester. (3) The London agent of Messrs. Lumière is Mr. T. K. Grant, 89, Great Russell Street, London, W.C.1, by whom all the Lumière goods are supplied in this country. (4) Messrs. Fallowfield, 146, Charing Cross Road, London, W.C.2, make a specialty of mounts and other miscellaneous goods for stickyback portraiture.

A. W. S.—Half-watt lamps will answer perfectly either as a supplement to daylight or for working alone at night. For the former purpose two 1,000 c.p. lamps placed near the ceiling about 7 ft. from the background in front of the sitter should be enough. For night work you would require three more lamps of the same power arranged in a curve commencing from a point opposite one edge of the background, and continuing round to meet the two used with daylight. The front lamps should be about 8 ft. from the floor, the side ones may be rather lower, say 6 ft. You must consult your electrician as to the meter and wiring.

MARCUS SHAW.—It is rather uncommon for single blisters to appear on prints after their being in the wash water for as long as half an hour. The fact suggests that the water may impinge in a fine stream on certain prints, or perhaps prints may have been "kinked" in places in turning them over. The means for prevention, apart from those suggested by what we have just said, are to keep all solutions at the same temperature; and you might also transfer prints to a fixing bath of half or quarter strength instead of to plain water when they have been fully fixed in the hypo of the ordinary working strength. Have you tried whether the use of a hardening-fixing bath, made up with alum, sulphite, hypo, and citric acid avoids the defect? It is possible that it may do so.

W. A.—(1) There is not any substantial advantage in using an $f/4$ aperture over one of, say, $f/6$ or $f/8$, so far as avoidance of retouching is concerned. Using a plate of fine grain, it should be quite practicable to make negatives which would give post-card enlargements practically indistinguishable from prints from direct negatives, but an aperture of $f/4$ is not necessary for this purpose, but, in fact, has rather a contrary influence. We should say $f/6$ is about a useful aperture for this purpose. (2) Film-packs require an adapter in which the pack itself is held in order that the successive paper separators may be drawn off, and so expose one section of film after another. The pack is complete as purchased, consisting of a stout card casing strengthened with thin metal. Having the adapter in which to hold it at the back of the camera, no other accessory is needed. (3) With all the actinometers that we have tried there is a slight difference in colour between the tint and the darkened sensitive paper, but it is not a difficult matter to judge, with sufficient nearness, a match of "depth" apart from any slight difference in colour.

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Contents.

SUMMARY

In a further series of notes on the pictorial exhibits in the exhibition of the Royal Photographic Society, Mr. F. C. Tilney deals particularly with the landscapes. (P. 579.)

Mr. W. S. Davis, in our American contemporary "Camera," gives some useful tables for obtaining the maximum sharpness of objects at different distances from the camera by proper selection of the marking on the focussing scale in conjunction with the lens stop. (P. 583.)

In the further chapter on the speed of a lens, the causes of falling off of illumination towards the margins of the plate are considered, namely, that which takes place regularly with every lens, and that which depends upon the degree of cut-off by the lens mount. Figures are quoted showing the extent to which illumination falls off in the case of wide angle lenses. Absorption and reflection of light by the glasses of the lens are further factors affecting speed which almost always are neglected. (P. 580.)

A correspondent, Mr. Louis Nell, raises the question of the greater rapidity of small lenses compared with those of the same f/No., but of longer focus. (P. 589.)

We refer to this question in a paragraph on page 577.

In a leading article we give two rules which are of frequent usefulness, namely, those for finding the distance between object and ground glass when enlarging or reducing upon any scale with a lens of given focal length, and also the possible degree of enlargement or reduction within a prescribed distance between image and object. (P. 578).

Destruction of a wet gelatine film by insects is an annoying mishap which occasionally occurs and against which the only effective safeguard is the use of a drying chamber covered with muslin or other open fabric. (P. 578.)

Adjustment of the distance of the light, or means for using "dimming" screens, should be a feature of the bromide printing box. (P. 578.)

A short communication to the "Chemical News" by Mr. J. G. F. Druce states that the composition of the black substance which is formed when mercurous chloride is acted on by ammonia. (P. 584.)

As has, however, been shown by Mr. Chapman Jones, the product formed when ammonia is used for darkening the image (of mercurous chloride) in the mercury-ammonia intensification process is not of this definite composition. (P. 578.)

In further discussion of the respective merits of plates and film, correspondents lay stress on the relative speeds of emulsion on glass and film and on the storage of film negatives. (P. 590.)

In accordance with the discontinuance of summer time, clocks will require to be put back one hour during the night of Sunday-Monday next. (P. 588.)

An absurd prosecution under the Business Names Act was recently dismissed by a London magistrate. (P. 588.)

EX CATHEDRA.

The 1922 Almanac. The 1922 edition of the British Journal Photographic Almanac is now in an advanced stage of preparation as regards both its text and advertisement pages. All being well, it is hoped to publish it on or about December 1. We have issued application forms to secretaries of photographic societies and to photographic firms, requesting correction of the particulars which appear in the respective directories of societies and the photographic trade. We shall be very glad if those to whom these applications have come, and who have not yet returned them, will do so without further delay. Unfortunately, in compilations of this kind, it is the last comers who fix the time at which a section of the Almanac can be printed. Naturally, there is a limit beyond which we cannot wait, whether particulars are forthcoming or not. Apparently, in the case of societies delay chiefly arises in consequence of a change of secretary of which we have not become aware. In such cases, we send to the previous secretary, but it seems not to be the invariable rule that the ex-officer forwards the application promptly to his successor. We make this comment in the hope that those to whom it applies will take the hint. A second application has just been made to secretaries and firms who have not answered the first. The third, and last, will be made in a week's time.

* * *

The Speed of Small Lenses. The letter by Mr. Louis Nell, which appears on another page, raises a point which undoubtedly is deserving of more attention than it commonly receives. As set forth in the article which appeared in our issue of September 16, the working aperture or number of a lens is rated solely according to the proportion which the focal length bears to the diameter of the largest stop. Yet, after all, this is not the only determining factor, since the number of separate glasses in a lens, and their colour and thickness, considerably affect the brightness or intensity of the image which is formed on the ground glass. We refer briefly to this subject in the concluding paragraph of the article which appears this week. We know that some very experienced and methodical users of small cameras, *e.g.*, of vest-pocket size, regularly make a great allowance for the extra speed of the small 3-inch lens which is usually fitted. In one case that we know, an expert photographer adopts one-fifth the time of exposure compared with that which he would consider correct when using a lens of, say, 6 or more inches focal length. Fineness of definition no doubt enters also into this question, and, considering the present widespread use of very small lenses and cameras, it certainly seems that there would be a practical advantage to the user if the extra rapidity of these small lenses could be more definitely established on theoretical grounds or as the result of experimental measurements. Perhaps some of the lens makers have data in their possession which bear on this point.

Mercury-Ammonia Intensifier. The note by Mr. J. G. F. Druce, which we reprint on another page from the "Chemical News," relates to the process of mercury intensification in which the bleached image is darkened with a solution of ammonia. From analysis, Mr. Druce finds that the composition of the dark substance corresponds with the formula NH_2Hg_2Cl, which is that generally adopted by chemists. The note is of interest as tending to show that the black substance, when produced in this way by the action of ammonia solution on mercurous chloride, is a definite compound. This, however, is contrary to what has been found by Mr. Chapman Jones, and later by Leteur, under the somewhat different conditions which prevail in the use of the mercury intensifier. Here the ammonia solution acts not on mercurous chloride alone, but on a mixture of silver chloride and mercurous chloride existing in gelatine. Mr. Chapman Jones's experiments of some years ago clearly showed that ammonia, used in the strengths which are commonly employed for darkening the bleached image, dissolves mercury irregularly from the dark substance, a property which accounts for the somewhat erratic behaviour of this intensifier upon the scale of tones in a negative.

* * *

A Printing Hint. To secure even quality in bromide printing it is a good plan to sort out the negatives into batches of as nearly equal density as possible, and if this can be done by daylight so much the better, as with pyro development there are often variations in colour which will cause a comparatively thin negative to take as long as a fairly vigorous-looking one. As Dr. Glover points out, the usual practice in bromide printing is to over-expose and to stop the development at a comparatively early stage. This is open to two serious objections, one being that the gradation of the negative is less truly rendered, and the other that such prints are unsatisfactory in colour when toned. A fault in many printing boxes is a lack of means for controlling the light, involving, with thin negatives, a very short exposure which cannot be repeated with any degree of accuracy. Most boxes are too shallow to allow of any appreciable variation of light being obtained by altering the distance of the lamps, and in such cases it is necessary to use translucent screens as "dimmers." These should be carefully tested and marked to indicate the actual increase of exposure needed with each.

* * *

Insects and Gelatine. It is, perhaps, not well known that the ordinary house spider has a distinct partiality for the wet gelatine films of plates set up to dry, in illustration of which an instance from our own experience may be given. A number of plates exposed upon a holiday had been developed, fixed, washed, and set up to dry upon a shelf. In the morning they were taken down, and upon the bottom edges of several of the negatives the films had been eaten away to the glass in a series of semi-circular holes, the largest being about an eighth of an inch in diameter. The plates were not of any particular value, though, if they had been, the probability is that the spiders would not have refrained from their meal. While on the subject, we may point out that spiders are not the only form of lower insect life that appreciates a square meal of gelatine. We have known gnats perish in the attempt to obtain sustenance from a drying negative. Nor is this entirely confined to the insect species. A friend of ours on holiday in the country at a time when water was not plentiful, and also with a view to saving the labour of drawing the washing water from the well, conceived the idea of putting his films in their washing tank in an adjacent brook. When, a short time after, he went to see how they were getting on, he found that some tadpoles had been faring sumptuously upon his gelatine emulsion. Thereafter, he was careful to tie a piece of butter muslin entirely over the top of the washing tank, in order to exclude these unwelcome intruders.

APPROXIMATE FORMULÆ FOR CERTAIN REDUCING AND ENLARGEMENT CALCULATIONS.

A FEW months ago, in our issue of July 1, 1921, p. 382, we wrote some notes explanatory of a very simple formula which may be used in order to find the focal length of lens which is the longest which can be used in a studio of given size for any particular kind of portrait, from full-size heads to carte-de-visite full lengths. As was pointed out, the chief factor in calculations of this kind is the degree of reduction; that is to say, the size of the image relatively to that of the object. In ordinary studio work the greatest degree of reduction, which is commonly employed, is in taking a full-length carte-de-visite. If the figure on the print measures 3 inches, its proportion to the average height of a person is one-twenty-third, or, as is usually said, the "reduction figure" is 23. This being understood, the formula for the longest focal length which can be used is simply the distance between the sitter and the ground glass of the camera divided by a number which is 2 greater than the reduction figure.

In giving examples of the use of this method, we did not point out that the formula serves equally well for ascertaining the dimension of a studio which is required for various descriptions of work with a given focal length of lens, and also for ascertaining the types of work (degrees of reduction) which can be done in a given space with a lens of given focal length. As several correspondents have recently inquired for a simple rule which applies in these conditions, it may be of service to others to indicate the variation of the rule which, in our previous article, was put forward only for the particular purpose of ascertaining focal length.

It must be pointed out that these rules are not absolutely exact, because they leave out of account the extra camera extension which is required when photographing objects which are nearer than the "infinity" corresponding with a camera extension equal to the focal length of the lens. But this distance is a very small one in all cases of enlargement or reduction greater than about 6 times, since it is then less than one-sixth of the focal length. Nevertheless, it is necessary to point out that for degrees of enlargement or reduction between about 6 and same size the rule is not sufficiently exact, even for the approximate calculations which usually are sufficient in the taking of studio portraits or the making of enlargements.

First, as regards the length of a studio which is necessary for various types of portrait with a given "focus" of lens. If we call the degree of reduction in size R, *e.g.*, 23 when making carte-de-visite full-length portraits, and D the distance which requires to b provided between the sitter and the ground glass, then

$$D = (R+2) \times f.$$

f representing the focal length of the lens.

In words, to find the required distance add 2 to the reduction figure and multiply by the focal length. The result is the required distance in inches. For example, if it is required to make full-length carte-de-visite portraits with a 10-inch lens, what length of studio is necessary? Here R (the reduction figure) is equal to 23. Adding 2

and multiplying by 10, we get 250 inches, equal to (practically) 21 ft. Inasmuch as it is necessary to have some space behind the sitter and also behind the camera, it is usual to add about 5 ft., so that the minimum length of studio for convenient working is 26 ft.

To turn now to the other form of the calculation, ummely, to find the reduction figure which is possible when enlarging or reducing within a given space, when using a given focal length of lens. Using the same symbols as before the formula for this reduction figure is

$$R = \frac{D - 2f}{f}$$

In words, subtract twice the focal length from the available distance and divide by the focal length. The result is the number of times of enlargement or reduction which is possible under the conditions.

An example of both enlarging and reducing will serve to show how this formula is used. Suppose we have a distance of 5 ft. available between the negative and the easel in a vertical enlarger fitted with an 8-inch lens. What is the maximum degree of enlargement which can be done? Following the rule, we subtract twice the focal length (16 inches) from the available distance (60 inches). This leaves 44 inches. Dividing by 8, we get 5½, which is the maximum number of times of enlargement which can be done under these conditions.

To take another example from the studio. In a studio of overall length of 27 ft., what is the maximum degree of reduction which can be obtained with a 12-inch lens? If we wish to allow 5 ft. for the spaces behind the sitter and behind the camera, we must first subtract 5 from the overall length, leaving 22. Then, according to the rule, subtract twice the focal length (24 inches) from this distance (264 inches), leaving 240 inches. Divide by the focal length, which gives 20 as the maximum degree of reduction. It will thus be seen that the studio space, while ample for cabinet full lengths, which require a reduction figure of 13, is not quite enough for carte-de-visite full lengths, requiring a reduction figure of 23. As the first rule shows, for reduction to this latter smaller size the distance between the ground glass and the sitter must be 25 ft. with a 12-inch lens, so that we must either make do with a lesser space behind the sitter or the camera, or use a lens of somewhat shorter focal length.

THE ROYAL PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The lectures to be delivered during the current week at the exhibition of the Royal Photographic Society include a discourse on the making of portraits by Mr. C. P. Crowther on Tuesday next, October 4. On Friday, October 7, Mr. E. W. Harvey Piper will lecture on Chartres Cathedral. The lecture to-night, Friday, September 30, is "Wonderlands of the Western World," by Mr. J. Dudley Johnston, whose lantern slides invariably are works of artistry which the lantern-slide maker cannot too often have the opportunity of seeing. All these lectures begin at 8 o'clock, and, like the exhibition itself, are open free to the public.

The notices of the Exhibition conclude with the following further review of the pictorial section (landscape prints) by Mr. F. C. Tilney.

LANDSCAPE IN THE PICTORIAL SECTION.

As already stated, the really good landscapes are more numerous than the really good figure subjects, and they are by R.P.S. men at home, not abroad. On the whole, I think that Bertram Cox and T. H. B. Scott this year hit up the record for Russell Square. Mr. Cox's view of the Tower Bridge, called "The River" (71), is entirely free from those little misfortunes in tone-values and textures which hand-controlled works so frequently show. He has long since got past the rubicon of composition—that is the first thing that photographers set out to achieve—he has reached the highly advanced stage of knowing and seeing the more elusive truths that escape all but the artist schooled by observation. His Tower Bridge stands free in the air, it is not in front of one part of the sky and behind another part—the fate of the average bromoiled tower. Light glints upon it, but does not drag it out of its proper plane. In fact, the great beauty of this print is far more that of aerial perspective which is convincingly right than those of design which is the fetish of one school of photographers. Yet the design is scarcely beaten in this show. Nature again, though with no more poetry, speaks in his "Evening on the Arun" (71); a sunny expanse, broad and simple in its masses of light and shade. "In Arundel Park" (32) the design is imposed by the lines of a little fold in the hills. It is perhaps a thought too regularly balanced for a free and natural design. I feel that the little figures on the left constitute a dark spot that is too isolated to be of any help to the composition. Another valley design comes from T. H. B. Scott. Across a little dip in the fields depicted in "Lengthening Shadows" (76), the shadows from some trees are cast by the low sun. They are foreshortened to a narrow line which follows the contours of the ground. Beyond is a fine expanse. A rich mellow quality distinguishes this, as all other prints by Mr. Scott. Indeed, I am not sure that the richness of quality in his "Chalk Pits" (80) has not been the occasion of some sacrifice in other directions. The lateness of the effect does not tally with the amount of detail which, though drowned in tone, is not eliminated as it would be naturally. In his "Arundel" (86) a picturesque group of trees saves a fine thing from being very nearly an unfortunate composition, the chief line running down and out rather obviously.

A remarkable piece of truth of tone comes from F. E. Cederberg called "Vinteraftan" (18). It shows a Swedish winter afternoon with the lingering luminosity of a dark northern sky. This gleams upon the snowy roofs of a quiet town. In the distance is a hall or church lit up inside, and here is the bad spot in an otherwise charmingly true effect—the windows shriek of retouching. Other good examples of good tone effects are "The King's Arms" (54), by Hugo van Wadenoyen, Junr., a plucky scheme of side illumination by sunlight; the even better "Shadows on Whitewash" (73), by the same worker; "Lewes" (53), with its simple masses of even tone, by H. L. Wainwright, and "Sunset at Hradchui, Praha" (84), by J. J. Happ, which is a valiant attempt to seize by tone the charms of the western evening sky. The success of a work of this sort is in the exact ratio of the response of a spectator who knows enough of Nature to see what it implies: to the unobservant person it would be a dull thing. The "Sun Splash" (44) of J. A. Lomax would likewise be "cavaire to the general," in spite of its remarkable luminosity.

Other landscapes that deserve special commendation are H. Ruddick's "Welsh Landscape" (28), a magnificent prospect, with perfect recession. F. O. Libby's "The City—New York" (50), which is not in the habitual blue tint, and, therefore, more grateful to the eye than usual; "Evening Sunlight, Venice" (78), by Louis J. Steele; Alex. Keighley's "Court-

yard" (79), a nice composition, with sun streaks falling across floor and walls; and "The Lifeboat, Criccieth" (91), a dark and dramatic seascape, by F. K. Glazebrook. Capt. Alf. G. Buckham sends further examples of his excellent cloud studies, or rather cloud landscapes, "A Coming Storm" (87), "Three Miles Above the Earth" (93); and "Finis Coronat Opus" (70), which, in the matter of gradation, is certainly his crowning work: a fine picture of sea and sky and an aeroplane. The newness and vigour of these works make them very refreshing. And so in a measure is Oscar Maurer's highly pictorial scene called "Forest Rangers in California" (106). But this is anything but new; it is like an old book-illustration, happily composed, with a fine relief of chiaroscuro, and in every way equipped with the attractiveness that charmed our aged parents before the photographic era. Pictorial charm is likewise strong in "Florence—the Old Bridge" (129), by H. Y. Summons. This holds a deal of literary interest of the romantic kind. "The Lake" (154), by F. O. Libby, has the romantic touch also, as well as the "big" feeling, which is the outstanding characteristic of Mr. Libby's work. And in the same category should be mentioned "A Canyon by the Sea" (158), by N. P. Moerdyke.

The notable figure works were by no means exhausted in my first notice of this exhibition, and it is necessary to direct attention to "The Heir" (11), by Charles Borup; a baby who is sitting up with a precocious air without the help of any supporting arms. I am disposed to think this a new sort of triumph in the photography of infants. Another notable work is "A Character Study" (21), by C. Pollard Crowther. It is a beautiful print, and only slightly spoilt for me by a kind of actor's excess of muscular mobility about the mouth. Madame Yevonde's pictorial portrait of a girl in a dressing-room putting on "The Ballet Shoe" (42) is a fine example of its kind. Ballet skirts are the motive of Marcus Adams's "Dancing Girl" (43) also; a pretty child standing before some dark curtains. The pose and lighting are remarkably happy. A similar subject is "The Ballet Dress" (7), by Mrs. K. Gash. Here the sitter is a young lady in her 'teens. The arrangement and general treatment of this print have much distinction. Geo. Turner has certainly not enhanced the attractiveness of his eminent sitter "Mark Hambourg" (13) by allowing him to wear the hideous goggles that are the present craze of all who lay claim to be anybody in particular. It only remains to mention the curious carved idol aspect of "The Rag-Picker" (48), by Maurice Beck—a combination of flatness and sharp modelling, the effect of which is produced by the inclusion of a white wall behind the figure. This forces a contrast that suppresses the tone of the sitter; but whether it is admirable or merely startling is a matter of individual taste.

Is it wise of the Society to encourage the sending in of little things such as one sees at an average local club's exhibition? Such works may be highly creditable and full of beauty; but they look their worst, not their best, upon walls that display fine imposing prints. The regulation area for all entries has much to commend it; for the senders who prepare prints on sumptuous lines are usually those who understand what pictorialism demands. If there must be a collection of little "gems" they might perhaps be on a screen by themselves; but even then they would be overlooked. F. C. Tilney.

THE SPEED OF A LENS.

[Of the sub-divisions of photographic optics, those which relate to the effect of the stop are of the greatest practical importance, and, fortunately, are those which permit of explanation of the first principles by the use of mathematical symbols or formulæ of the simplest kind. In the preceding chapter ("B.J.," September 16), was considered in this simple form the relation of the stop to the "speed" of the lens. It was first shown how the familiar F. No. is derived from the action of a lens and how the F. No. varies from its nominal value when the object is relatively near to the lens. Older systems of marking the stops of lenses were explained, and the concluding part of the article now deals with the two-fold cause of the falling-off of illumination towards the margins of the plate. It is hoped that an occasional article of this kind will contribute to a more exact understanding of familiar working facts and figures by those who are disinclined to include in their reading anything which they regard as "only theory."—Eds., "B.J."]

II.

Variation of Intensity of Lens Image over Field.

In the foregoing we have considered the image formed in or near the centre of the field of the lens. The intensity of the image, however, falls off towards the margins of the field; or, as is commonly said, the plate is not so well illuminated towards the edges.

This falling-off arises from two causes, one regular and applying equally to every lens, the other irregular and varying according to the particular form of the lens mounting. The latter cuts off the marginal rays to a greater or less degree. The reduction of intensity from these two causes together becomes considerable only with wide angle lenses, and even in the case of their use is less serious in its effect than might be supposed in consequence of the latitude of the plate.

Regular Reduction of Marginal Intensity of the Image.

The factors which enter into the regular diminution of the image were shown many years ago by R. H. Bow ("B. J.," 1866, April 6, p. 160), who arrived at the formula that if the brightness of the image on the axis is i, that at an angle Q to the axis (equivalent to an angle of view of 2Q) is

$$i \cos^4 Q.$$

If it is borne in mind that the cosine of an angle is simply the ratio of the base to the hypotenuse when that angle occurs in a right-angled triangle, the derivation of this formula will be easily followed. In the triangle A B C (fig. 4) the cosine of the angle Q is the ratio of BC to AB $\left(i.e., \frac{BC}{AB}\right)$.

For angles from 0 to 90°, representing angles of view up to 180°, the value of this cosine ratio ranges from 1 to 0—that is, through a series of fractions (*e.g.*, cosine 30° = .86; cosine

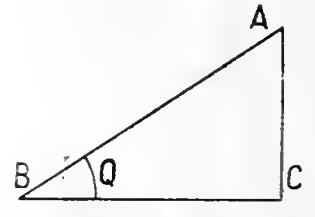


Fig. 4.—The cosine of an angle. The ratio of BC : AB is the cosine of the angle Q.

45° = .71; cosine 60° = .50), which gradually become smaller. Hence it is clear that the application of the formula yields much greater proportional reduction of intensity as rays reach the plate at a greater angle.

The three factors which cause a regular (*i.e.*, calculable) reduction of the brightness of image towards the margins of the field are shown in figs. 5 to 7.

(1) *Virtual Constriction of Aperture.*—The first relates solely to the diaphragm. In fig. 5 *aa*, *bb* represent the limiting rays of the cylindrical pencil which can pass through the diaphragm aperture *ab*. The intensity at the centre of the field is therefore proportional to the area of the aperture, *i.e.*, to $(ab)^2$.

But an oblique pencil *cc*, *dd*, of diameter equal to that of *aa*, *bb*, does not pass through the aperture, because this latter is presented to it at an angle, and, therefore, the effective passageway becomes virtually contracted to an ellipse having

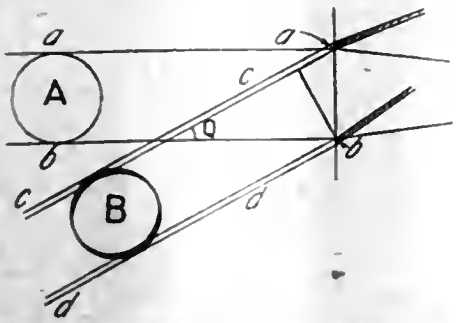


Fig. 5.—Reduced image-intensity through reduction of effective aperture of diaphragm for oblique pencil of rays.

one dimension equal to *ab* and the other smaller. This effect can be seen by holding a circular disc, such as a coin, level with the eye and gradually turning it on the line of sight: the circular area is seen to become elliptical. Part of the pencil is therefore cut off, as indicated by the shaded portion, but more correctly by the equivalent sections of the aperture for axial and oblique pencils shown at A and B.

Now it can be shown that if *s* is the *area* of the full circular aperture, that of the ellipse effective for a pencil making an angle of Q with axial rays is

$$s \times \text{cosine } Q.$$

Hence from this cause alone the intensity *i* of the axial image is reduced to *i* cosine Q when the rays make an angle Q with the lens axis.

(2) *Greater Focal Distance of Marginal Rays.*—The second factor is that the focus of marginal rays is at a greater distance from the diaphragm than that of the central pencil

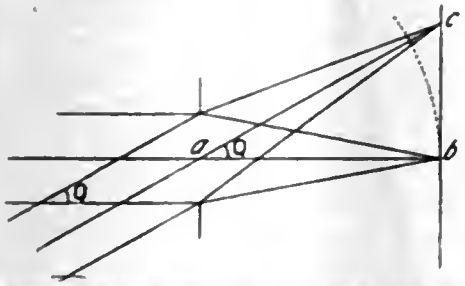


Fig. 6.—Reduced image-intensity through greater focal distance of marginal rays.

In fig. 6 the distance *ac* is greater than *ab*; and hence, according to the diminution of illumination inversely as the square of the distance from the source of light, the brightness of the image at *c* is less than that at *b* in the proportion of $\frac{(ab)^2}{(ac)^2}$.

But in the triangle *abc*, $\frac{ab}{ac}$ = cosine Q.

Therefore the ratio

$$\frac{(ab)^2}{(ac)^2} = \text{cosine}^2 \text{ Q}.$$

Thus, from the two causes of virtual aperture constriction and greater distance, the intensity of image at the angle Q becomes $i \times \text{cosine}^2$ Q.

(3) *Angling of Marginal Rays to Focal Plane.*—The third factor is that the marginal pencil does not fall perpendicularly upon the sensitive surface as does the central pencil. The surface on which it would fall perpendicularly is *RS* (fig. 7),

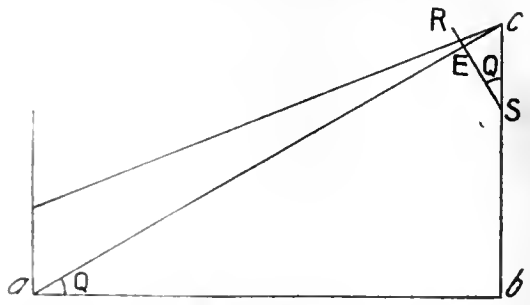


Fig. 7.—Reduced image-intensity through obliquity of marginal rays to image plane.

which is at an angle *c S R* to the sensitive surface. The area of each little bit of image (represented on an exaggerated scale by *ES*) which is received by the sensitive surface therefore becomes *c S*, and therefore the intensity of illumination is less than that produced by perpendicular central rays in the proportion *SE* : *cS*.

But $\frac{SE}{cS}$ = cosine of the angle *c S E*, which, from the drawing, is equal to Q. Hence, on account of the obliquity of the image-forming rays, the intensity of image is further reduced by the coefficient cosine Q.

From all three causes, therefore, the intensity at angle Q

$$= i \times \text{cosine}^4 \text{ Q}.$$

The magnitude of the reduction in the intensity of the image according to this formula at various angles of view is shown in fig. 8. The angles of view subtended by the diagonal of the plate are marked on the upper line of the diagram, the

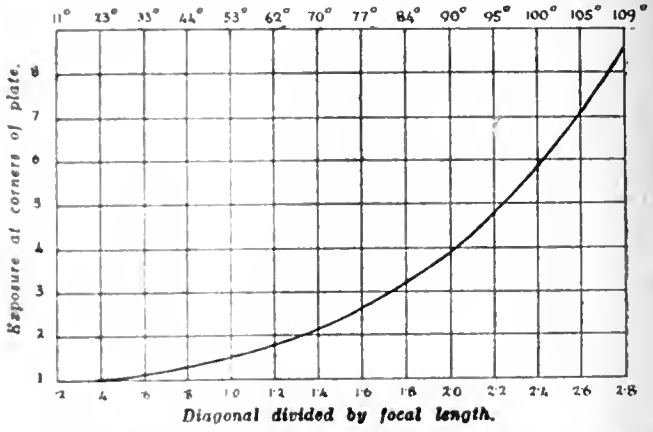


Fig. 8.—Diagram showing exposure required at edge of circular field compared with that at centre in accordance with cosine⁴ rule.

value in each case being, of course, double that of Q in the formula. The figures below the diagram are the ratios of diagonal of plate to focal length of lens corresponding with each angular value. The ordinates (upright) scale is marked in exposures, compared with an exposure of 1 on the axis. Thus, at an angle of view of 53°, corresponding with an 8-in. lens on 6½ × 4¾-in. plates, the exposure required in the extreme corner of the field is about 1½ times that in the centre. At an angle of 90°, corresponding with the use of a 4-in. lens on a 6½ × 4¾-in. plate, nearly four times the exposure in the centre is required.

It must be repeated, however, that the rule embodied in the curve holds good only when there is no obstruction of oblique rays by the lens-mount—that is, when the diaphragm aperture is clearly visible, though of elliptical shape, when viewed from the margin or corner of the field, as by turning back the focussing screen and applying the eye to the edge or angle of the space left by it.

Irregular Reduction of Marginal Intensity through Cut-off by Lens Mount.

The intensity of the image towards the margins of the field suffers an irregular reduction whenever the diaphragm aperture is of such size relatively to the dimensions of the lens mount that the oblique pencil of rays cannot pass through.

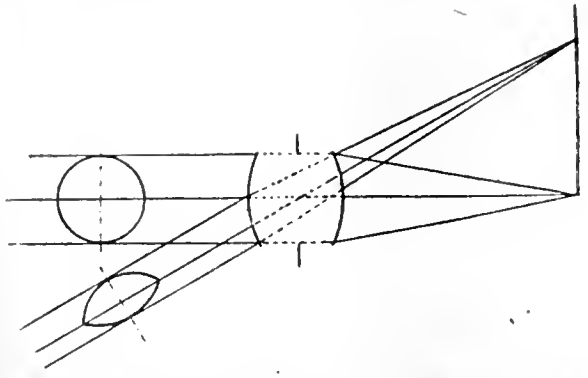


Fig. 9.—Constriction of marginal pencils through (1) cut-off of oblique rays by lens mount, and (2) reduced effective apertnre nf diaphragm.

This state of things is shown in fig. 9, where the transmissible pencil of rays is that in dotted lines, the aperture which is actually effective becoming contracted to the size and shape shown on the left.

This drawing serves as a reminder that in the case of lenses the mounting of which causes much cut-off, the actual diameter of the largest stop may be a very misleading indication of the "speed" of the lens a little way from the centre of the field. In fact, old lenses are occasionally met with in which the largest diaphragm aperture is larger than the front lens and with which, therefore, even the axial transmissible pencil of rays is smaller than the diaphragm aperture.

Reduction of marginal intensity from cut-off obviously occurs chiefly with lenses having a large relative aperture, more so in the older patterns of lenses than in anastigmats having their elements near to each other and the lens mounts correspondingly short. Many rapid rectilinear lenses will show cut-off at apertures larger than $f/16$, whereas an anastigmat may be free from it at apertures smaller than $f/8$. Sufficient stopping down of almost any lens eliminates the cut-off

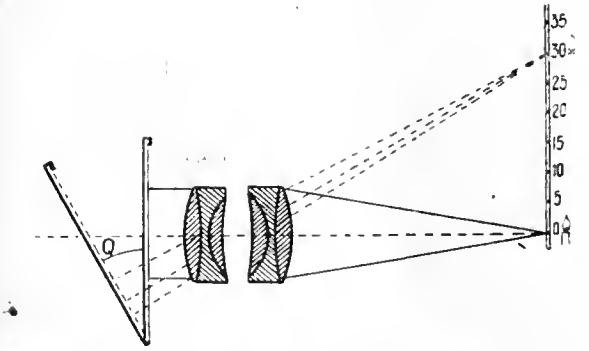


Fig. 10.—Measurement of effective diaphragm aperture (including cut-off by lens mount) for oblique rays.

effect, the image then undergoing reduction of intensity towards the margins according to the regular cosine[4] rule already considered.

While it is not possible to calculate the reduction of marginal intensity due to cut-off, the area of the constricted and deformed diaphragm aperture which is virtually effective for rays of any given obliquity can be measured, as suggested by W. Zschokke ("B. J.," 1912, October 25, pp. 823-827), and the angular image intensity computed by multiplying the area by cosine[3] Q (not cosine[4] Q, since the factor of diaphragm aperture is included in the experimental measurement). The method consists (fig. 10) in replacing the focussing screen by a metal plate pierced with fine apertures at distances from the centre of the field corresponding with 5°, 10° values of Q. *i.e.*, with angles of view of 10°, 20°, etc. The lens being focussed on infinity, rays from a light-source placed behind a given aperture in the plate are received on a surface placed perpendicularly to the emergent parallel pencil, and may be photographed on a piece of bromide paper placed there.

Figs. 11 and 12 show, on a reduced scale, the shapes and relative sizes of the contracted and distorted diaphragm apertures which are effective for rays of increasing degrees of obliquity, in the case of a lens at full aperture $f/6.8$ (fig. 11) and with the same lens at $f/15.5$ (fig. 12). It will be noticed that at full aperture the diaphragm begins to be cut-off at an angle of 15°, whereas at $f/15.5$ it remains effective at the full aperture up to an angle of 25°.

These angles correspond respectively with angles of view of 30° and 50°, equivalent to the use of lenses of 12 in. and 7 in. focal length on a $6\frac{1}{2} \times 4\frac{3}{4}$-in. plate. By measuring the areas of the constricted apertures and multiplying each by the

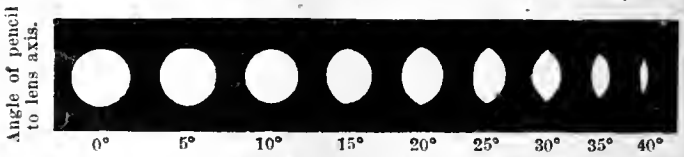


Fig. 11.—Effective diaphragm apertures (for oblique pencils) for double anastigmat at full aperture ($f/6.8$).

coefficient cosine[3] of the respective angle of obliquity, the variation in the intensity (both "natural" and through cut-off) of the image from the centre to the margins of the field can be expressed numerically. The exposure required in each marginal zone will then be inversely proportional to these figures, and can be charted in the manner already shown for "natural" reduction of intensity in fig. 8.

From these two lines of reasoning and experiment it is seen that with the most perfect lens the image intensity inevitably falls off to a considerable extent outside an angle of view of about 50°, equivalent to the use of a lens of focal length equal to the diagonal of the plate: also that when cut-off of marginal

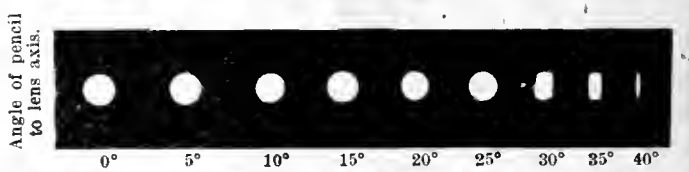


Fig. 12.—Relative effective diaphragm apertures for same anastigmat as Fig. 11, but with $f/15.5$ stop.

rays by the lens is added to this natural reduction of marginal image intensity, the effect sets in nearer to the centre of the field and becomes much greater, particularly in the case of the older types of lenses, such as rapid rectilinears of $f/8$ aperture. Use of a small stop will generally equalise unevenness of illumination due to cut-off by the mount, but has no effect on that due to the three-fold cause, which has been called "natural." The concurrent action of the two effects is responsible for some curious anomalies. For example, Zschokke has shown that of two lenses, an $f/6.3$ aplanat and $f/6.8$ anastigmat, the former is more rapid than the latter within an angle of view of about 20°. Outside this angle—that is to say, towards the edge of the field—the image is better illuminated with the anastigmat than with the aplanat. The case is worth citing, as emphasising that the conventional F. No. rating of lenses is a very partial measure,, and may at times be highly misleading as an indication of the comparative speeds of two lenses of different types.

Absorption and Reflection.

There remain also the effects of absorption of light by the glasses of a lens and reflection from the free surfaces of its components. Both of these factors are commonly neglected in

the rating of lenses for "speed," as regards both the centre and the margins of the field, although it cannot be said that either is negligible. Moreover, the reduction of intensity of image produced by a lens owing to its departure from the ideal colourless, transparent and non-reflecting instrument can be calculated, and if opticians so choose, expressed as a coefficient increasing the F. No. to a greater or less extent: or the speeds of actual lenses could be more accurately indicated in relation to each other as when Zschokke, by taking into account both absorption and reflection, found that a Dagor at *f*/7.5 had the same speed as a Syntor at *f*/6.8.

Few data respecting absorption of light by the glasses of lenses are available, but, apart from the rare instances of yellowing with age and exposure to light and the less rare cases of greyness of the glasses in a newly-manufactured objective, there appears to be a great variation—2% to 12%, among optical glasses as regards absorption of violet light. When it is also considered that absorption increases in geometrical ratio with the thickness of the glass, it will be understood that from this cause the 3-in. lens of a vest-pocket camera may be appreciably faster than one of the same relative aperture but of, say, 9 in. focal length.

The reduction of intensity by reflection of light has been commonly estimated on the basis of a loss of 5% of the light reaching each air surface in the lens. On this basis the loss in the case of two air surfaces (a single lens) is 10%; of four, 19%; of six, 26%; and of eight, 34%. Hurter and Driffield, adopting a somewhat higher coefficient of reflection, considered the differences between single, doublet and triplet lenses to be sufficient to justify provision for them in the design of their actinograph or exposure-meter. Reflection losses, on the other hand, are independent of the size of a lens.

To conclude, in view of the considerable and irregular loss of marginal intensity with wide-angle lenses and of the appreciable differences which are liable to occur by absorption and reflection, the relative aperture or F. No. of a lens must be regarded as a rough measure of "speed," valuable for indicating a range of required exposures of the order of 1 to 2,000, but leaving out of account other factors which may have a substantial effect upon the shortness of exposures permissible with a given instrument. Considering the advances in the speed of lenses which have been made and continue to be made, the question may be asked of opticians whether a more refined system of marking lenses for speed is not now required.

G. E. B.

FOCUSSING INTERIORS BY SCALE.

[In the following article from the "Camera," the author, Mr. William S. Davis, gives a useful series of tables for use as a guide in obtaining the greatest depth of focus by setting the focussing scale of a hand camera to a certain distance (somewhat further than that of the nearest object required in focus) according to the degree of stopping down of the lens.—EDS. "B.J."]

As the more advanced readers know, a lens, when set on the focus-scale for a near object, will not produce a clear image of a distant one at the same time when a large lens-stop or diaphragm is used, but the ability of a lens to render near and distant parts clearly simultaneously, which is called "depth of focus," is much increased when the size of the diaphragm is reduced. The smaller the lens-stop through which the image-forming rays of light have to pass, the greater the depth, which is the reason why one is told to "stop down" a lens when taking a subject containing both near and distant objects which it is desired to have sharp in the picture.

When stopping down to increase the depth of focus, many make the mistake of setting the lens-pointer upon the focus-scale for the same distance as the nearest object is from the camera. This is quite right when such an object is the only one to be considered, and the lens is being used at its largest aperture, but it entails the employment of a needlessly small lens-stop to bring distant parts into good focus. The reason for this is the fact that a smaller lens-stop not only increases the depth of focus *beyond* the point for which a lens is set, but for *nearer* parts as well, so one can take advantage of this to "split the difference" when focussing. In other words, set the lens for a point somewhat beyond the actual distance from the camera of the nearest object one wishes to have clearly defined, and in this way secure good definition upon both near and distant parts with a larger lens-stop than would otherwise be necessary.

To avoid using a needlessly small lens-stop, on many occasions it is well worth while to know the depth of focus possessed by the lens one's camera is fitted with for each stop used. This knowledge is especially valuable when photographing interiors, whether in the home or a large public building, since good definition is called for in all parts of such subjects, yet owing to the lighting frequently being weak, the employment of an unnecessarily small lens-stop would greatly prolong the time of exposure. Most workers, however, not knowing how much depth of focus to count upon at a particular stop opening, simply stop the lens "way down" to make sure of getting the depth desired, which is often unnecessary.

While I might give the formula for figuring the depth of focus, I know the reader would not care to stop to do this before making an exposure, so have, instead, worked out sets of tables for ready reference, and all the reader need do is to cut out the one which applies to his camera, or copy on a card, which can be included with other accessories in the outfit.

To use with any focussing type of camera, select the table for your camera. Arrange the subject as desired, then measure the distance from the lens, or front of camera, to the nearest object in the scene included within the angle of view. Having obtained this distance, look for the measurement in the left-hand column of the table headed "Distance from lens to nearest object." Opposite the line on which this is found, under "Set lens on scale at," is given the proper distance at which the lens focus-pointer must be set on the camera to produce the maximum depth of focus in this particular case. On the same line in the third column the correct size lens-stop to use is indicated, which will ensure good definition from the nearest part to any distance required for interiors up to approximately forty feet in depth.

Example: One is about to take an interior, or other subject, containing objects at varying distances which should all be in focus, with a 5½ × 3½ size camera. By measurement, the distance from lens to nearest object is found to be 6 ft. This distance is named in the third line of the left-hand column, opposite to which 10 ft. is given as the correct point on the focus-scale to set the lens, while in the last column stop *f* 32 will be found the right size to employ to secure the required definition throughout. One, therefore, pulls the lens-front out to the 10-ft. mark on the scale, moves the diaphragm indicator on the shutter to *f*/32, and goes ahead with the exposure, confident of getting good definition in the negative. If *critically* sharp definition is required, as when the negative must stand considerable enlargement, or the depth of the interior is greater than 40 ft., the next smaller lens-stop than one indicated in the table should be used.

If the exact measurement for distance from lens to nearest object is not found in the first column, take that for the next nearer. For example: If the distance happens to be

6½ or 7 ft., take 6 ft. in the table, for it is obvious if an object as near as this is in good focus, the one further removed will also be sharp.

Naturally, a fixed-focus camera is much limited in scope for use upon very near objects, since the lens is set to give the best results for the average outdoor scene, but objects quite near can be made reasonably clear in the picture by "stopping down" the lens. The table for fixed-focus cameras will therefore be useful to users of that type of instrument, as showing the nearest object which will be in focus with each size of lens-stop, including, of course, all that lie beyond.

Regarding the sizes of stops on this table. Some cameras, such as the simpler small boxes, have the lens-stops numbered 1, 2, 3, etc. When such is the case, stop 1 can be considered the same as "*f*/11" on the table; No. 2 as "*f*/16," and so on.

Just to prevent possible confusion in making calculations, it is well to mention the fact that two systems of marking diaphragms are still in common use on the better grade lens—the "*f*" and Uniform System, the latter usually known as "U.S." Practically all the anastigmat lenses have the stops marked by the "*f*" system, while in most cases the outfits fitted with single achromatic and R.R. lenses have the "U.S." numbers on the diaphragm scale. One can tell which is used at a glance, since with the "U.S." system each size smaller stop is marked with twice as high a number as the preceding one, which on a good R.R. lens makes the scale read 4, 8, 16, 32, 64, 128. When the "*f*" marking is used, each smaller stop bears a number only about half as high again as the previous one, making the same-sized stops as those of the "U.S." system read *f*/8, 11, 16, 22, 32, 45. Whichever system is used, each smaller stop opening requires just twice as long an exposure as the next larger one preceding.

When possible, it is better not to include objects very near the lens when taking an interior view. By keeping the nearest parts as far away as circumstances permit, the depth of field is reduced, thus making it possible to use a larger lens-stop than would otherwise be needed, while the chances of having the nearer objects appear exaggerated in size will also be practically eliminated, to the great improvement of the composition.

A direct-vision finder will prove helpful in arranging the composition, as one can more easily note the relative position of details than is the case when depending upon observance of the small image given by the ordinary reflecting finder. A simple cardboard frame, with a sight aperture placed in the position from which can be seen the same angle of view included by the lens, serves the purpose.

SPECIAL FOCUSSING TABLE FOR USE WITH FIXED-FOCUS CAMERAS.

	Stop F/11, or U.S. 8	Stop F/16, or U.S. 16	Stop F/22, or U.S. 32	St pF/32, or U.S. 64
1⅝ × 2½ Camera ..	8 feet	6 feet	5 feet	4 feet
2¼ × 3¼ Camera ..	12 feet	9 feet	8 feet	6 feet
3¼ × 4¼ Camera ..	16 feet	12 feet	10 feet	8 feet

FOCUSSING TABLE FOR 2¼ × 3¼ CAMERAS
(Lens of approximately 4-inch focal length)

Distance from Lens to nearest object	Set Lens on Focus-scale at	Use Lens-stop
4 feet	6 feet	F/22, or U. S. 32
6 feet	10 feet	F/16, or U. S. 16
8 feet	10 feet	F/11, or U. S. 8
10 feet	15 feet	F/8, or U. S. 4

FOCUSSING TABLE FOR 2¼ × 4¼, 3¼ × 4¼, AND 2¾ × 4¾ CAMERAS
(Lenses not over 6-inch focal length)

Distance from Lens to nearest object	Set Lens on Focus-scale at	Use Lens-stop
4 feet	6 feet	F/32, or U. S. 64
6 feet	10 feet	F/22, or U. S. 32
8 feet	10 feet	F/16, or U. S. 16
10 feet	15 feet	F/11, or U. S. 8

FOCUSSING TABLE FOR 4 × 5, and 3¼ × 5½ CAMERAS
(Lenses not over 7-inch focal length)

Distance from Lens to nearest object	Set Lens on Focus-scale at	Use Lens-stop
4 feet	6 feet	F/45, or U. S. 128
6 feet	10 feet	F/32, or U. S. 64
8 feet	10 feet	F/22, or U. S. 32
10 feet	15 feet	F/16, or U. S. 16

The figures under each stop number indicate distance from lens of the nearest object which will be in sufficiently good focus when that sized lens-stop is used. All parts beyond the nearest distance named will always be sharp.

If the size of your camera is not listed in the above table, take the next larger size for a guide. The figures given for a 1⅝ × 2½ camera will serve for 2¼ × 2¼ size; those for 3¼ × 4¼ can be used with a 2½ × 4¼ camera, and 3¼ × 3¼ also.

WILLIAM S. DAVIS.

THE ACTION OF AMMONIUM HYDRATE UPON MERCUROUS CHLORIDE.

A Note from the "Chemical News."

When ammonium hydrate is added to insoluble mercurous chloride, the white solid is converted into "black precipitate" of the formula NH_2Hg_2Cl. The equation representing this reaction is usually given as :—

$$NH_4OH + Hg_2Cl_2 = NH_2Hg_2Cl + H_2O + HCl.$$

This suggests that on mixing the reactants, one of which is neutral and the other is alkaline to indicatora, the resultant products should react acid. Actually, it is found that this is not the case, and it was thought desirable to ascertain whether the hydrochloric acid represented as being formed was immediately neutralised by excess of ammonium hydrate.

This appears to be the correct view, since however little of the alkali is used, only one-half of it is accounted for by the above equation, which only represents an initial reaction. The hydrochloric acid produced is only momentarily free; it is immediately neutralised by a second equivalent of ammonium hydrate.

Quantitative experiments have been carried out to elucidate the nature of the reaction as follows :—

Mercurous chloride (0.942 grm.) was placed in a conical flask of 200 cc. capacity, and shaken with 10 cc. of water. 20 cc. of a normal solution of ammonium hydrate were added, and the whole was shaken, after inserting a stopper, and allowed to stand for 15 hours. The mixture still evolved the odour of ammonia, and was quickly filtered into a graduated flask (200 cc.), and the precipitate was washed several times with water. The volume of filtrate and washings was made up to 200 cc. 20 cc. were withdrawn and titrated against a decinormal solution of hydrochloric acid. This was repeated twice. The 20 cc. of filtrate required :—

Expt.	cc. $\frac{N}{10}$ HCl
1	8.00
2	7.90
3	7.95
Mean	7.95

Thus the free ammonium hydrate in the total filtrate was 0.556 grm. The quantity actually taken was 0.700 grm., therefore 0.144 grm. was used in the course of the reaction. The amount of soluble chloride ions formed was estimated as follows :—

20 cc. of the filtrate made up to 200 cc. were withdrawn and boiled for 15 minutes to drive off all free ammonia. The residual solution was then titrated with a fiftieth normal solution of silver nitrate, using potassium chromate as indicator. This was also repeated twice, and the following results were obtained :—

Expt	cc. $\frac{N}{50}$ $AgNO_3$
1	9.20
2	9.15
3	9.10
Mean	9.15

Thus there was 0.098 grm. of ammonium chloride in the whole solution.

These results are accurately expressed by the equation :—

$$2NH_4OH + Hg_2Cl_2 = NH_2Hg_2Cl + NH_4Cl + H_2O$$

which requires that for 0.942 grm. of mercurous chloride, 0.140 grm. of ammonium hydrate should be used and 0.107 grm. of ammonium chloride should be obtained.

A difference of opinion exists regarding the nature of the black precipitate NH_2Hg_2Cl. Some chemists consider it to be a mixture of white precipitate, NH_2HgCl and metallic mercury. If it is rubbed on to copper it does not amalgamate or perceptibly affect this metal. This is hardly to be expected if free mercury were present. Hence it seems more correct to regard the substance as a compound and not a mixture

J. G. F. Druce, M.Sc., A.I.C.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Hon Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tolleross, Glasgow.

1922

January 21 to February 4.—Partick Camera Club. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, September 5 to 10:—

Colour Photography.—No. 24,133. Production of natural colour photographs. S. J. Cohen

Cinematography.—No. 23,999. Cinematograph apparatus. G. Greenway.

Colour Photography.—No. 23,625. Colour photography. R. H. Martin and F. M. Robb.

Stereoscopy.—No. 23,858. Means for obtaining stereoscopic pictures. E. M. Wright

The following complete specifications are open to public inspection before acceptance:—

Process.—No. 168,578. Process for the production of gelatine printing plates. H. Renck.

Applications, September 12 to 17:—

Shutters.—No. 24,201. Photographic shutters. Akt. Ges. für Feinmechanik (R. Haddon).

Photography.—No. 24,506. Photography. H. C. Austwick and R. Kohler.

Film Devices.—No. 24,278. Portable holding-device for handling photographic films. J. H. Rigbey.

Colour Cinematography.—No. 24,351. Production of colour play pictures. H. L. Stoltenberg.

Distance-Recorders.—No. 24,683. Camera distance recorder. H. E. Unwin.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Cinematograph Projection Screens.—No. 167,340 (May 26, 1920). The cinematographic picture is projected through a translucent screen in front of which (*i.e.* on the same side as the spectators) and at an angle thereto is arranged a transparent screen having a reflector disposed for reflecting uniform light thereupon.

In the drawings, A indicates the projector placed behind the screen B, the screen being made of translucent material; the

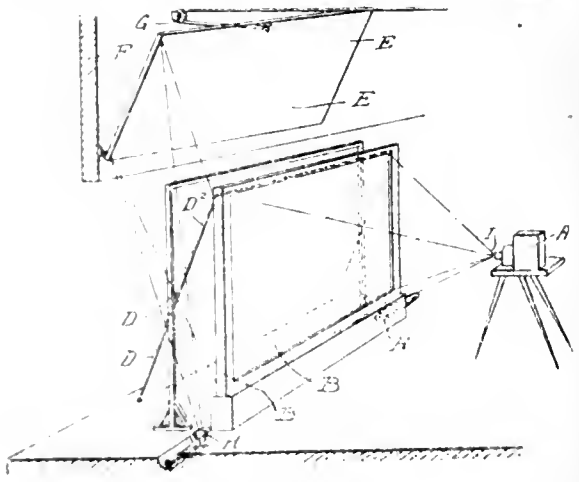
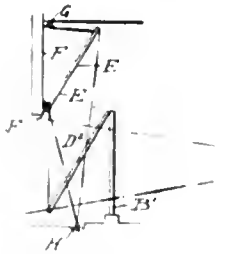


Fig. 1.

audience is seated in front of the screen in the space indicated by C. D indicates a second screen of transparent material such as clear plate glass supported in swinging relation to screen B. The screen D is supported in a frame D^1 that can be moved relative to the frame B^1 which holds the screen B. E indicates a reflector which is located above the screen D with its reflecting surface arranged parallel with the surface D^2 of the screen D. The reflector E is supported on the wall F by means of hinges, one of which is indicated by F^1, and by means of a cord and pulley combination G, the reflector may be adjusted in proper relative position to the screen D.

The reflecting surface E^1 is preferably a cloth fabric of light brown material having a glossy surface which reflects the light projected thereon from the lamps H and H^1 respectively, placed at each side of the screen B and far enough away from the frame B^1 to permit the light to fall full upon the entire surface



of the reflector E, and the light is reflected on to the surface D^2 of the screen D. The light from the lamp I of the projector A conveying the picture is thrown on to the screen B, and the picture is then visible to the audience.—John Frederick Robert Troeger, 648, East 34th St., Brooklyn, New York State, U.S.A.

Rotary Print Dryers.—No. 165,529 (March 29, 1920). The invention relates to apparatus for drying prints in which the prints are passed between two endless bands round a heated drum, and consists in providing means for controlling the length of contact with the drum and in the structural framework of the apparatus.

The endless aprons pass round rollers *b*, *k*, the latter of which is mounted on pivoted arms *j* and can be adjusted towards or away from the periphery of the drum *a* by screw nuts j^6; alternatively, the roller *k* may be mounted in a bracket slidably adjustable towards and away from the periphery of the drum. Means may be provided to hold the roller *k* in any adjusted position.

The framework of the apparatus comprises two frames formed of inverted T shaped rods *c* jointed by chills *d* and braced by

sets of double tubes *e*, *f*, one of the latter being arched as shown. An extending framework *g* of double tubes supports other idler rollers over which the endless belts pass and form a feeding and

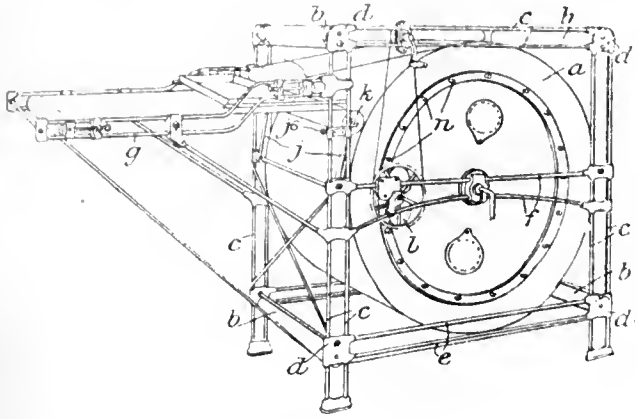


Fig. 1.

delivery platform for the prints. The drum *a* is driven independently of the belts as by means of hand-pulley gearing and a cam *l* shaped to engage periodically pins *n* on the drum, and is

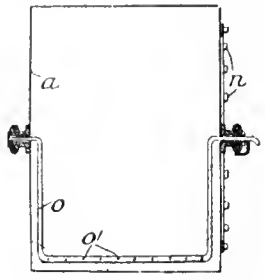


Fig. 5.

heated internally by gas jets *o*, Fig. 5, provided on a stationary cranked gas pipe *g*.—Edwin Charles Bates, 122, High Street, Bordesley, Birmingham, and Charles Howell, 26, Chesterfield Road, Blackpool.

THREE-COLOUR PRINTS.—No. 148,737 (July 25, 1919). The three pictures are formed direct on the celluloid sheet, which is afterwards folded to form the final print. A strip of celluloid has three separate parallel colour fields, and is then sensitised to receive the three separate pictures parallel to one another, whereupon it is developed and washed and the three parts folded one over the other as in the above mentioned arrangement. Thus the pictures are produced on a carrier which forms the permanent carrier for the picture.

A thin transparent, flexible foil which is unaffected by liquids, *e.g.*, celluloid of about .04mm. thickness, is coated with a layer of gelatine in such a way that three adjacent equal sized colour fields, each of the size of the negative employed, result.

To this gelatine film, consisting of three-colour fields, there is added a suitable quantity of sensitive gelatine emulsion, as in the well-known silver bromide pigment process. The back of this foil is laid on the film side of the three negatives so that the yellow colour field lies on the blue negative, the red colour field on the green negative, and the blue colour field on the red negative. The negatives are printed, developed, fixed and washed in the ordinary way. The silver print is then treated in a hardening and bleaching bath, in which the gelatine is hardened according to the strength of the silver deposit, and rendered insoluble in hot water. The silver emulsion may be omitted and pure gelatine and pigment employed, which may then be sensitised with chromates and further treated in the ordinary way. The foil is then placed in warm water and the picture washed as in the pigment process. As the foil is exposed from the rear, any transfer of the picture is unnecessary. The well-washed foil is then dried.

The foil, before being laid on the negative, is twice creased very sharply in such a way that yellow and red meet at the back and red and blue at the film side. The foil is again pulled straight and laid on the negative and further treated. After drying the foil, it is merely necessary to fold the same at the creased places in order to obtain an immediate register, as the negatives already exactly register one with another. For paper prints the folded foil is stuck together with a suitable adhesive and firmly adheres to paper, cards, etc., with the blue film side uppermost. For transparencies the creased foil is mounted between sheets of glass.—Arthur Gleichmar, 82, Albrechtstrasse, Steglitz, Berlin.

New Apparatus.

Quta Letters, Figures and Tablets. Made by the Quta Manufacturing Co., 252-254, Haydons Road, Wimbledon, London, S.W.19.

THESE goods are for the making of attractive notices for show windows and other places, and have the advantage over other outfits, which are now familiar to the passer-by in almost any large street, that the letters need not necessarily be arranged in straight lines, but can be set also in any curved design. The outfit consists of a supply of letters and figures which are made in a composition resembling wood and incorporating some form of adhesive by which they may be immediately secured to a tablet which consists of a stiff board having a celluloid surface. The letters are obtainable in a series of seven colours, namely, blue, red, yellow, black, white, gold and silver, and in six sizes. The tablets are listed in the sizes 9 by 3 inches, 9 by 6 inches, and 12 by 9 inches, at the respective prices of 1s. 6d., 2s., and 3s. 6d. Other sizes at proportional prices. The letters are supplied in assorted lots of 70, at 3s. 6d., of $\frac{1}{2}$-inch size, 4s. 6d. in $\frac{5}{8}$-inch size, and 10s. 6d. for letters of 1 inch. The Quta Company list two standard outfits at the prices of 5s. and 6s. 6d.

The letters are most readily attached to the tablets simply by moistening their backs and pressing firmly into position. For removal it is simply necessary to insert the point of a penknife

after the letter has dried thoroughly on its support. They can, if required, be attached permanently to glass by damping with hot water.

In appearance the notices composed of these letters and tablets are exceedingly neat, and by ringing the changes on the various colours of the letters any required variety may be introduced, quite apart from the facility of arrangement in either straight lines or

curves, which the method affords. We are quite sure that there are many photographers who will find useful applications for the outfits in their show windows, reception and work rooms. It is probable also that use can be made of the letters in "setting up" titles for view negatives, the setting being photographed down on to a process plate for transfer by stripping to the view negative.

New Books.

BIRDLAND STORIES.—This is a nature book for children by Oliver G. Pike, who writes in an entertaining style of the habits of wild ducks, wagtails, gulls and grebes. The book contains twenty-four supplemental plates from photographs by Mr. Pike, and is published by the Religious Tract Society, 4, Bouverie Street, London, E.C.4, price 6s. net.

FIRST AID TO THE AMATEUR PHOTOGRAPHER.—We reviewed this little book by Mr. Will R. Rose of Chester, on a copy of the first edition coming into our hands a few months ago. Although the volume has been thoroughly revised, its plan has not been altered, and, therefore, we cannot say more than we did in writing of the first edition. Nor must we say less, for we think very highly indeed of the book, and repeat that to those multitudes of people whose photography begins and ends with the use of the camera, this is the one manual which they should have. Mr. Rose's book is now published by Messrs. Seeley, Service and Co., 38, Great Russell Street, London, W.C.1, price 3s. net.

New Materials.

ILLINGWORTH PLATES.—An announcement of more than ordinary interest in the photographic trade is that which has just been made by Messrs. Thomas Illingworth & Co., Ltd., Park Royal, Willesden Junction, London, N.W.10, namely, to the effect that they have added the manufacture of dry plates to their long-established business as manufacturers of printing papers. The full list of the Illingworth plates includes fourteen different grades or varieties, inclusive of a rapid and a slow lantern plate. For professional use the four grades which have been designed specially for the requirements of studio and outdoor photographers are the "Studio Fast," "Studio Extra Fast," "Studio Ortho Fast," and "Fleet," the latter a rapid plate for press photography and other high-speed outdoor work yielding clean and contrasty negatives. Plates of special interest to amateur workers are two of lesser speed, namely, a "Special Rapid" and a "Non-Screen." We hope to be able to write at greater length on these new introductions, after having had an opportunity of making trial of samples of the plates which reach us at the time of writing this preliminary note.

PHOTOGRAPHING BATHERS.—The following incident is reported from Broadstairs. A party of girls were enjoying themselves in the water when a young man with the inevitable camera came along. A big wave struck the bathers and spun one of them round until breathless but laughing she was flung on the sand. The force of the wave had pushed the strap of her costume off her shoulder, and just as she noticed it and hurriedly replaced the strap she heard the click of the camera and saw the man's grin. The girl jumped up from the water and advanced to the man, who was trying to replace his camera in the bag hanging on his arm. Not a word was spoken, but the girl snatched the camera out of the man's hand, and, evading the astonished photographer's grab, flung the camera into the waves. The man looked foolish, particularly as a crowd began to collect. Then the girl recovered the camera, opened it, removed a roll of film, dripping with water, and threw the camera at the man's feet. The young man then slunk away without a word of protest.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, OCTOBER 3.

Bradford Phot. Soc. Social and Musical Evening.
South London P.S. "Architectural Photography." E. R. Bull.
Wallasey Amateur P.S. "Intensification and Reduction" J. Pilkington.

TUESDAY, OCTOBER 4.

Manchester Amateur P.S. Lantern Lecturette. D. M. Paul.
Morley Photographic Society. Whist Drive.

WEDNESDAY, OCTOBER 5.

Partick Camera Club. President's Address.
South Suburban Phot. Soc. "Palestine as I saw it." P. R. Salmon, F.R.P.S.

THURSDAY, OCTOBER 6.

Wimbledon and Dist. Camera Club. "Stories and Glories of Canterbury Cathedral." E. W. Harvey-Piper.

CROYDON CAMERA CLUB

At the last informal meeting, Mr. G. H. Gardner gave a highly interesting lecture-demonstration on "How to Make Money," without reference to prevailing doles. He first said that, owing to the well-known characteristics of some of his fellow-members, he felt bound to point out that the method to be described had inherent disadvantages, usually setting in as a sequel to the work accomplished, which in itself was fairly simple and straightforward.

He then proceeded to give a thoroughly practical exposition of the making of counterfeit coins of nominal value, from sixpence to a sovereign. Apparatus of all description, elaborate and otherwise, was on the table, and the method of working clearly explained. Mr. Sehors, with, apparently, special knowledge, found fault with some of the castings, but the students generally had nothing but commendation to offer.

Almost invariably, the lecturer said, the man who makes the coins does not "utter" them, but passes them on to a confederate, generally a woman—always concerned in any case of mischief. She, in turn, transfers them to the passer of the counterfeit, who takes care only to handle one at a time, so that if nabbed, no other is found on his person. A woman, he added, makes an unreliable crook, as if her delicate feelings are in any way ruffled, she is liable to split.

In the discussion, Mr. Salt inquired how the lecturer had acquired his remarkable skill. "Purely due to a practical application of Einstein's theory of 'Relativity,' and concentration of will," came the reply. Mr. Isaac, who appeared discouraged, thought the game insufficiently remunerative. This view was not shared by Mr. Hibbert, who enthusiastically suggested the starting of evening classes on the subject. Mr. Harpur, speaking in tones of burning indignation, announced that the Bank of England recently had been returning coins which showed any signs of being clipped. He had been much interested in what he had heard. Proposed by the president, Mr. John Keane, a most hearty vote of thanks was accorded Mr. Gardner for an evening of great criminal attractiveness.

Perhaps it would be just as well to add that the lecturer frequently referred to himself in the first person plural. Can it be that the word "we," so often used, indicates connection with Scotland Yard? Many friends of the club will appreciate the gravity of the position.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given of the dissolution, by mutual consent, of the partnership between Frank Worrell and Henry Pickard, carrying on business as wholesale and retail opticians, at 32, Furnival Street, Holborn, E.C., under the style of The Lorel Optical Company. All debts due to and owing by the late firm will be received and paid by Frank Worrell, who will continue to carry on the business.

A first and final dividend of 3s. 4½d. in the £ has been made in the case of Harold George Webster, photographer, 10, Orchard Gardens, Teignmouth, Devonshire. The dividend is obtainable at the Official Receiver's Offices, 9, Bedford Circus, Exeter.

News and Notes.

PHOTOGRAPHING CATS.—If you want to make a cat comfortable when posing before the camera (writes a correspondent) simply warm the cushion or other article on which the cat is to sit, when pussy will at once become a docile subject. A cat loves warmth and will sit longer and more quietly upon a warm spot than a cold one.

WINTER PHOTOGRAPHY.—Messrs. W. Butcher and Sons send us the 96-page list for distribution by dealers, which calls attention to the many attractive branches of work which can occupy amateur photographers during the winter months. The list deals with enlarging, lantern work, home cinematography, etc., and contains articles on these subjects. Individual amateur workers should apply to their dealers for copies, or send a postcard to Messrs. Butcher, Camera House, Farringdon Avenue, London, E.C.1.

COOKE LENSES ON THE QUEST.—We see from an article in the "Leicester Daily Mail" that Sir Ernest Shackleton selected Cooke lenses for the whole of the photographic equipment which he is taking on the Antarctic expedition. Messrs. Taylor, Taylor & Hobson have supplied him with lenses for cinematography and ordinary camera work, including telephotography. Mr. J. Ronald Taylor, who visited The Quest, reports that he was greatly impressed with the thoroughness of the preparations for the voyage.

THE ENSIGN MESSENGER, Messrs. Houghtons' publication for photographic dealers, contains particulars in its September issue of the Ensign competition for enlargements in which £100 will be awarded in cash prizes. Entries must be received not later than December 31 next. The "Messenger" should be studied by dealers for its particulars and illustrations of the latest introductions of Messrs. Houghtons, which include some neat amateur printing boxes, mounts and albums, box enlargers, and enlarging lanterns.

GASLIGHT PRINTING.—A very practical booklet on the development and toning of gaslight prints has been written by Mr. R. R. Rawkins, of the Rajar Company, and is obtainable free on application to the latter at Mobberley, Cheshire. Mr. Rawkins writes simply and clearly on his subject, and while his aim has been the production of good prints on Rajar gaslight papers, his notes can hardly fail to be of advantage to those employing any gaslight printing material.

"THE CLUB PHOTOGRAPHER" draws the material for the text of its October number from members of the Bury Y.M.C.A. Photographic Society. The chief contributions are a lengthy article on the Paget process of colour photography by A. Benson Ray and another, on pinhole photography, by J. Nichols. Other notes are on the carbon process by Arthur Evans. The fixtures for numerous societies during next month are responsible for the growing bulk of our Liverpool contemporary. Some typographic compression seems to be called for in these pages.

THE SCIENTIFIC AMERICAN announces that from November next its weekly issue, which has appeared regularly for 76 years, will be combined with the "Scientific American Supplement" into a monthly magazine, which will be issued as the "Scientific American." The same large size of page will be continued, and it is stated that the change has been made for the purpose of the better presentation of the scientific and technical matter which has always been a feature of our contemporary. The yearly subscription (United States) of the new monthly will be 4 dollars.

MR. MACKLEM is holding a little exhibition of pictorial photography in his studio at 16, Brook Street, New Bond Street, London, W.1, until October 15. Most of the prints are examples of his own very strong and artistic portraiture, notable among them being portraits of Lord and Lady Byng taken shortly before the former's departure to Canada. Mr. Macklem is a professional worker in the oil process, and a few exhibits on the walls show his excellent technique in this medium. Some Autochrome transparencies are included in the exhibition, and also a number of prints by Mr. John Gear and Mr. Bertram C. Wickison.

LANCASHIRE SOCIETY OF MASTER PHOTOGRAPHERS. — Arrangements have been made to hold the annual meeting of the Society at the Palatine Hotel, Blackpool, on Wednesday next, October 5, at 3.30 p.m. The committee will meet at 2.30 p.m. At this meeting the president and officers will retire, and successors will be appointed. No arrangements have been made this year to hold the annual dinner, in consequence of the great distress. Should there be a sufficient number of members who desire to have an impromptu meal after the meeting, arrangements have been made with the management of the hotel for this to be done.

END OF SUMMER TIME.—The Home Secretary gives notice that summer-time will cease and normal time will be restored at 3 (summer time) in the morning of Monday next, October 3, when the clock will be put back to 2 a.m. The hour 2-3 a.m. summer-time will thus be followed by the hour 2-3 a.m. Greenwich time. All railway clocks and clocks in post-offices and Government establishments will be put back one hour, and the Government requests the public to put back the time of all clocks and watches by one hour during the night of Sunday-Monday, October 2-3. Employers are specially recommended to warn all their workers in advance of the change of time.

A PHOTOGRAPHIC GARDEN PARTY.—The members of the South Suburban Photographic Society were, on Saturday last, invited by Mr. and Mrs. G. H. Dannatt and Mr. P. B. Dannatt to a garden party at their Blackheath home, to meet the new president (Mr. P. R. Salmon), and to inaugurate the autumn session. There was a large attendance, plenty of enthusiasm, surreptitious exposing of plates and films, and "shop talk," the event being the first of its kind in the history of the Society. There were, of course, the usual felicitous and congratulatory speeches, and the party broke up at a rather late hour, well pleased with the excellent start made, thanks to the hospitality of the hosts and hostess.

A BEAR THAT USES PLATES!—A Central News New York correspondent states that a black bear in the wilds of Alleghany has taken a photograph. It is reported that a Mr. R. S. Craig, a forester from the New York College of Forestry, left his camera on a log whilst he looked for a good subject for a picture. He then saw a black bear browsing amongst some berry bushes. In his surprise he did not think of his camera as he sped down the trail to the camp. With two others he went back to the spot, but the bear had disappeared. The camera was still on the log where Craig had placed it, but a plate had been exposed. When the plate was developed it showed Craig in rapid flight down the trail.

FREE-LANCE JOURNALISM.—The business of press photography is now so largely dependent upon a possession of the journalistic instinct, that any course of instruction which contributes to a firmer footing on the journalistic road is of distinct advantage to the tyro in free-lance press photography. It often happens that it is difficult to place photographs simply on their own merits, whereas as accompaniments of a short article they will frequently find a ready market. On these accounts it is worth while to draw the attention of those seeking to earn money by press photography to the course of instruction in free-lance journalism offered by the Practical Correspondence College, 57, Berners Street, London, W.1. We have been interested in reading the very practical advice contained in this course of postal lessons.

PHOTOGRAPHING THE INDIAN ROPE TRICK.—Another attempt to photograph the Indian "rope trick" is described very fully in a new book ("Here, There, and Everywhere") published last Friday. The photographer was Colonel Barnard, at one time chief of the Calcutta police. All the illusionist's operations of throwing up the rope, sending a boy up it, etc., were photographed on "a new roll of film," but, on developing the negatives, none of these operations were pictured on the negatives. The negatives showed the courtyard in which the trick was performed, also the people, including the rope, juggler, and boy, "who had not moved at all." The author, in summing up the mystery, suggests hypnotism and the forcing "the people to see what he (the juggler) wished them to see." The results were the same as those obtained by other travellers who have had the opportunity of photographing the performance of the trick.

A BUSINESS NAMES ACT PROSECUTION.—A case of particular interest to "father and son" businesses was before the courts last week. As is fairly well known, the Registration of Business Names Act makes it compulsory that every firm carrying on business under any name not consisting of the true surnames of all the partners shall be registered. A Mr. G. Arthur Wingfield carried on his business under the name of Wingfield and Son. The Board of Trade discovered that the name of Mr. Wingfield's partner was not "Son," as stated, but was actually "Wingfield." Had they called themselves "Wingfield and Wingfield" or "Wingfields," instead of the more exact "Wingfield and Son," they would not have needed to register—but the words "and Son" laid them open to the attack of people in Whitehall. The firm was not registered, and a prosecution at Bow Street followed, when Sir Chartres Biron described the offence as a

technical one and dismissed the case. The case, says the "Evening News," must have cost each side about £60. The Government Department dealing with the Business Names Act cost £6,260 10s. 5d. in the twelve months ended in June, and its receipts were £4,358 9s. 6d. It has a staff of a registrar and assistant registrar and 40 clerks.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

THE SPEED OF SMALL LENSES.

To the Editors.

Gentlemen,—With reference to your interesting article, "The Speed of the Lens," may I ask if there is any explanation of the difference in speed between short and long-focus lenses?

The old box-form pocket Kodak (1½ in. × 2 in. picture, single lens about *f*/13) and the original Verascope (R.R. lenses, somewhat similar aperture) gave fair results in rainy weather with the film and plates of those days. Their shutter efficiency cannot account fully for this.

With my stereo camera (2½ in. focus), one-third the exposure needed with a 6-in. lens suffices. The shutters are nearly akin as regards efficiency.

Glass cuts out the ultra-violet rays to some extent, but I use orthochromatic material, so the thicker glass of the large lens cannot have much influence. Is some form of "scatter" involved?

Though not pertinent to the subject, I may mention that my 2½-in. lenses have a focussing movement which is constantly in use, the effect of the focussing being quite plain in enlargements.—Yours faithfully,

LOUIS NELL.

London, September 22

"A DIRTY LITTLE ROGUE" AT THE SALON.

To the Editors.

Gentlemen,—In criticising my picture as above (No. 82) London Salon of Photography, in your issue of this date, Mr. Tilney appears to have made a remarkable "discovery." The textuous material upon which the baby is peacefully reclining is a concrete floor and the apron of the "pram" is an intervening wall out of focus—hence the vignetted setting. The kiddie had just rubbed his face with road dust. The idea of foamy water just below the edge of a quay is most amusing, and I almost regret having to write this "disillusionment."—Yours faithfully,

JAS. BEARDSWORTH

29, Warrels Grove, Bramley, Leeds.
September 23.

R38 DISASTER PHOTOGRAPHS

To the Editors.

Gentlemen,—As you have published letters from two others in reply to Mr. T. C. Turner's article, in which he claims to have taken the first photographs from the Humber of the wrecked airship, may I, too, be allowed to state my own case, as one of those who signed the letter contradicting Mr. Turner's statement? I am still of the opinion that he is quite mistaken, and that my photographs were actually taken before his. In the first place, I was much nearer to the pier at the time of the disaster, and immediately cycled to the pier, and, seeing a couple of rowing boats leaving for the scene of the disaster, engaged one of them to take me out to the wreckage. I was certainly out on the water some time before Mr Turner arrived at the pier. That can be fully proved, as witnesses who saw the whole proceedings are prepared to testify. Mr. Turner also states that the tug which took him out had already made a trip out and brought in a survivor. It would take quite five minutes to reach the wreck, and not less than ten minutes to search the wreckage and rescue Captain Wann, who, I believe, was unconscious at the time, five minutes to return, and at least another five to get stretchers and move the captain on to the landing-stage. Then the second trip out must have taken at least ten minutes to take soundings and get into position for Mr. Turner's historical picture. That means over half-an-hour must have passed before Mr. Turner took his photographs. This is fully borne out by his statement that there was no part of the forepart of the airship visible when he went out except a few blazing and smoking pieces. When I went out we passed a considerable amount of wreckage out of the water, quite apart from the burning portions, which were chiefly petrol. This wreckage was still visible some time after we reached the after-part of the airship, but had disappeared on the return journey.

On one of Mr. Turner's photographs two boatloads of men are to be seen, one of them most likely the boat I engaged, and the other the one that set off at the same time. If it were not so, as Mr. Turner claims, the fact that boatloads of men had reached the scene is surely enough proof that it was possible for other boats to have done so. I am quite certain there were no fully-loaded boats on the scene when ours arrived, as we rowed all round the wreck to look for survivors. There were one or two boats on the scene which contained only one or two men. I make no pretence to have taken the first photographs, but do claim to have beaten Mr. Turner.

I was quite prepared to let him take all the glory had he not taken so much pains to depreciate the work of other photographers in a journal which appeals to the professional photographer throughout Great Britain and other parts of the world. As a final proof, I enclose a set of prints which I am quite willing to submit to your judgment. I am sorry the selection is not larger owing to an unfortunate accident on the rowing boat, when my camera bag was overturned and nearly a dozen plates were dropped into the river. Still, those sent are quite sufficient to show that no breaking up of the after-part had taken place when they were taken. The one showing the wrecked girders was taken from the end that had broken apart, and is probably the only view taken looking right into the opposite end, from which most of the photographs were taken, as probably it was quite unsafe for anything else but a rowing boat to approach.

A great part of the damage done later was caused by two powerful tugs, which attempted to pull the wreckage over in case there were any of the ill-fated crew underneath. Instead, it was pulled to pieces, at the same time sinking into the sand and being covered with the rising tide.

Mr. Turner's letter published in your last issue I will leave, except that part which deals more directly with myself, being one of those pressmen who frequently turn up, nearly always "on invitation" when Mr. Turner is on the scene. If not invited, I am always sent as a representative of the "Hull Daily Mail," I never interfere with him in any way if I can possibly help it. But to be told at a "public event" that he cannot allow anyone else to take photographs, and that the Press must take their pictures from him, is taking up a position which in these days (when the recognised Press photographers have every assistance given them by those in authority) is a very undignified one.

As an illustration of Mr. Turner's judgment of a Press picture, the fire and smoke picture, which he did not think worth a plate, and was taken, he says, with a small camera from the pier, the leading newspaper in which Mr. Turner's "star" picture appeared paid £100 and £20 cab fare to London for it.

As for editors using professional studio workers' photographs in preference to pressmen's work—well, editors are human, and naturally use that which costs them nothing.

With apologies for taking up so much space with the first letter I have ever written to the Press.—Yours sincerely,

G. H. HARNESS.

7, Elsie Villas, Holland Street, Hull.
September 26.

[Mr. Harness sends us four of his photographs of the wreck (unmarked as regards order of taking), and the last one of Mr. Turner's for comparison. Three of these views, all of which were taken at comparatively close range, do not show the wreck from stem to stern as do the earliest of Mr. Turner's. The fourth does show the wreck under this aspect, but in our judgment at a later stage of

collapse than the earliest of Mr. Turner's. In view of what has been said of the rapidity with which the structure changed its shape under the action of the tide, we imagine there was a comparatively short interval of time between the exposures by the respective photographers.—Eds. "B.J."]

To the Editors.

Gentlemen,—Mr. T. C. Turner places the responsibility for our letter on Mr. Watson. I signed it, and, apart from the mistake which I corrected and apologised for, I agree with the contents.

Photographs taken by Mr. Harness have now been forwarded to you. When comparing the various photographs, I would ask you to remember that the tide was rising and the wreck gradually collapsing.

In the light of facts with which he is now acquainted, does Mr. Turner still claim to have taken his photographs about an hour before those of any other photographer? Stripped of all its trimmings, that is the inference his article conveys.

As regards my own photographs, you commented as follows:—"It is possible to say, with reasonable correctness, that the last of Mr. Turner's photographs to be taken shows the wreck in approximately the same state as does the first of Mr. Overton's." How then, does Mr. Turner justify his assertion, "And they" (the other men with cameras), "arrived on the scene when the wreck had broken up a great deal by the action of the tide"?

I have kept strictly to the points that have been raised. I would ask Mr. Turner to do the same.—Yours, etc., F. OVERTON.

85, Prospect Street, Hull.

September 26.

"PLATES *VERSUS* FILMS."

To the Editors.

Gentlemen,—The correspondence on films and plates is disappointing in one respect. With the exception of my own letter no reference is made to the new Board of Trade draft regulations as to storage of celluloid. This is of serious consequence to all those who have been using films since their introduction, because they must have accumulated a hundredweight or more of celluloid, which may mean, under new regulations, the construction of a fire-proof chamber in which all the stock celluloid and nothing else must be stored. This will be a very serious matter for some of us, especially those who are cramped for space and money. In my own case I do not see how it is possible to find room for such a place, and many others must be in a similar position. It is quite impossible to get more accommodation in this town, the demand for offices greatly exceeds the supply, and for quite a small room in a side street a rent of £50 a year is asked; to this must be added rates of 18s. in the pound, nearly doubling the rent, and gas at 5s. 6d. per thousand cubic feet, and so on.

This seems to me the point which decides whether we shall use plates or films. On the question of quality and convenience every photographer can decide for himself, but in the matter of storage he has no option but to obey whatever law is enforced or take the unpleasant consequences of defying it. I don't think for a moment that any objections on our part will stop the new regulations coming into force, because, after all, we are not obliged to use films, we can go back to glass, though many may be reluctant to do so. I hope we shall hear from other photographers what their ideas on the subject are on this matter of storage. Acrimonious remarks on the virtues and vices of plates or films do not get us any "forrarder."—Yours truly,

HAROLD BAKER.

To the Editors.

Gentlemen,—With your permission I would like to add the following remarks to my already-published letter, and then I hope just to look on while the discussion continues.

My critics seemingly forget that Messrs. Kodak's "Announcement" was based upon three main clauses: (1) Their decision not to manufacture any more glass plates, (2) an assertion of the superiority of film over plates, and (3) a statement which implied that only back-numbers in the photographic fraternity were users of plates to-day.

The first statement should concern the firm alone, the second is debatable, while the third is a remark which, to my mind, is unwarrantably assertive and should never have been made. It was to the covert attack implied in (3) that Mr. Lambert drew attention, and to which I appended my supporting protest. The distinction was appreciated by you, gentlemen, as is shown by the two headings used. The original heading, "The Kodak Manufacturing Policy," has now become "Plates *versus* Films." Messrs. Kodak entangled them together, but film enthusiasts bid me concentrate on the latter subject only. I have no doubt whatever that this is what Messrs. Kodak would prefer, but I cannot believe that those members of my profession who use portrait film would assent to the implied slur on those who do not. "Chacun à son gout." Those who differ from me on this aspect of the matter may say so.

To continue. When "portrait" film was brought to my notice, I tried it as I would try anything which might help me to improve my business. I could not do more. It did not suit me, and so I dropped its use. I did not bother any further about it until I was up against the suggestion that, speaking generally, I was "an unprogressive person, opposed to change of any sort." I object to *that* label. Anyone who can show me what might be to my advantage is ever welcome, but I claim the right of rejection without the makers' further comment if the goods are found wanting. A little less of the "high falutin'" on Messrs. Kodak's part and all would have been well, so far as I am concerned. The discussion in such a case would have been confined to the simple question, "Which is the better for the professional user—plates or film?

With respect to this latter question, it might be of interest if I state how I came finally to eliminate the use of film from my working. I first tabulated what I considered to be the essential requirements in my *ideal* negative-making medium. These were as follows:—

(*a*) Rapidity; (*b*) freedom from chemical fog, combined with latitude in development in case of necessarily brief exposure; (*c*) density-giving power; (*d*) non-halative property; (*e*) amenity to any needed after-treatment, *i.e.*, intensification or reduction; (*i*) indestructibility, *i.e.*, non-breakage, non-inflammability; (*g*) speed in working when urgency demanded; (*h*) absolute flatness and rigidity when in use; (*i*) correct monochromatic rendering of colour-values; (*j*) keeping qualities—especially prior to development; (*k*) cost to buy.

I do not pretend that these items are placed in strict order of importance, for this would naturally vary according to the requirements of each individual worker. I do, however, consider it essential that such a list should contain only those properties which the negative-making medium would inherently possess. I mean by this that such points as, for instance, difficulty in retouching, should be looked upon as being purely personal factors, dependent to a very great extent on the idiosyncrasy of the worker.

I think that if discussion centred on the fixation of such points as these, each worker could then quickly decide for himself as to what would best meet his requirements. (Lady readers, please consider yourselves included, where necessary. I am no misogynist). Now, to me, with the preceding list before me, the advantage of plates over film was manifest in items (*a*), (*b*), (*e*), (*g*), and (*j*), while films scored with items (*d*) and (*k*). I considered that (*c*), (*f*), and (*i*) were really neutral, with a slight advantage for plates in (*i*), assuming a good non-filter type of plate to be used. While again, as regards (*d*) and (*k*), a well-backed plate has hitherto done all that I have asked of it, and done it well. As for cost, I have never considered this if I could get definite practical advantages by paying a bit more.

Undoubtedly, the principal factor is the question of support for the sensitive emulsion. Glass is breakable and thick, hence its halative tendency. Celluloid is highly inflammable and easily scratched, while it has, more or less, to take its own time in drying. Can anything else be substituted which would be minus these defects, inexpensive to manufacture and highly transparent? Should something eventually be evolved, I promise that I shall not be found "resistant to progress."

A few words now to certain of my critics. Mr. W. E. Debenham inquiries what justification exists for my implication that films

are slower than plates. They were most definitely so with me, but no doubt he has since read what Mr. Harold Baker says on this point on the very same page as Mr. Debenham's own letter. But why do Messrs. Kodak not indicate the speed of the film on the package?

As regards Mr. Will Cadby, his suggestions (well meant, I am sure) seem to be quite impracticable. What period would he assert to be the minimum for fair and adequate trial of a new production? And what quantity must be used in any such trial? Would he try everything that is offered? (To keep exclusively Messrs. Kodak's productions would scarcely be fair to other manufacturers.) Will he assert, in addition, that the full extent of the trial must be made both by technical expert and by novice, that both will then be equally competent to pronounce a verdict, and that in such case agreement will be unanimous? And so on. Respecting his second condition, I concur on the understanding that it applies *all round*—in this case, to Messrs. Kodak as well. And then, where are we? No, no, Mr. Cadby. Think it out a little bit more, and, *please*, do not think me personal in asking this, any more than you meant to be with me. And I really do not consider Mr. Cadby's reference to the Swiss mountains at all germane to the present discussion; at least, none such have ever yet put in an appearance in my studio, while *portrait* film for photographing *mountains* seems somewhat anomalous.

I am rather disappointed with the majority of the letters so far published. Mr. Harold Baker's, I think, was a real contribution to the discussion. Your correspondent, "Fair Play," preaches a sweet reasonableness, in which I am all with him. But why the nom-de-plume? The letter reads rather like one from a trade finisher, but I can see nothing in it to demand the anonymity, which spoils it. He is the only instance of this, too.

Just one little thing in conclusion. Let us consider the case of the Press photographer, whose very calling compels him to take no chances with his work. Those with whom I have discussed the point have expressed a preference for plates. For what reason? Because they are far more dependable than any film yet produced. And so, still, say I. Yours faithfully,

Shrewsbury. J. MALLINSON.
September 23.

To the Editors.

Gentlemen,—There has been so much discussion as to the relative qualifications of plates and film that I feel it is only fair (having used the film since its introduction), to add my testimony and appreciation of the qualities which the portrait film supplies. It is not always easy to find material that is a real assistance in developing artistic qualities in the work, and I consider that the scale of gradation obtainable with the portrait film, together with the fine grain and the many advantages in manipulation combine to make the portrait film a real assistance in the artistic workers' hands.

Would to heaven we could persuade our paper manufacturers to produce a paper that would yield a greater degree of atmosphere, which quality only the Platinotype print can boast; but whilst we remain content with the old and pay well for it, there are few manufacturers who will stir themselves to greater effort. All honour then to the Kodak Co. for succeeding in giving us some thing better in material to enable us to produce better work.—Yours faithfully, EDWIN LUKER, F.R.P.S.

30, Old Christchurch Road, Bournemouth.
September 20, 1921

To the Editors.

Gentlemen,—Throughout the controversy now raging re the respective claims of plates v. films, one point seems to be continually cropping up, viz., speed.

It is generally admitted that the films now on the market are not so fast as the very fine plates obtainable from various makers, and to the worker who depends entirely upon electric light, this is a big point.

Some of your correspondents hopefully suggest that no doubt films could be made as fast as plates.

This subject always reminds me of an occasion some years ago, I think it was before the portrait film was much heard of. Members of the P.P.A. congress were visiting Barker's studios at Ealing, and in an informal talk which followed Mr. Barker, with great geniality and, I believe, considerable authority, explained many interesting things to us.

The query was raised as to why films should be slower than glass plates, and it was then stated that if an emulsion of a certain speed was taken and one-half of it coated upon glass, and the other half upon film—when used, the portion upon film would be found to be considerably slower than the portion upon glass.

If this is correct, then there would seem to be some inherent quality in the film which is antagonistic to the most delicately sensitive state of photographic emulsion.

If there is little in it, or if it can be overcome, Messrs. Kodak, Ltd., may yet pamper us with a combination of their ideal, but highly delicate emulsion, Wratten Panchromatic, served upon their "ideal" base.—Yours faithfully, A. W. H. WESTON.

8, Bank Parade, West Kensington, W.14.
September 23.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply, 5-cent International Coupon, from readers abroad

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

K. N.—The maker of the jig-saw photographs is Mr. Campbell Gray, 88, Edgware Road, W.2.

G. R.—The Packard Ideal shutter can be used very effectively in a double camera front—that is to say, the shutter sandwiched between the original front and an extra lens board. The instantaneous exposure is quite fast enough for moving objects at ordinary speeds.

W. R.—One ounce of bicarbonate of soda in about 50 or 60 ozs. of water would be a suitable formula. The bicarbonate is used up by being neutralized by any acids in the emulsion coating, and, therefore, it is well to use plenty of the bath, so as not to exhaust it. Immersion of the prints for five minutes is ample.

S. H. C.—If you took the group "on your own"—that is to say, did not receive an order from the club, and therefore are not looking to the club for payment, then copyright in the photograph is yours, and any reproduction of the photograph is an infringement in respect of which you can demand a reproduction fee, or, if the people won't pay, can sue them in the County Court.

H. A.—We advise you to get the "Writers' Year Book," published by Messrs. Black, and obtainable through any bookseller. It gives particulars of the chief periodicals in this country and America, with brief notes on their preferences both as regards illustrations and literary matter. Another book, which it would be worth your while to get, is "Willing's Press Guide," price 2s., from Messrs. Willing, King Street, Covent Garden, London, W.C.2. It is a complete classified directory of the Press in this country, and contains also particulars of leading journals abroad.

W. A.—(1) The feasibility depends on the size and illumination of the room. Whatever lens you use, whether small or long focus, the sitter should not be closer to it than 10 ft. or 12 ft., and, therefore, this very greatly limits the size of the room which can be used for portraiture. (3) The cross front is a sliding movement of the lens horizontally. (4) They are quite convenient in use, but one drawback which occurs is that the film does not lie as flat as a plate, and for this reason no doubt, and also on account of the lesser facility in handling in enlarging and printing, plates are preferred. (5) Quite impossible to say with any degree of approximation. From the definition and the drawing we should say that the group was taken with a lens of at least 8 ins. or 9 ins. focal length. It might, of course, have been longer.

RETOUCHING.—I have been making an enlarged portrait negative on a 12 x 10 plate, and experienced some difficulty in potting retouching medium on so large a surface. (1) Would you kindly tell me what is the best way to apply the medium on large plates? (2) If spotting has to be done to block out pinholes, I presume it must be done after the medium is on, but it does not appear to adhere on the medium's surface as well as it does on the plain gelatine surface.—A. T.

(1) The best way to apply retouching medium to a large surface is to wet a corner of an old silk handkerchief or piece of china silk with the medium, and to rub gently and quickly upon the film. (2) The pinholes may be stopped out before putting on the medium if a little gum is mixed with the colour; this will prevent it from shifting when the medium is rubbed on. It is quite easy to put colour on the medium when the latter is perfectly dry.

A. B.—We should think you can bring the negatives to uniform printing density for simultaneous printing simply by using a greater or less number of sheets of thin tissue paper under each, as is done by the rotary printers of postcards, who thus "even up" a score or so of copy negatives. Certainly, in making such copy negatives it is possible to get a pretty even match throughout; nevertheless, the system is one which can be used for negatives which are of considerable difference in density. The worst of it is, of course, that it slows all down to the printing speed of the densest. If you have to reduce, we advise a very weak Farmer's reducer of pale lemon yellow colour. For intensification probably the best plan would be to use the chromium intensifier in the form which gives the least increase of density (page 439 of the current "Almanac"), repeating the process as required and ascertained by testing the evenness of the negatives together by making a print

T. O.—At the present time there is no paper on the market which, by the ordinary processes, yields a positive image in the camera, or photo-micrographic camera. The only thing of the kind is the so-called ferrotype card or plate, which is a sensitive material of black colour having an emulsion coated on it. Development is done with a solution which gives a whitish image, so that what is really a negative appears as a positive, the shadows being formed by the black substratum and the so-called "whites" by the developed image. But we do not think that the somewhat degraded gradation of the results produced in this way would be satisfactory for your purpose. No doubt you know the kind of thing which is made by the beach photographer. There was formerly a paper on the market which gave excellent results for your purpose, the developed image being rapidly reversed from a negative to a positive, as is done in the Autochrome process. This was called "Wernertype," and came from America.

K. H.—(2) The formula in the "Almanac" is the one we recommend for mercuric iodide intensifier, but this is rather a tricky intensifier to make up, and we always advise using the Tabloids of Burroughs Wellcome, or the powder sold by Mr. T. K. Grant, agent for MM. Lumière. (3) The formula for the Kodak amidol developer is:—

Sodium sulphite, cryst.	1 oz.
Water	20 ozs.
Amidol	60 grs.
10 per cent. potass bromide solution	20 drops.

(4) We think the formula you refer to is one recommended in 1911 by MM. Lumière. We have not had occasion to try any of these, and we think that the need of them has been largely removed by the introduction of the Ilford Tropical hardener, supplied by Messrs. Johnson's, which we recommend to your notice for development at high temperatures. (5) The medicated soap is manufactured by Messrs. E. Cook and Sons, The Soapery, Bow, London, E., who would no doubt inform you where you could obtain it locally. Any chemist should be able to obtain it to order.

T. P.—For copying same size, whatever focal length of lens is used, the negative postcard will be two focal lengths from the lens diaphragm, and the sensitive paper will also be two focal lengths from the diaphragm. This is an approximate rule, because with some lenses the distance really requires to be measured not from the diaphragm, but from some point in the lens near to it. To cover a postcard the focal length of the lens should be at least 6 inches, and as the lens is used at twice its focal length the F. No. becomes twice that marked on the mount; that is to say, the exposure is increased four times. Therefore, with short exposures, it is of importance to have the lens of large maximum aperture, at least *f*/6 we should say, and probably *f*/4, since the working stops in the respective cases will be *f*/12 and *f*/8. If you don't mind considerable distance between the negative original and lens, and also between the lens and the sensitive paper, an excellent lens for the purpose would be a cabinet portrait lens of, say, 10 or 12 inches focal length, so that the distance from negative to paper would be from 40 to 48 inches. A portrait lens gives very bright and crisp definition, but as its covering power is very much less than that of other types it is necessary to use a greater focal length.

COPPER TONING.—Kindly let me know following with regard to copper toning for bromides:—(1) Do prints require to be wet before being toned? (2) How long the prints require washing after toning? (3) Does it matter if prints are not free from hypo? (4) Is it suitable for gaslight papers, and if process is a good one? (5) Also if solutions are poisonous either separate or mixed? (6) How long will separate solutions keep (about)? (7) How many prints (half-plate) will 8 ozs. of mixed solution tone?—J. W.

(1) Best to soak for a few minutes before toning. (2) Half an hour is ample. (3) Prints must be perfectly washed from hypo. (4) Prints on almost any gaslight paper will tone well and will yield excellent colours from warm black to red chalk. (5) The chemicals are not dangerous poisons. (6) We think you might keep the separate solutions for at least three months. (7) We cannot say, but should think a dozen or so half-plates in 8 ozs. of mixture.

W. M.—We are afraid we cannot suggest anything to remove the abrasive quality of the cards. Apparently cyanide in the developer does not suit them. You might see whether the use of an acid fixing-bath would do anything to remove the yellow stain, and perhaps, if you could take the trouble, a quick rub over each print with weak iodine-cyanide reducer would clear away the yellowness, although we rather doubt it. No quicker method of glazing than by stripping from glass. If you use one or other of the glazing solutions—Vanguard "Bango," Rajar, or Gem—you will avoid a great deal of the labour of polishing the glasses. The use of a formaline bath makes the print hard enough for using a higher temperature for drying, but, as a rule, the glaze is not so good when the prints are dried very quickly. For practical purposes we do not think the formaline has any bad effect on the cards. Yes, gelatine prints are treated in exactly the same way as collodion prints when glazing with enamel collodion. A burnisher would be too slow for you, and the results are far inferior as regards gloss to those by stripping.

THE BRITISH

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Contents.

SUMMARY.

To-day week, Friday, October 14 is the latest date for the receipt of advertisements in the forthcoming British Journal Almanac.

An article, which we are able to reprint from our contemporary, "Conquest," describes with numerous illustrations and examples the photographic methods which are employed in the scientific laboratory attached to the Paris police service. Photographs of finger impressions are used in the detection of suspected persons, and considerable use is made of photographs produced by ultra-violet light for the purpose of detecting fraudulent alterations in documents. (P. 595.)

In a leading article we refer to some of the social opportunities which exist for bringing business to the studio. (P. 594.)

We regret to record the death, at the age of 83, of Mr John Thomson, for many years a leading professional photographer in the West-End of London, and a traveller and inventor. (P. 600.)

In a paragraph on page 593 we give prominence to a misapprehension commonly entertained by clergymen respecting copyright in photographs of churches and church precincts.

Further discussion of plates and film ranges round the alleged absence of halation and the drawbacks of two gelatine surfaces in the negatives. (P. 603.)

In close quarters, a mirror may allow of better drawing being secured of a piece of furniture or of a more suitable lighting being arranged, when photographing a sitter in an ordinary room. (P. 594).

In burning magnesium ribbon in quantity, the best plan is to plait several lengths roughly together. (P. 593.)

The occasional usefulness of hydroquinone as a developer for great contrast, or for the treatment of stale plates or papers, is the subject of a paragraph on page 591.

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

In a contributed article Mr. R. M. Fanstone gives some hints on the making of Autochrome and Paget colour photographs of scenes in autumn foliage, emphasising the advantage of reproducing subjects on a relatively large scale, and instancing the benefit, under difficult conditions of lighting, of giving full exposure and intensifying the plate. (P. 37.)

A hint is given of progress in the Gorsky method of colour cinematography by a recent patent specification describing the process of preparing the three superimposed colour images. (P. 38.)

Particulars are given of the process now being employed by Mr J. Newlands Thomson for the making of two-colour portraits in the studio. (P. 39.)

In the Ulysses process of colour cinematography each picture area receives several partial exposures through the same colour filter for the purpose of avoiding colour fringing. (P. 40.)

Interest is being taken in Germany in a colour process devised by a Herr Loudine. (P. 40.)

EX CATHEDRA.

Almanac, Last Day.

In consequence of contracts made with the printers and binders of the "Almanac" our publishers are obliged to adhere to a date on which they must close their books for the receipt of further advertisements. For the forthcoming 1922 volume, this last day is to-day week, October 14. All advertisements which come to hand on or before this date can be included in the book, and no doubt any advertisement order which arrives at the same time can be executed, providing the "copy" for the printers is available immediately afterwards. On the day following, October 15, the advertisement pages will be finally arranged for the press; while it may be possible at this last hour to find space for an odd page or so, it must be emphasised that it is impossible to guarantee inclusion of advertisers' announcements which reach our publishers later than a week hence.

* * *

Rights in Chuch Photographs.

We are glad to see that the editor of the "Church Times" is able to display a greater knowledge of the law of copyright than is possessed by many of his readers. It is a very common experience of ours to hear from photographers, who have been threatened with all kinds of penalties because they have been publishing views of a church or, sometimes, a churchyard, without the permission of the vicar. We daresay that the incumbent of a church has the right to refuse permission to a photographer to enter the church premises or precincts for the purpose of taking a photograph. But when once a photograph has been obtained, whether with or without permission, the vicar's rights in the matter disappear. He then has no power whatever to restrain the photographer from making any use of the negatives which he thinks fit. Nevertheless, many clergymen seem to hold an entirely contrary and erroneous view.

* * *

Portable Light

There are many occasions on which some form of artificial light is needed, and very often there is some objection to the use of any form of flash light, either because of the risk of firing curtains or other fabrics, or the deposit of white dust. In such cases, magnesium ribbon is a very efficient substitute, requiring no lamp or other appliance besides a clip (to prevent burning the fingers) and a damp cloth or tray to catch any hot ash. The best way to use the ribbon is to plait several strands together, and these may be further secured with a twist or two of very fine flower wire. The advantage of this plan is that not only is the time of exposure reduced, but a continuous light is obtained, for if one strand is extinguished it is immediately relighted by the others. In order to secure good combustion it is necessary that the ribbon has a clean silvery surface, which can be obtained by drawing it once

or twice between a piece of folded emery paper held between thumb and finger. Sharply defined shadows can be avoided by waving the magnesium torch from side to side during exposure. Two or three Swan vestas held together give a good flame for ignition. Wax matches are apt to give a coating of soot, which is an impediment.

* * *

Dark-Room Lamps. The increase of rapidity and colour-sensitiveness which is going on in plate-making renders it necessary to overhaul the illumination of the dark-room if there is any trace of fog upon the negatives. Even the most rapid emulsions of the present day will show no deposit upon the margins protected by the rebate of the slide if the dark-room is properly lighted and reasonable caution exercised in exposing the plate during the filling of the slides and development. It would be well if the old practice of judging the density of the image by repeated inspections, the plate being held close to the lamp, were abandoned. To avoid all temptation, it is an excellent plan to place the lamp in such a position that no direct rays reach the eye of the worker. A comparatively bright light may be used if its rays are reflected from the ceiling or, if this is not convenient, from a sheet of yellow paper fixed on the wall. Once the habit of judging density from the time taken after the image has appeared has been acquired, all desire to toast the negative in front of the red light will cease.

* * *

Negative or Paper? In the far-off days, when wet collodion was practically the only process for obtaining negatives, it was the rule to destroy all unsatisfactory results as soon as developed and to make another exposure forthwith. The principal reason for this was that the albumenised paper then used for printing would not give even passable results from a poor negative, and photographers had perforce to make fairly good ones. Now it is quite different; if there is any sort of image it is deemed good enough to print upon some sort of paper. If we study the advertisements of the various makers of developing papers we find every encouragement given to careless workers, as they are catered for with soft, normal, contrasty, vigorous, and other grades. The carbon and platinum printing processes are not used as often as they might be, because these processes require a negative of good average quality. With a little care it is at least as easy to produce negatives of uniform quality upon gelatine as it was upon collodion, the main points to be observed being uniformity in the strength of solutions and close attention to the time and temperature of the developer.

* * *

A Neglected Developer. Hydroquinone is now rarely used as a developer except in conjunction with metol, but there are many occasions on which its power of giving clear, contrasty images would be of great service, especially as those who compound their own metol-hydroquinone developer have all the necessary materials ready to hand. If sodium carbonate be used as the alkali the developer keeps well in a single solution, although it is better for long keeping to make up the hydroquinone and soda in separate bottles. For line subjects, or when copying from flat originals, great density can be obtained by using caustic soda as the alkali, while the maximum density results from using formaline in place of either alkali. Detailed formulæ will be found in the current B.J. Almanac. Hydroquinone is rather a slow working developer, and should never be used at a lower temperature than 60 degs. Fahr.; 65 degs. is probably the best working temperature, and this should not be exceeded with a caustic alkali. It may not be generally known that hydroquinone is excellent for use with stale plates which give foggy stained negatives with other developers.

* * *

Using a Mirror. Although the interposition of a mirror between the lens and the subject is now almost exclusively utilised for the production of reversed negatives, it has another application, which is very old, but not the less valuable. It is to obtain, in confined situations, a greater working distance, or to secure a more favourable position for the camera. For example, if it be desired to photograph a piece of furniture in an ordinary room where there is insufficient length to allow of the whole being included upon the plate, an ordinary looking-glass may be placed so as to present the image to the lens which is situated at the side of the object. In like manner a portrait may be taken in an ordinary room, and nearly a front lighting secured by placing the mirror in front of or a little to one side of the window, the only precaution necessary being that the camera is not included in the field of the lens. As the angle is usually small, ordinary silvered plate may be used without risk of a double outline. It is, of course, necessary that the mirror does not distort in any way and that it is perfectly upright when straight lines occur in the original.

BUSINESS BUILDING.

Many recently-established photographers find themselves disheartened by the slow growth, or even stagnation, of their businesses, and are inclined to blame the times they live in for what is frequently due to a lack of enterprise or judgment. It is a great mistake to imagine that, given the ability to make good photographs and the premises and plant suitable for their production, all that is necessary is to open the front door and wait for the sitters to walk in. Experience in every branch of industry shows that such is not the case. If we consider the business of the portrait painter who has to reach the same class of customer as the West-End photographer, we shall find that the former either languishes in impecuniosity or that he lets slip no chance of asserting his personality in society. In such a calling as photography, which permeates every stratum of the population, the means adopted to do this must of necessity vary greatly, but the essential idea of making one's professional existence known to as many people as possible must be at the bottom of all. The young painter who has passed through the academy schools with credit, and strikes out for himself, soon finds that he has exhausted the immediate circle of his friends as far as commissions are concerned, and frequently becomes a mere hack to dealers or publishers, earning a pittance which a self-respecting workman would despise. If more astute, he keeps in touch with art circles, and by embracing the newest heresy becomes mentioned in the papers, is welcomed at social gatherings, and finds new ground upon which to exercise his talents in a saner way, all the while taking special care to keep in evidence at every social function to which he can gain the entrée. Although this course is more difficult to the photographer, it has been, and can be, followed with success. Motoring and golf clubs, masonic lodges, musical, philanthropic, and even political organisations all widen the circle of potential sitters, and if the end is never forgotten in pursuing the means, an increase of business must result. It must not,

however, be imagined that this self-advertisement can be dropped when it appears to have served its purpose. We have only to recall the dwindling away of many well-known businesses to realise that it is never safe to rest upon one's laurels until the time for rest has come.

It is not given to all photographers to cut any sort of figure in society, and those who are diffident of their powers in this direction must adopt the methods of the tradesman, rather than those of the artist, to make themselves known; still, the social element must not be ignored, a fair number of provincial photographers become councillors and mayors, and it would be foolish to pretend that these dignities do not react to the possessor's benefit. It is obvious that except in exclusive circles the photographer's business is largely dependent upon his window show as the experience of one amply proved. Business was commenced with no external show, a modest brass plate being the only indication. Little was done, the photographer being unknown in the district. In a few months a small showcase was exhibited, the result being to double the turnover. Later, the premises changed hands, and permission was given to put in a shop window, after which there was no lack of orders.

It is essential that the class of work shown should be acceptable to the residents of the locality. Pictures that command ten guineas a dozen in Victoria Street would not fetch the odd shillings in Tottenham, and this not because the Tottenham folk want poor photographs, but because their tastes run in the direction of small, sharp portraits at a low price. We know of two photographers in the same road in a London working-class suburb. One is just making a living. He is a good artist, his pictures have been hung in the Salon. The other shows the "usual thing" in a style suited to the neighbourhood. He has opened several branches and visits them in an expensive car.

The beginner has no reason for apprehension if he has a reasonable amount of artistic taste and technical ability, together with a modicum of business acumen. A good photographer may open in a locality apparently already overcrowded with photographers and his work will tell, while in a new suburb a man or woman whose work and manners are acceptable to the community will be able to found a business which will grow with the population and defy competition. These are not merely arm-chair opinions, but are based upon recent happenings within our own knowledge.

Specialisation in portraiture has never taken root on this side of the Atlantic; few, if any, of our artists confine themselves exclusively to the pictures of men, children or women, although in the greater American cities the practice has been found satisfactory; possibly a bold "photographer of men" may take the risk of opening in the City of London and achieve success. For some reason which we cannot fathom "home portraiture" is neglected in this country. We have news of one or two workers, little more than amateurs, who are thriving on this class of work, while more experienced photographers sit waiting for days without an order.

We are glad to be able to say that public opinion amongst photographers is strongly against "free sittings" as a means of securing business, some of the oldest offenders in this respect having now seen the error of their ways. It is, of course, sometimes desirable to give "invitation" sittings to celebrities whose portraits are saleable, or for the purpose of securing attractive window specimens, but to do so on the chance of orders from the free proofs is not good business. People who will accept free portraits are not above getting them copied cheaply if more are required; and it is not easy to discover the illegal infringement.

The old practice of having showcases at railway stations and other places of public resort seems to be going out of fashion, except in the outer suburbs. It is difficult to find a reason for this, unless it be the labour incurred in keeping them clean and filled with fresh specimens. Dirty or neglected showcases are worse than useless; they are positively deterrent. To conclude, it is a trite saying, but a true one, that there is no standing still in business; there must be a forward movement or a backward one, and the forward one is only to be maintained by unremitting vigilance and effort.

PHOTOGRAPHIC METHODS OF THE FRENCH POLICE.

[An interesting account of the most recent photographic methods of the Paris police appears in the current (October) issue of our contemporary, "Conquest," the monthly magazine of popular science, of which photography is often a feature. By courtesy of the editor, Mr. Percy W. Harris, we reprint the chief part of this article. Those interested in certain other scientific methods of criminal investigation may consult the pages of "Conquest," where they will find also an illustrated account of the Prizma process of colour cinematography.—Eds. "B.J."]

Often in detective fiction we read of the "polished" criminal, who utilises scientific methods in the prosecution of his evil deeds. It is characteristic of such stories that the police are pictured in a very uncomplimentary manner, the inference being that they have little knowledge of the resources of modern science.

That such a state of affairs no longer exists the reader may rest assured. Rather might we say that the ignorance of science lies mainly with the criminal. We have only to examine the scientific methods of the French police to see what strides have been made during the last fifty years in the detection of crime. As long ago as 1883 the Paris police adopted the system invented by M. Bertillon for the recording and comparison of finger-prints and other personal characteristics. The present "Laboratory of the Scientific Police" is in reality the outcome and extension of M. Bertillon's modest "workshop."

The criminal who has once passed through the hands of the police must be wary indeed if he would avoid leaving at least some trace of his personality on the scene of a further crime. Should he but touch the surface of the furniture with an ungloved hand, the imprints left thereon will render his identification simple. If he has erased a date or altered a cheque, an investigation in the laboratory will reveal the extent of the alteration and the means that have been adopted in so doing. By calling in the aid of the microscope and the analyst it is even possible to tell the material with which a knife or hatchet has been wiped and the substance it has been used to cut. Lately the ultra-violet rays have been brought into play in the detection of crime, while X-rays and the spectroscope are regularly turned to account for such purposes.

Before describing the work of the police laboratory, we will consider for a few moments the preliminary steps taken by the French police in the investigation of a crime. As soon as

the occurrence has been reported to the local police station or to headquarters, a small party of technical experts, consisting of three photographers, a finger-print specialist and a draughtsman, leaves at once for the scene. One investigator examines the lock of the room and carefully notes its condition, while his colleagues photograph the whole of the room and, if the crime be murder, the body. Meanwhile, the

Fig. 1.—The thumb-print of a known malefactor in the records of the police authorities.

draughtsman prepares a plan of the locality and of the room itself. A description, complete in its minutest details, is then made of the body of the victim, its position, the condition of the clothing and anything else which may serve to throw light upon the outrage. Finger-prints left upon smooth surfaces are, of course, a very effective means of identification, since no two human finger-prints show similar patterns. In search of such evidence the investigators must very carefully examine the furniture, window panes, glasses, bottles, papers—in fact, anything which the criminal may have touched. Readily portable objects, such as bottles or glasses, which have finger-prints upon them, are carried back to headquarters, precautions being taken that the finger-prints of the investigators do not touch the surfaces to be examined. Bottles, for instance, are picked up by placing one finger in the neck and the other fingers at the bottom of the bottle, while broken fragments of glass are lifted by their edges. When finger-prints are found on walls, mirrors, or furniture not readily transportable they are powdered over with white lead (if on a black surface) or red lead (if the surface be of light colour),

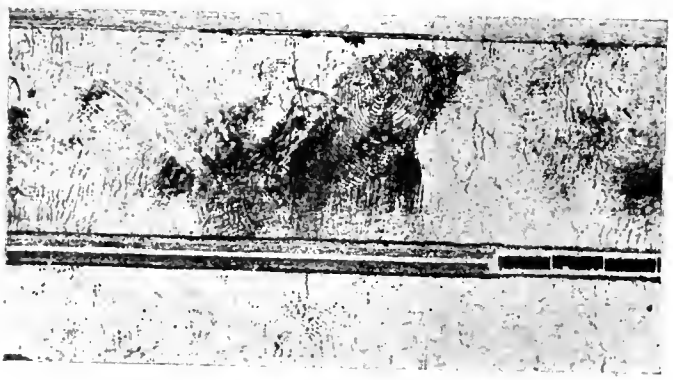


Fig. 2.—The imprint of a thumb on a box. This was proved to be that of the malefactor above. (See Figs. 3 and 4.)

and the excess of powder is removed with a very fine brush. So treated, the finger-prints stand out clearly and are readily photographed.

We will now leave the scene of the crime and see in what manner the scientists utilise the material so collected. Finger-prints, as already indicated, seldom show up well without some treatment, and in the laboratory many clever devices are

Fig. 3.—An enlargement of Fig. 1 with eighteen distinctive markings indicated.

utilised to make them clearly visible. One of these devices is an apparatus consisting of a table of adjustable height, carrying a large camera which itself is adjustable, a powerful

Fig. 4.—An enlargement to the same scale of the thumb-print on the box. The eighteen distinctive markings are easily identified.

electric lamp which can be made to project a beam upon the object photographed, and a holder into which can be clipped objects of practically any shape. To facilitate the examination the holder is made adjustable so that the object may be rotated, raised or lowered without being touched by hand.

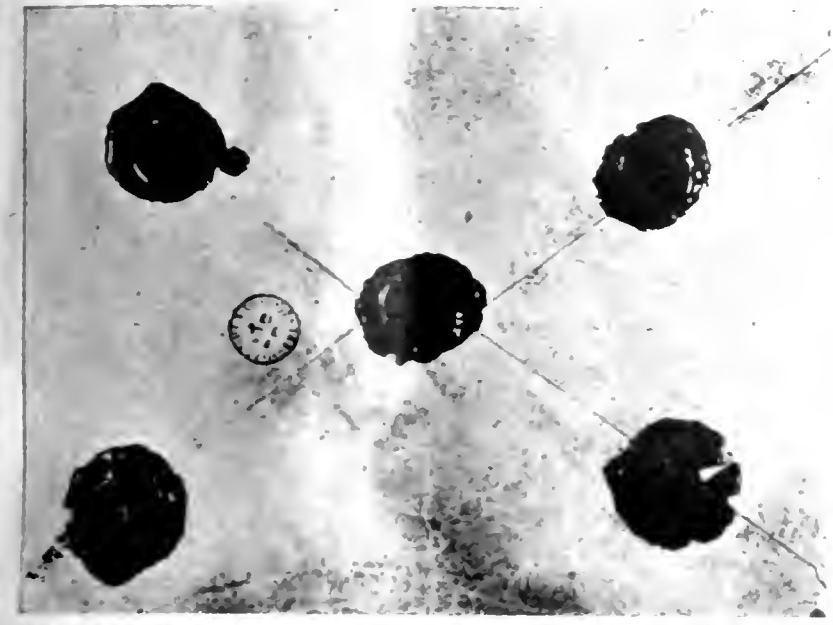


Fig. 5.—This envelope was supposed to contain 25,000 francs. When opened by the addressee it held nothing but wrapping paper! The article tells how the thief was discovered.

It is well-known that many crimes are committed by habitual criminals, who are known to the authorities. Careful records and measurements are made of all criminals passing through the hands of the police, the finger-prints and other evidence being filed for ready reference. Fig. 1, for example, shows the thumb-print of a known malefactor, as shown in the records of the police. In fig. 2 we have a photograph of the imprint of a thumb found upon a small box on the scene of a crime. It was suspected that this finger-print was that of the criminal whose imprint is shown in Fig. 1. How was it proved?

An examination of figs. 3 and 4 soon makes the method clear. Fig. 3 is an enlargement of fig. 1, and fig. 4 a similar enlargement of fig. 2. On these two enlargements are marked eighteen points of resemblance, establishing beyond all doubt the identity of the two imprints.

The official statistics given below prove the importance of the method which last year brought about the identification and final conviction in France of 123 criminals:—

1920.	
Calls upon the special section	1,203
Number of finger-prints collected on the sites of crimes	2,282
Comparisons made	122,205
Total number of negatives developed	4,582
Total number of prints taken	6,788
Criminals traced by means of finger-prints	123

The detection of finger-prints, however, is but one branch of the work of the laboratory. Let us consider another case—that of the envelope with five seals shown in fig. 5. This envelope was supposed to contain banknotes to the value of 25,000 francs, but on being opened by the addressee held nothing but wrapping paper! As the seals seemed to be intact M. Bayle dissolved them in a mixture of benzine and alcohol, and thereupon found that the paper at these points showed no trace of having been torn. From this he argued that the thief had not removed and replaced the seals. Continuing his investigations, M. Bayle immersed the envelope in water so that the whole might be unstuck and opened up as a flat sheet. The envelope was thereupon photographed against the light, as shown in fig. 6. It was then discovered that a portion of the flap was still adhering to the part on which it had been stuck down, indicating that at some time the flap had been torn open after the first gumming down. The presence of a tiny piece of sealing wax on this portion of the paper proved that when the seals were placed on the envelope the tear had already been made. From this, of course, it followed that the theft had taken place in the establishment from which the package had been despatched, and it was shown that the theft actually occurred in the office of a particular employee.

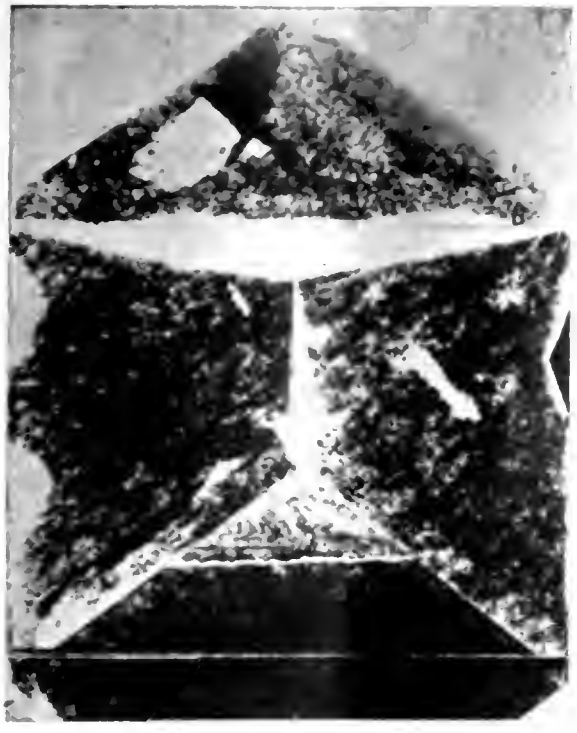
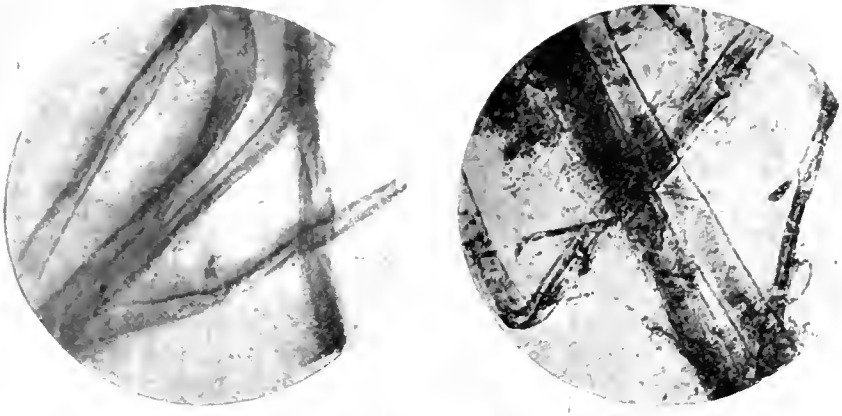


Fig. 6.—The same envelope photographed open and against the light during the investigation. A tell-tale spot of sealing wax gave the key to the mystery.

Fig. 7. A suspected hatchet which was shown to have been wiped with a cloth and not with paper.

Photo-micrography is largely used in the police laboratory. On one occasion a prosecutor forwarded the hatchet shown in fig. 7 to the police, asking whether it had been



Figs. 8 and 9.—Fibres of cotton (left) and newspaper (right), magnified 800 times. Those on the left were taken from the rough edge of the hatchet.

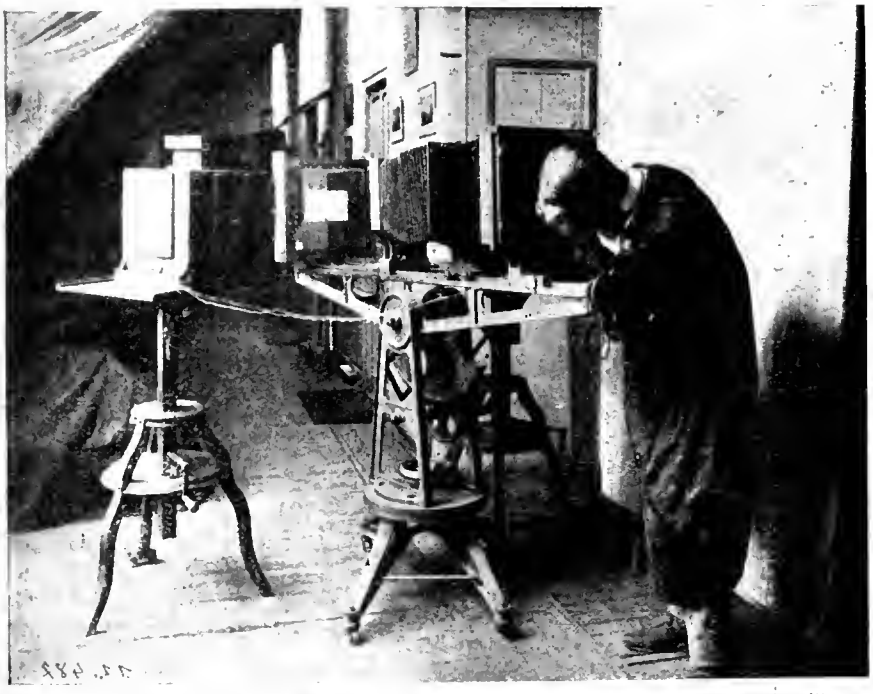


Fig. 10.—Ultra-violet light apparatus used to prove the forgery of the War Bond illustrated in Fig. 11.

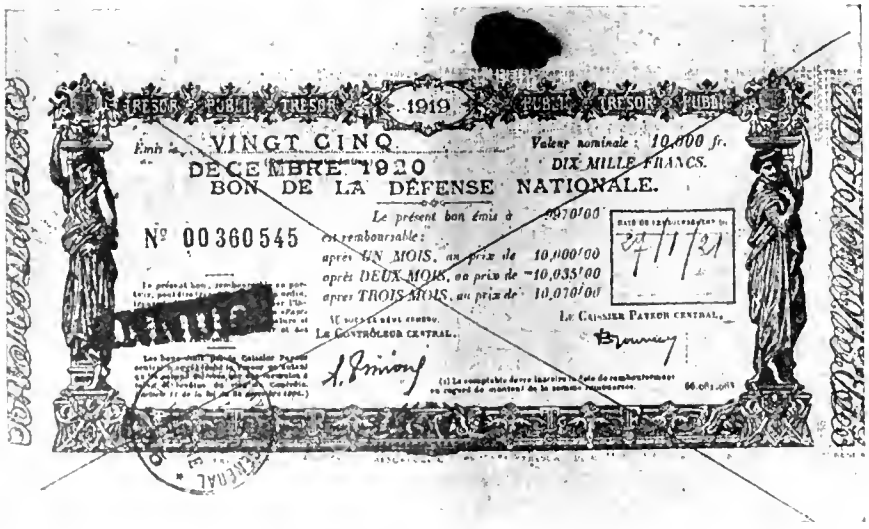


Fig. 11. A French War Bond marked as issued December 25, 1920, and paid on January 27, 1921. Actually this bond had been issued and paid prior to the first date. The forger had erased the original date of issue and substituted a new one. He also removed the date of payment from the small square so that it could be paid a second time.

wiped with a cloth or a piece of newspaper. An examination of the surface with a magnifying glass showed that some specks were adhering to the rough edge of the instrument. These specks were examined under a microscope and proved to be fibrous. When treated with a particular chemical reagent fibres of cotton are stained pink, and those of newspaper (manufactured from wood pulp) yellow. Furthermore, the form of wood pulp fibre is different from that of cotton. This is clearly shown from Figs. 8 and 9, wherein Fig. 8 shows the fibres of cotton found on the hatchet and Fig. 9 those of wood pulp taken from an object wiped with a newspaper. In both cases the fibres are magnified 800 diameters. As rather a large number of the specimens examined showed the characteristics of cotton fibre the conclusion was arrived at that the hatchet had been wiped with a cloth and not with a paper belonging to the suspect. A fact of considerable importance in this particular case, however, was that the stains on the hatchet were shown to be not human blood, as had been suspected, but those of salt pork, for cutting which the hatchet had been used.

In a previous article (CONQUEST, May, 1921, some interesting particulars were given of how X-rays are used to trap the picture forger. Many other obvious uses of the X-ray in the tracking of crime will occur to the reader. Still more interesting, however, is the use of ultra-violet light for the detection of crime. In M. Bayle's laboratory the equipment shown in Figs. 10 and 12 is utilised to examine forgeries of documents. It may be stated here that a photograph of a document taken by ultra-violet light will often reveal details quite invisible in ordinary white light.*

The ultra-violet rays are produced from a specially designed mercury-vapour lamp, the radiation from which is very rich in these rays. The lamp is enclosed in a lantern provided with a special screen opaque to any but the ultra-violet rays (see Fig. 12). The rest of the box is entirely light-tight, so that when other illumination in the room is extinguished the chamber appears completely dark. Actually, however, a beam of ultra-violet light is being projected from the lantern upon the object to be photographed (in Figs. 10 and 12 the object is a French War Bond). Two of these ultra-violet lamps (one on each side of the object) are used.

Some astounding results have already been achieved by means of ultra-violet illumination and photography. As an instance, a large number of French War Bonds were stolen from the French Treasury after they had been paid and cancelled. A forger, using chemicals, removed the handwritten date of payment and the printed date of issue, substituted a new date for the latter, and promptly presented the Bonds for payment. One of the stolen Bonds appears in Fig. 11. From this it will be seen that the Bond is marked as issued on December 25th,

* The relation of the ultra-violet rays to other portions of the spectrum is admirably shown on p. 336 of the June issue of "Conquest."—ED.

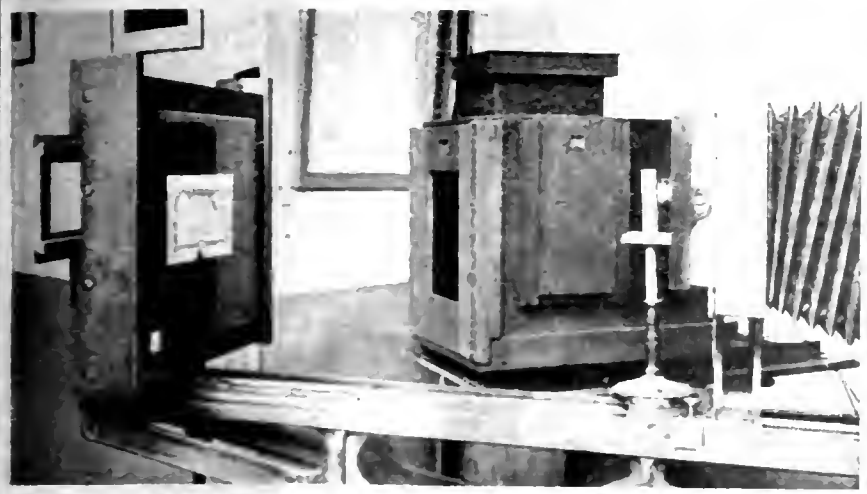


Fig. 12.—A "close-up" view of the ultra-violet lamp box and the Bond mounted for photographing.

Fig. 13.—The photograph by ultra-violet light. Notice how the erased date, "25 Août 20," becomes again visible, although it cannot be seen by ordinary light. This was the original date of payment.

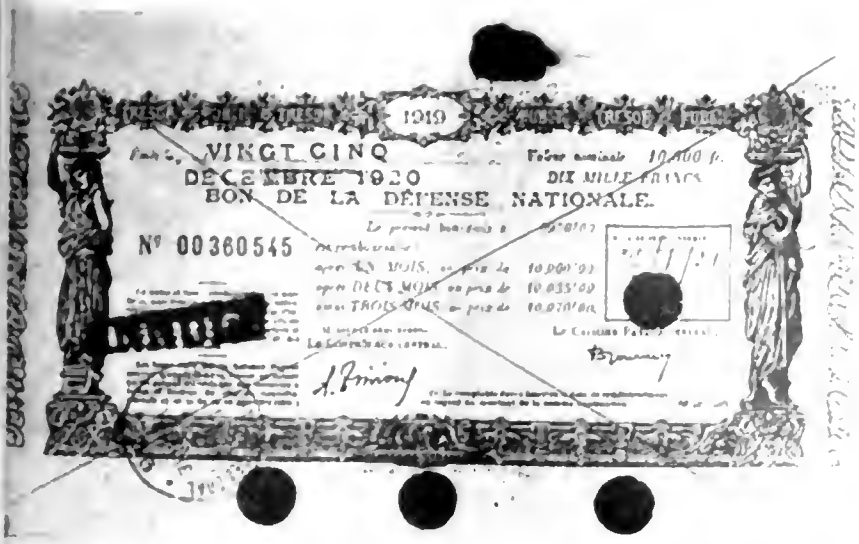


Fig. 14.—Pieces of paper were punched out of the treated and non-treated parts tested with an electrical appliance.

1920 payment being made on January 27th, 1921. The police suspected this Bond to be one of those stolen from the Treasury.

To prove this theory M. Bayle placed the suspected Bond in the holder (Figs. 10 and 12), projected rays of ultra-violet light upon it, and photographed it with the camera. The resulting photograph by ultra-violet light is reproduced in Fig. 13. If the small square-headed "*date de remboursement*" be examined in the two photographs it will be seen that in Fig. 13 the ultra-violet light has shown up very clearly a date—August 25th, 1920 (*25 Août*, 20)—which was quite invisible in ordinary light. It will also be seen that the printed date of issue (*vingt-cinq Décembre*, 1920) disappears in the ultra-violet photograph.

When ultra-violet light falls upon certain substances (for example, sulphate of quinine, nitrate of uranium and certain other salts) these substances become fluorescent, giving off light visible to the eye. In the Bond, practically all the printing and writing was fluorescent. As M. Bayle required to show only those portions of the Bond which were fluorescent under the rays, a special filter was interposed between the lens of the camera and the plate so as to cut off the ultra-violet light and allow only the fluorescent rays to pass through. In this way the result shown in Fig. 13 was obtained.

Having established that the Bond had been fraudulently altered, the laboratory next endeavoured to establish the complicity of the individual at whose house the packet of Bonds had been discovered, particularly as one of his accomplices had been found to be in possession of a pad of blotting paper spotted with chemicals. Was there any connection between these spots and the solution which had served to wash out the ink on the Bond? In other words, had the blotting paper been in contact with the Bonds? The problem presented difficulties insurmountable by ordinary methods, and these were solved by making use of electro-chemical devices.

Students of electricity are well acquainted with the fact that the electrical conductivity of water can be altered by the addition of salts, conductivity increasing with any increase in the quantity of the salt added to the water. M. Bayle possesses highly sensitive electrical apparatus, which enables the slightest variation in resistance of a liquid to be accurately measured. A very high degree of sensitivity is obtained in this apparatus by the employment of a valve amplifier, similar to that used in wireless telegraphy. The apparatus is arranged with a telephone in the circuit so that when a perfect electrical "balance" is obtained no sound whatever is heard. If there is an increase or decrease in the resistance of any portion of the circuit a buzzing will occur. By methods too complicated to be fully described in a popular article this apparatus was used to prove the identity of the liquid on the blotting paper with that used to falsify the Bond.

JACQUES BOYER.

DEATH OF MR. JOHN THOMSON.

We regret to announce the death of Mr. John Thomson, formerly head of the old-established firm of professional photographers in the West-End of London, Messrs. J. A. Thomson. Mr. Thomson died very suddenly from heart failure on Friday last whilst returning from the Royal Societies' Club to his home at Streatham Hill He was 83 years of age.

In the course of his long life Mr. Thomson had keenly followed many literary and scientific pursuits. When little more than a lad he had made enough money by taking photographs in his father's garden in Edinburgh to undertake a tour in China, from which country he returned some years afterwards with many photographs, taken with a home-made camera, and with the material wrote a book, "Through China with a Camera," for which he received a gold medal from Queen Victoria. Afterwards Mr. Thomson took up the manufacture of dry-plates, but his venture was not successful in consequence of the difficulty, in the early days of the dry-plate process, to convert photographers from the use of wet collodion. Mr. Thomson then undertook a second journey in China, and visited many parts of the country not previously explored. He again took a large series of photographs. It was on his return to London that he started a portrait studio in Buckingham Palace Road, removing a few years later to Grosvenor Street, where he remained for twenty-one years, in the course of which time he photographed people of note in this country and from abroad. He was a pioneer in modern studio portraiture, and was one of the first to introduce the pictorial background, which he always painted himself. During his professional life and since his retirement painting and scientific experimental work have occupied his leisure, and we believe that one of his inventions is at the present time awaiting the decision of the Inventions' Commission. The business in which he was so actively engaged for many years is now carried on at 22, Brook Street, London, W., by his son, Mr. J. Newlands Thomson, who for the last few years has devoted himself to colour photography, and of whose work in this field a notice happens to appear on another page of this issue in the "Colour Photography" Supplement.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, September 19 to 24.

Relief Photographs.—No. 25,333. Means of making sculptures and reliefs from photographs.—E. J. Clifford.

Studio Lighting.—No. 25,096. Artificial lighting accessories for photographic studios. J. W. Freckleton.

Apparatus.—No. 24,916. Photographic apparatus. F. E. Hoffman.

Camera Holder.—No. 25,204. Holder for photographic cameras. A. W. Ker.

Camera Device.—No. 24,744. Camera steadier. J. W. F. Littledale.

Stereoscopy.—No. 24,943. Production of stereoscopic pictures. J. F. Lloyd and Baron A. M. de Ott.

Drying Prints.—No. 24,794. Frames for drying photographic prints. A. L. Price.

Cameras.—No. 25,287. Photographic cameras, etc. G. H. Sutcliffe.

Aerial Cameras.—No. 25,137. Cameras for aerial photography. H. D. Wootton.

Distance Calculator.—No. 25,117. Distance-estimator for photographers. C. E. L. Wright.

Cinematography.—No. 24,937. Optical system for cinematograph projection apparatus. A. C. W. Aldis.

Stereoscopy.—No. 24,967. Stereoscopic photo-projection. A. M. Constant and C. H. Palmer.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Colour Cinematography.—No. 100,021 (August 3, 1914). The invention consists in a process of colour cinematography according to which each picture area receives several partial exposures through the same colour-filter.—Pierre Ulysse, Le Val-Pre, Saint Loup, near Marseilles. (Further details are given on another page in the "Colour Photography Supplement.")

Colour Cinematography.—No. 168,100 (April 20, 1920). The invention consists in the making of three-colour transparencies for lantern or cinematograph projection. The positive images from the negative recording the blue-violet sensation are coloured yellow by means of a solution of basic auramine in the presence of basic aluminium acetate. The green-sensation positive is coloured red by means of rhodamine in the presence of acetic acid, and the images corresponding with a yellow-sensation [? red-sensation.—Eds., "B.J."] are toned or coloured blue by treatment with a solution of potassium ferricyanids and ammonia, followed by immersion in solutions of ferric chloride and hypo, and finally of sulphuric acid. Light-filters of methyl-violet 6B, brilliant green and rose-bengal may be used, and the necessity for a protective layer between the component images may be avoided by treating the gelatine film of each image with a hardening solution before the next coating of emulsion is applied. —Serge Michael de Procoudine-Gorsky, The Dell, Croft Road, Sutton, Surrey. (Details of the process are given on another page in the "Colour Photography" Supplement.)

New Materials.

Christmas Card Mounts.—Messrs. Houghtons, Ltd., 88-89, High Holborn, London, W.C.1, send us one of the sample packets of Christmas card mounts which they are offering to professional photographers against remittance of 1s. for the purpose of bringing their season's styles under the notice of portrait studios. The mounts which are included in the collection are all of the folder pattern, and without exception are made of papers of very pleasing light brown, grey, cream, or white papers. Most of them are of postcard size, and provide for the insertion of a postcard print under a cut-out. Some, however, are for prints to be attached within the folder by a touch of adhesive along one edge. The selection is sufficiently varied to represent widely different preferences. Some of the mounts are of the old-fashioned "Christmassy" type, with a certain amount of bright colour, whilst others are in the modern quiet style with relief motto in grey or gold. The prices range from 12s. to 15s. per gross, a reduction being made for three gross and seven gross quantities. The mounts are excellent value, and we have no doubt that Messrs. Houghtons' reminder that orders should be placed at once is necessary in order to obtain delivery of any particular design.

FORTHCOMING EXHIBITIONS.

September 10 to October 8.—London Salon of Photography. Hon. Secretary, London Salon of Photography, 5a, Pall Mall East, London, S.W.1.

September 19 to October 29.—Royal Photographic Society. Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, OCTOBER 9.

Hammersmith (Hampshire House) P.S. Outing to Marlow.

MONDAY, OCTOBER 10.

Bowes Park and Dist. P.S. "Plate Sunk Mounts." J. R. Smith. "Passe Partout Framing." S. Smith.
Bradford Photographic Society. "Pictures of Italian Life." Alex. Keighley, F.R.P.S.
City of London and Cripplegate P.S. Social Evening, musical programme.
South London P.S. "Picture Making in Northern Italy." G. H. Dannatts.
Wallasey Amateur P.S. "Production of a Newspaper." C. Coates

TUESDAY, OCTOBER 11.

Leeds Phot. Soc. Social Evening. Music. Exhibition.
Manchester Amateur Photographic Society. Monthly Meeting.
Morley Photographic Society. Exhibition of Members' Work.
South Glasgow Camera Club. Lantern Slide Monthly Competition.
Tyneside Phot. Soc. "Photographic Lenses." C. J. Young.

WEDNESDAY, OCTOBER 12.

Ilford Phot. Soc. "Camera Portraits with a Portable Light." C. P. Crowther.
Partick Camera Club. "Development of Negatives." A. Dordan Pyke.
South Glasgow Camera Club. "Apparatus and Exposure."
South Suburban P.S. Retouching Demonstration. Robert Coombe

THURSDAY, OCTOBER 13.

Hammersmith (Hampshire House) P.S. "Chartres Cathedral and its Carvings." E. W. Harvey Piper, F.R.I.B.A.
Wimbledon and Dist. C.C. "Faking." M. O. Dell.

CROYDON CAMERA CLUB.

Last week witnessed the opening of the autumn session, following the demise of the informal one which has dealt with varied subjects, not a single Wednesday being reduced to "Conversational," generally signifying the telling of humorous tales, some of reputable kind.

The subject announced for the evening was "Home Portraiture," and the exponent the versatile Mr. A. Dordan Pyke, well known to the club, and an ingennous lecturer who never talks over the heads of the members. Indeed, he is apt to assume the pose of a genial schoolmaster instructing a class of babes and sucklings. This, apparently, is not intended as a special recognition of the mentality of the Croydonians, but doubtless is due to force of habit, for Mr. Pyke discourses airily on many things, in many places, and has to make his themes understood by the veriest beginner.

As a portraitist he is best remembered by a study of Mr. Sellors taken early in the year during a demonstration on flashlight. Advancing towards the sitter, and without any preliminary request to "look pleasant" or anything equally futile, he discharged a flash close to the head of the secretary, whose gasp of astonishment neatly functioned as a trap for descending dust. The portrait was certainly striking, but not one to show an imaginative child subject to nightmares.

Mr. Pyke opened with an apology, as "Home Portraiture," though ready, was not sufficiently so for Croydon, and his discourse, he said, would be entitled "A Story of a Photographer with Two Lenses." In fact, there was no story at all, but merely a set of wholly disconnected lantern-slides, the original negatives having been taken by the "Telecentric" and "Xpres" lenses. Luckily the majority knew that these represented the hall-mark of optical excellence, for the slides, with a few exceptions, most inadequately conveyed this fact. Hardly a good advertisement for the Telecentric, for instance, was an early slide depicting two children on the beach, the negative being so badly under-exposed as to convert their faces into those of niggers.

So obsessed is he with the fear of turning a lecture or demonstration into a "trade" one, commendable up to a certain point, that he gets over this difficulty by avoiding the real subject under consideration so far as possible, only allowing oblique references to it to escape occasionally. However, he jog-trots along in his own gay and festive fashion, and the evening passes pleasantly enough.

In the discussion some members kindly supplied much practical and interesting data relative to lenses in general, and the Telecentric and Xpres in particular, which were very highly spoken of. In reference to the lining of lens-hoods, Mr. Sellors said Dr. Mees many years ago had found that the dead-black paper which undertakers use for lining coffins was the most effective; it had a most depressing effect upon the light entering. A hearty vote of thanks was accorded Mr. Pyke for a discourse which, with alterations and additions, is capable of being worked up to a first-class lecture.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice is given of the dissolutions, by mutual consent, of the following partnerships:—(1) Between Arnold Vincent Eckersley and John Edward Norman, carrying on business as portrait and commercial photographers, at 35, High Street, Chatham, Kent, generally under the style of A. T. Honey or A. T. Honey and Co. and occasionally as Norman and Eckersley. All debts due to and owing by the late firm or partnership will be received and paid by Arnold Vincent Eckersley, who will continue to carry on the business at the above address in his own name. (2) Between Lawrence Percival Raven Pritchard, William John Brinkley and Russell Hudson, carrying on business as commercial illustrators and block makers, at 34, Gray's Inn Road, W.C., under the style of The Pritchard Photographic Company. All debts due and owing by the late firm will be received and paid by Lawrence Percival Raven Pritchard and William John Brinkley, who will continue to carry on the business.

NEW COMPANIES.

KINOPOSTERS, LTD.—This private company was registered on September 24, with a capital of £3,000 in £1 shares. Objects: To carry on the business of automatic advertising contractors, photographers, publishers, printers, etc. The directors are: E. L. Smith Masters, Embrook, Wokingham, Berks, and L. W. Blakiston, 67, Broad Street, Reading. Qualification: £100. Secretary: E. L. Smith-Masters. Registered office: 67, Broad Street, Reading.

News and Notes.

LONDON'S FOG FILTER.—The need of artificial light in London studios is obviously very great during foggy days. Describing to the British Association an instrument for recording suspended impurities in the air, Dr. J. S. Owens, of Westminster, said that during a dense London fog there was probably suspended overhead 200 tons of soot. That was the quantity emitted every winter's day from domestic fires between the hours of 6 and 9 a.m.

THE TRAILL TAYLOR LECTURE.—As already announced, the twenty-fourth Traill-Taylor Memorial Lecture will be delivered by M. L. P. Clerc at the house of the Royal Photographic Society, 35, Russell Square, on Tuesday next, October 11, at 7 p.m. The subject of the lecture is "Aerial Photography and Photo-Topography," and M. Clerc will illustrate his discourse with a large number of lantern slides and with a demonstration of stereoscopic lantern projection by the Anaglyph method.

CROYDON CAMERA CLUB.—The redoubtable Mr. Sellors has brought together a formidable programme of fixtures for the meetings of the Croydon Camera Club. During the present month Mr. K. C. D. Hickman will lecture on processes of colour photography, and Mr. Elwin Neame will take a life model to Croydon, and give a demonstration of posing for advertisement photographs; and Mr. Sellors himself, at a later meeting, will demonstrate a method of exposure in bromide printing and enlarging which is both "rational and reliable." The full programme shows that Croydon continues to exhibit a flood of energy, and that its meetings (at 128a, George Street, on Wednesdays, at 8 o'clock) will be as well attended as ever.

THE LATE MR. C. BRANGWYN BARNES.—We are very sorry to hear of the death on September 15, at the age of 64, of Mr. C. Brangwyn Barnes, who had been connected with the photographic profession for the past forty-five years, and had been an occasional contributor to the "British Journal" during almost the whole of this period. Mr. Barnes during the last few years had endured a very painful illness with great fortitude, and up to within a few hours of his death occupied himself with literary work.

200,000 PHOTOGRAPHS PER MINUTE.—Mr. C. Francis Jenkins, of Washington (who was stated in our correspondence columns recently to have been the originator of America's first cinematograph show), has just introduced a new film camera, which, he states, will take 200,000 pictures per minute. The camera is specially made for slowing down and studying (on the screen) the movement of bullets, propellors and other rapidly-moving objects. Pictures taken with this camera slow down normal speed two hundred times, which is to say, an exposure of one second in the camera is extended to two hundred seconds when projected upon a screen. Prisms are used instead of the usual shutter and intermittent movement mechanism.

PHOTOGRAPHIC TRADE'S GOLFING SOCIETY.—A golf club has been formed among members of the photographic trade, and its activities were recently begun by a contest at the Bushey Hall Golf Club between teams captained by Mr. E. W. Houghton and Mr. G. M. Bishop. The following committee has been appointed to make future arrangements:—Messrs. C. S. Downing, D. Geddes and S. S. Bojesen. Information regarding the Society may be obtained from members of the committee, and from the following others who have expressed their intention of joining the Society:—Messrs. A. C. Brookes, W. H. Burditt, P. W. Greenwood, H. W. Hall, Thomas Illingworth, T. M. Illingworth, F. J. Mortimer, H. H. Ward, J. B. B. Wellington and Geoffrey Whitfield.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

BROMIDE PRINTING BOXES.

To the Editors.

Gentlemen,—With reference to the paragraph in the "British Journal" of to-day headed "A Printing Hint," we notice that it is pointed out that the great fault in many printing boxes is a lack of means for controlling the light.

We should like to say that this trouble has been got over by the production of our X.L printer, in which the light can be raised or lowered from the outside of the box so as to allow for the density or weakness of the negative, and with all these machines there is also supplied a ground glass diffuser.

Many of these X.L. printers (which were used by the Army and Air Force during the war) are now being supplied by us to the photographic trade, and, we understand, are giving complete satisfaction.—Yours faithfully,

For and on behalf of F. BRODRICK, LTD.,
C. B. SMITH, director.

50, High Street, London, W.C.2.
September 30.

ACTION OF INSECTS ON GELATINE.

To the Editors.

Gentlemen,—Those who read your article under the above heading in your last week's issue may be interested in the following:—I have had for a number of years portable dark-rooms for use at military camps. As a rule they are built on grassy ground. The earwig is, to my mind, the chief offender. In bygone days I have had negatives utterly ruined by the little brutes, and in consequence I have long since guarded against them by standing the drying racks in a shallow tray of water, so forming a moat around the negatives; the negatives being, of course, raised above the water.

I was surprised only a day or so ago to find a plate with the edges eaten away. I suspected an earwig, and on examining the wooden rack I found one in a crevice I don't suppose it swam the moat, as doubtless it was on the rack when I put it in the water tray.

The designs it executed on the plate led to further designs in the execution business. I would emphatically add: Beware of earwigs.—Faithfully yours,

CHARLES LANE

Maresfield Park, Sussex.
October 3

EXHIBITION V. COMMERCIAL PORTRAITURE.

To the Editors.

Gentlemen,—I am a little bewildered and troubled in mind. I have "done" both the R.P.S. and London Salon shows, read Mr. Tilney's and other learned dissertations on the exhibits, and yet I do not feel satisfied. I cannot quite understand the position of the average portraitist, or what he must do to improve his business. The two big annual shows are unsettling, and are not nearly so useful to the average "bread and butter" photographer as the little show the P.P.A. get together at the Horticultural Hall each spring, and even this little show can—and I hope will—be improved and made of even greater service to those who, like myself, have to make portraits of all comers.

The only picture that keeps well in my mind after making visits to the two shows is "Mrs. M. W.," by Mr. E. Drummond Young, of Edinburgh. Mr. Tilney, in his criticism published in your pages, calls this "one of the most taking portraits . . . a most pleasing result," and most, if not all, professional workers will agree with him. It is the only picture I have seen this year that stimulates me, and the only one I wish to emulate. Between really good professional studio portraiture and exhibition—and High Art if you like—examples, there appears to be a big gap, and pictures made to fill this gap are useless, both artistically and commercially. W. Crooke, W. Thomas, and maybe a few others, appear to get over this gap very well, they producing really artistic portraits commercially (excellent as examples of technique and of exhibition standard, and not out of place in either class or section), but the average worker fails to do so. High Art portraiture, so-called, is to most studio workers a veritable will o' the wisp.

Most exhibition "portraits" are—in a commercial sense—not portraits at all, but fancy, freakish, and theatrical things which would not pay a studio worker to produce, even if he could. And as an example "Portrait of a Lady," by Miss Margrethe Mather (reproduced in the R.P.S. catalogue), may be named. No professional worker would dare to offer a "portrait" of this type to a customer, and to exhibit such a picture in his show-window, would make him the laughing stock of his town; he would be labelled a crank and his business would suffer. Happily the example named is American, and it would be interesting to know what America's new ambassador, Mr. Pirie Macdonald, thinks of it.

The examples of portraiture produced by Mr. C. P. Crowther are perhaps the most talked of pictures of the year, but no professional studio worker, I think, wishes to do work like it, because of its utter uselessness, except, of course, for show purposes. Mr. Crowther's "Showman's Wife" (labelled by one critic as "the picture of the year") would form an excellent attraction for a photographer's window, but I doubt if it would bring him any customers.

About thirty years ago, when I was a lad, I lived in a town where one of the professional workers—Mr. R. H. Lord—made it a rule to exhibit at the (now) Royal Show, and his accepted pictures were always exhibited in his window where they were a great attraction. I never heard that they brought him any business. One, however, never saw the slightest trace of any "exhibition" work in the portraits he produced commercially. The two branches of work were kept quite distinct; had he attempted to combine them he might not have been the successful business man he was.

The novelty, and possibly the charm, of Mr. Crowther's beautiful studies wears off, or becomes very thin, when one studies them very closely and learns of the conditions under which they were made. They are mainly theatrical in reality as well as in appearance, and given such models, whose life is one of posing and expression, most studio workers could produce similar results. Far more skill is required to produce a studio-like—and apparently commercial—portrait like "Mrs. M. W.," or of anyone else not accustomed to posing daily, or of fixing for a time any expression called for. I see, by the way, that Mr. Tilney comments on one exhibited portrait as being "slightly spoilt for me by a kind of actor's excess of muscular mobility about the mouth." The keen artistic eye of Mr. Tilney detected the little defect.

The best professional work, and that of the greatest interest to average studio workers, is to be found exhibited by paper manufacturers on the staircase at the R.P.S. Manufacturers, it is interesting to note, always use technically perfect negatives—good, clean every-day examples of artistic studio (professional) negatives—for producing prints to represent the excellent qualities of their wares, the public never seeing a "faddist" or High Art picture upon a showcard, or in an illustrated advertisement of lenses, plates, and papers, a fact that should encourage and stimulate the photographer who has his living to get.—Yours faithfully,

GODFREY WILSON.

AMERICA'S FIRST "MOVIE SHOW."

To the Editors.

Gentlemen,—Some correspondence has lately appeared in your journal concerning the first exhibition of motion pictures on the screen. The subject has been one discussed a good deal of late, and national prejudices have had some play in the matter.

In the March issue of "Le Photographe," Ernest Coustet gave an outline of the history of the motion picture, leaning too much towards giving France the honours. Apparatus for the purpose of exhibiting apparent motions are of early date, but for the exhibition of pictures obtained by photographing the moving objects themselves, the United States appears to be in the lead. Mr. Jenkins, in his book entitled "Animated Pictures," points out that in 1861 Coleman Sellers, of Philadelphia, took out a patent, No. 31,357, for pictures on an endless band, and Jenkins regards this as the first ever made in a camera, so as to give the appearance of objects in motion.

In 1870 Henry R. Heyl exhibited at the Academy of Music, in Philadelphia, in the course of a lecture given under the auspices of the Franklin Institute, several scenes projected on a screen, using photographs a little over one inch, taken directly from the moving objects. These motions were of a pair of waltzers and some acrobatic performers. The waltzing scene was shown to the accompaniment of appropriate music by an orchestra.—I remain, with respect,

HENRY LEITMANN.

The Franklin Institute, Philadelphia.
September 19.

PLATES v. FILM.

To the Editors.

Gentlemen,—I have followed with much interest the discussion on the relative merits of films and plates arising from Messrs. Kodak's intimation that they are discontinuing the manufacture of plates.

It should always be borne in mind that very few men in any trade or profession see "eye-to-eye," and surely the same thing applies in photography. What one man considers almost his ideal is probably impossible to the next man, and in my mind this applies to the use of plates and films.

Almost from the introduction of Kodak Portrait Film I have used this product, and as I said some time ago in an interview given to the Kodak people, I use film simply because it enables me to make better negatives. Dismissing all question of price and consequent economy of working, and leaving out altogether the weight of outfit and storage in my technical work, I obtain better negatives on film than I have done on plates. And one of the very finest testimonies to the film is the entire absence of that bugbear of technical workers, viz., halation.

My experience is that there is only one branch of photographic work where the plate is preferable to the film, and that is in very high-power photo-micrography, where the plate surface is more likely to carry accurately than the film, for the very slightest warp is fatal to this kind of work.

In conclusion, I cannot but think that the Kodak people have given the very fullest consideration to their policy of the discontinuation of plate manufacture. Such a huge, and in every way prosperous, concern as Messrs. Kodak, Ltd., has not been built up by making foolish mistakes, and, after all, perhaps we shall come to thank this concern for reminding us that we are all liable to become old-fashioned.—Believe me, very truly yours,

SAMUEL GRIMSHAW,
Photographic Department.

Ford Motor Company, Manchester.

To the Editors.

Gentlemen,—In the correspondence on this subject freedom from halation is generally included in the virtues allotted to the film, but, according to my experience, a film halates under exactly the same conditions as an unbacked plate.

The halo is certainly less spread, but more intense in proportion to the thinness of the celluloid.—Yours very faithfully,

EDGAR WARD.

20, Westfields Road, Acton, W.3.
October 1.

To the Editors.

Gentlemen,—In this correspondence I note that several writers consider it quite the thing to introduce a personal note. I consider it is very unprofessional, to say the least. Those who are satisfied that films suit their work better than plates will, of course, continue to use them. Those of us who are not convinced that the good points overcome the bad, will continue to use plates.

Personally, I am not at all convinced that film is of such all-round usefulness to a professional as plates. I am not comparing the emulsions, but the support. The film has three advantages, viz.: Lightness, non-halation, unbreakableness.

For studio work, weight does not matter, and surely breakages are rare? I have not had a negative broken for nearly two years, and only two in four years, so that these two "advantages" can be eliminated entirely. The question of halation is an old one, and has been the subject of countless papers. In this I agree that films score heavily, and for special work where halation is likely to be apparent I should be prepared to use film in preference to bother with backing.

Three parts, or more, of a professional's work is not undertaken under such strong lighting as to cause trouble from halation, neither does the average portrait photographer want to work against the light, or use freak lighting, because his clients would not have it. The fact that one man builds up a reputation on odd effects does not justify others in copying his methods.

I now come to the drawbacks of film, viz., its soft and easily damaged back, its too great flexibility, especially in a humid atmosphere such as we have in Cornwall, and its inflammability.

In my fairly wide experience of twenty-five years I have found it is quite as much as one person can attend to to prevent the *film* of a plate from getting damaged in the various handling which it has to undergo in the average business. To add to that a back which is almost as delicate is asking too much.

We cannot all have baize-covered benches in dark-room and work-room, and we certainly cannot have a staff of careful experts. It takes years to teach the average assistant to care properly for the *face* of a negative, let alone the back.

Apart from that, my own experience was that wherever the air was damp the backs of these films got so tacky they picked up all kinds of dust and dirt on their own account, and the only way to clean them was to put them into water, while a glass plate will stand any amount of cleaning.

My other point of objection is the difficulty of putting work on the back in the way of matt varnish, or dabbing on colour locally.

Someone said it was possible to retouch on *both* sides. Personally I have never wanted to do such a thing. A negative must be a pretty hopeless one if it has to be retouched on both sides; the less retouching there is on the better.

Their flexibility is too apparent in drying; instead of having a few draining racks the rooms would be festooned with dripping films

Then when all these trials and tribulations are over, and the film has passed through the nursery and been packed away, we shall always have a worry at the back of our minds as to what may happen in case of a little flare up in the stock room, or wherever they are stored.

Of course they will not fire unless a light is put to them, and no one would do that wilfully. Still, accidents will happen, and if a flare up occurred in the place a few buckets of water would probably extinguish it if *glass* plates only are stored, but if there are a few thousand films there, it would be a job for the fire brigade and as for sleeping in the same premises with a lot of films stored—no, thanks!

For special work I am not so prejudiced that I should refuse to use films, but for regular work I am sticking to glass plates.—I am, gentlemen, yours faithfully,

ANDREW C. GLOVER.

The Gainsborough Studio,
St. Ives, Cornwall,
October 3.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply, 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

O. G.—"The Professional Photographer" is published by Messrs. Kodak, Ltd., Kingsway, London, W.C.2, and "Popular Mechanics" at 239, Fourth Avenue, New York, U.S.A.

E. D.—We are afraid there is no remedy for reticulation produced by the mercury-ammonia process. The most common cause is the use of too strong a solution of mercuric chloride. Also, you should keep all solutions at the same temperature as far as possible. Too strong a solution of ammonia likewise tends in the same direction.

F. B.—Pinholes can be stopped in the blind by means of rubber solution, as used for cycle tyre repairs, mixed with fine vegetable black, but it doesn't make a permanent job. We think it is far better to have a new blind fitted, which you can have done by Messrs. Peeling and Van Neck, Ltd., 4-6, Holborn Circus, London, E.C.1.

L. V.—Non-electric installations for the studio are as follows:—Acetylene: R. J. Moss and Sons, 98, Snow Hill, Birmingham. Gas (incandescent mantles): "Howellite" of Messrs. J. J. Griffin and Sons, Ltd., Kemble Street, Kingsway, London, W.C.2. Incandescent oil lamp: Blanchard Lamps, Ltd., 151, Farringdon Road, London, E.C.1.

M. Q.—There should be no difficulty in substituting half-watt lamps for the mercury vapour tubes as far as the stand is concerned, but as the half-watts require a much greater amount of current it is very doubtful if the wiring would stand it. It would be very wasteful to use a resistance with half-watts. You should procure lamps to work at the full voltage of your local supply. We should advise you to do nothing without consulting an electrician.

E. D.—We have no experience of using an aluminium saucepan for heating up the hypo-alum toning bath, but we don't suppose it would do any harm to the bath. At the same time, we would prefer to bring the bath up to temperature by means of an outer hot-water tank. If you spread out the bath more by putting it in a dish which is contained in an outer vessel of water it would heat up quicker. Messrs. Illingworth supply—or used to supply—an outfit of this pattern.

J. D.—The mirror requires to be of the best optically worked surface, and it would be an entire mistake to attempt to make it yourself. You had far better pay the price of getting a satisfactory one, say, from Messrs. Adam Hilger, Ltd., 75a, Camden Road, London, N.W.1. Focussing is done in exactly the same way as when the mirror is not attached to the lens, the only difference being that you point the camera in one direction and photograph in a direction at right-angles.

H. G.—Every now and then a catatype method of making photographs turns up in the newspapers. The principle of printing by this means was gone into very thoroughly by the Germans some ten or fifteen years ago, and was not then found practicable. Some improvements may have been made, but we doubt it. So far as we know there is no more economical or practical method of making copies than copying the original in the camera on bromide paper. As you say, by using a reversing prism or mirror you can obtain direct copies in white letters on a dark ground. You could, if you liked, avoid the use of a prism by making the copies on Transferrotype paper, and stripping off on to another paper support.

A. J.—The commercial postcard which you send is no doubt from a copy negative on which the titling is done as follows:—A piece of the film in the position shown on the margin of the negative is scraped away and the negative of the lettering applied to it. This negative is made by setting up the lettering in type and photographing a proof; or, of course, the title and number can be written in black ink and likewise photographed. The negative is made on a process plate and stripped off on to the view negative by means of hydrofluoric acid. After transference to this latter, the view negative is blocked out to a rectangular shape leaving uncovered the two areas (number and title) occupied by the subject matter of the title negative.

R. B.—Albumenised paper is now quite unobtainable, at any rate in this country, and we think also in Germany, which previously was the principal producer, but that was 25 or 30 years ago. We dare say you will have some little difficulty in getting a suitable plain paper for albumenising and sensitising. Probably the best thing you can do, if you want to albumenise only small quantities, is to go to a firm which makes various pure papers, such as Olive and Partington, 12-13, Upper Thames Street, London, E.C.4. Probably the makers of raw papers for emulsion coating have not a thin paper which is suitable for albumenising and, moreover, want some persuasion to supply a small quantity. However, you might try them, namely:—Wiggins, Teape and Co., Ltd., 10, Aldgate, London, E.1; Alex. Pirie, Union Mills, Aberdeen. Burton's book gives the most thorough instruction in albumenising and sensitising.

THE BRITISH

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Contents.

SUMMARY.

Mr. F. F. Renwick, F.I.C., in an article prompted by the appearance of the second edition of Dr. Lüppo-Cramer's book (referred to on another page of this issue) draws attention to the importance of the chemistry of substances in the colloid state in connection with photographic processes, and stresses the necessity of greater study of photographic problems from this point of view. (P. 607.)

In a recent issue of "La Nature," M. Jean Brizon examines some of the grounds on which the production of pseudo-relief effects in projection are claimed. (P. 608.)

At the Royal Photographic Society on Tuesday evening last, M. L. P. Clerc delivered the Traill Taylor Memorial Lecture, and dealt at length and by the aid of many illustrations with aerial photography and its application to map making. (P. 614.)

At Croydon last week the vagaries of the Bromoil process provided an interesting event. (P. 614.)

The abominable quality of many lantern-slides used for commercial purposes still remains a deterrent from the more extended use of this form of photograph. In a leading article we lay emphasis upon the opportunities which may be cultivated for the supply of lantern transparencies for various descriptions of advertising. (P. 606.)

An active discussion on the place of artistic in commercial portraiture will be found in letters from Messrs. George J. Hughes, F. C. Tilney, and Marcus Adams on pages 618-619.

In the recovery of platinum metal from the spent developing and acid baths in the platinum printing process, the acid clearing solutions must on no account be neglected, since a large proportion of the developer is carried over into them. (P. 605.)

Trial of their suitability for posing purposes, by seating a model in them, is an advisable measure in purchasing chairs for the studio. (P. 606.)

Ample provision in the shape of protection of the camera during outdoor use is a precaution requiring to be taken by those employing their apparatus largely out of doors during the winter season. (P. 606.)

The making of positive prints direct by means of phosphorescent substances and the design of an automatic ferrotype camera are the subject of recent patent specifications. (P. 611.)

A method of increasing the sensitiveness of bitumen to light is described by a contributor to "Photo-Mechanical Notes," where also a recent process for the direct making of half-tone negatives for chromo-litho illustrated. (P. 610.)

A pretty example of judicial wit and acquaintance with the commercial side of the photographic industry is reported on page 612.

The use of self-toning paper for making finger-prints is described by a correspondent. (P. 617.)

EX CATHEDRA.

Posing Chairs. More care is needed in choosing chairs for studio use than might at first thought be imagined. It is not enough that the design should be attractive or that it should be a correct copy of a good antique original; it must be comfortable to the sitter, and its lines and dimensions must lend themselves to graceful posing and correct composition. There are many chairs of which the arms are extremely obtrusive. If the sitter's arm is allowed to rest upon them it is raised too high, making the pose strained and awkward, while if the arm is kept inside the chair the lines of the latter ruin the composition. It is therefore highly desirable for the photographer to be accompanied by a lady model when selecting his studio furniture. Another point which must receive attention is the height of the seat. As a rule, the chairs sold for studio use are too low for any but short people, and give a "bunched up" appearance to tall sitters. One photographer we know got over this difficulty by splicing the legs so as to make them a couple of inches higher. A very useful addition is two or three firmly stuffed cushions with square edges, like a mattress, which can be used to raise the sitter as may be needed.

* * *

Platinum Residues. The continued high price of platinum metal makes it still most important, as a measure of economy, to recover the platinum which passes out of the prints into the developing and clearing baths, for the money which is obtained in this way represents a substantial reduction on the price of platinotype paper. A correspondent reminds us of this by quoting his satisfaction at recently receiving a cheque for £12 for the platinum recovered from the working baths. In this connection it is worth while to emphasise the fact that the acid baths must not be neglected as sources of the precious metal. While theoretically the surplus platinum salt contained in the paper passes into solution in the oxalate developing bath, in practice a very considerable proportion of it finds its way into the first acid clearing bath, and to a much smaller degree in the subsequent clearing solutions. This arises from the fact that the developing solution is carried mechanically into the first clearing bath in considerable proportions. Some recent tests have shown that five whole plate prints, on removal from the developer to the clearer under the ordinary conditions of draining, convey into the acid bath one fluid ounce of the developing solution. It does not require much calculation in order to see that where a number of prints are being handled, the clearing bath very soon becomes a mixture of developer and clearer; and a considerable quantity of the platinum metal will be lost if it is not recovered from the clearing solutions. Those unfamiliar with the method of throwing-down the platinum from the spent baths may obtain an instruction circular from the Platinotype Company.

For the Out-Door Worker. The out-of-doors photographer cannot always choose the weather conditions under which his exposures must be made, and the time of year is now fast approaching when certain precautionary measures should be taken, not only with a view to facilitating successful work under bad conditions, but also that it may be undertaken without risk of damage to the apparatus and as easily as possible for the photographer. One of the greatest difficulties lies in keeping the cloth over the head while focussing, whilst allowing one hand to be sufficiently free to manipulate the rack and pinion. This may be materially assisted by having an elastic loop fitting tightly over the cloth, round the back-frame of the camera. It is then an easy matter, even in a strong wind, to hold the other end of the cloth, while the other hand is quite free. This is a better plan than weighting the corners of the focussing cloth. When photographs have to be taken in the rain, an extra long hood of stiff cardboard, or even an old P.O.P. tube, may be made to serve for the purpose of protecting the lens from rain drops. This will be found of great service, though it can only be employed when the exposure is made with a shutter. Another cause of annoyance is the sinking of the tripod points into the ground, if this is very soft after heavy rain. This may occur so rapidly as seriously to impair the definition while the exposure is being made.

COMMERCIAL LANTERN SLIDES.

Judging from the specimens of advertising slides which form the prelude to many cinematograph performances, particularly in the provinces, it would appear as if the art of slide making had reached its lowest level, as far as professional workers are concerned. The public cannot fail to compare them with the generally excellent quality of the films, and to conclude that the "still" slide is an inherently inferior article. As a rule, the images are harsh and wanting in detail, while the colouring consists of coarse smears of the primaries. This state of things cannot fail to react very prejudicially upon the demand for slides for advertising purposes, as manufacturers who are in the habit of issuing artistic posters and show cards are not likely to spend money upon bad transparencies. This attitude is clearly demonstrated by the fact that most of the slides shown at cinemas are advertisements of local traders, those of the great manufacturers being conspicuous by their absence.

Given slides of good quality, we are convinced that a practically unworked field is open to any enterprising worker, who has the necessary organising instinct and a moderate amount of capital.

Another field would be found in the preparation for shows at the advertisers' own premises or at suitable outdoor positions. For many years a firm of Regent Street photographers displayed portraits of the celebrities of the day and snapshots of current happenings, which formed a perennial attraction to passers by. It would take too much space to go into details as to the nature of the subjects to be shown, but one or two examples may help to make our ideas clear to the reader. At the present season winter clothing is coming forward. Here is an opportunity to show slides of attractive mannequins in fur coats; in the summer, both in London and at the seaside, interesting snapshots would help to sell cameras or film.

This idea is one which may be worked out on any scale from one covering the entire country to one suitable for a small district. If we consider a seaside resort, we have the char-a-bancs proprietors who would probably support a series of views of the show places around, entitled, "Where we take you." The outfitters could show happy children in their eight-and-eleven-penny suits, bathing costumes and caps being another good line, and the photographer himself could demonstrate the quality of his portraits.

There is yet another opening for good slides, namely, as an aid to the commercial traveller or manufacturer's agent. A little while ago the rather ambitious idea of using a portable cinematograph apparatus was exploited, with what success we do not know, but it struck us as being not easily workable. Films are expensive and soon get out of date, but slides can be prepared quickly and cheaply, and the latest goods may be illustrated. As electrical installations are universal the lighting question presents no difficulties, since a focus-type half-watt lamp with adjustable resistance will allow any convenient lamp socket to be utilised, the projector itself being no larger when closed than an ordinary reflex camera.

It is hardly necessary to indicate to a business man the utility of such an installation. At his own headquarters he can show pieces of furniture or machinery in their actual size after the original articles have been sold, while a smaller scale can be employed for displays at the hotel sample room or upon the customers' premises.

Although so many bad slides are to be seen, the production of good ones is not a difficult task, and any decent bromide printer can soon learn the art, which does not differ greatly from the production of paper prints. A rather slow brand of plate is easiest to work and gives the most brilliant results. Unless the negatives have been taken specially, contact printing is not possible, so that some method of reduction is necessary. If daylight be used to illuminate the negative a suitable reflector must be used, and an ordinary swing toilet glass answers the purpose admirably, care being taken that no sash bars in the studio intercept the light. In most cases artificial light will be found most convenient, and an ordinary enlarging lantern affords the readiest means of working, the procedure being the same as for enlarging, with the exception of the substitution of a short focus lens for the ordinary enlarging objective. A very simple way is to remove this altogether and to use an ordinary camera and lens, the latter projecting into the front of the lantern. Absolute sharpness is essential, and to secure this a fairly small aperture, say $f/16$, should be used, except for very dense negatives. Full exposure should be given and a strong well-restrained developer used, the plate maker's formula being usually the most suitable. The occasional worker will, however, find most standard negative developers to work well with the addition of a little bromide solution, as it is essential that there should not be the slightest trace of fog. A test for this is to press the film side of the dry, but uncovered, slide into contact with a piece of white paper, which should be untinted under the highest lights. If there be a slight veil, or if the sky of a landscape be too heavy, the slide may be brightened up by using the iodine cyanide reducer, which does not affect the colour. Thin slides may be strengthened with the chromium intensifier, or if considerable intensification be necessary with mercuric bromide and silver cyanide. It is important that slides should be bone dry before binding up, as any dampness in the film will cause deterioration when the slide is subjected to the heat of the lantern.

The appearance and value of an advertising slide is greatly enhanced by judicious colouring, and for slides which have to stand much work, oil or varnish colours should be used, copal varnish being the most suitable medium. Only transparent colours must be used; such metallic compounds as vermilion, chrome yellow and the ochres appear nearly opaque upon the screen.

COLLOID CHEMISTRY AND PHOTOGRAPHY.

In the part of Essex where I live the water supply is moderately hard, and in certain districts the water has to travel long distances through iron pipes, and often appears of a clear, pale-green colour when run to a depth of 10-12 inches in a white enamel bath; moreover, a bath sponge in the course of a few months assumes a deep brown hue. The green colour of the water is largely due to dissolved iron, probably in the form of ferrous carbonate. A wet sponge, from its highly porous nature, offers an enormous surface to the air, and the iron gets rapidly oxidised to ferric hydroxide which stains the sponge brown. No amount of washing in the water of this district will remove the colour. In the language of colloid chemistry the sponge strongly "adsorbs" colloidal ferric hydrate. When, however, I visited Manchester early last year and took my brown sponge with me, I was at first rather startled on proceeding to use it, to find I was rinsing my face in a coffee-coloured fluid, and thought the mischievous son of the house was up to some prank. It soon became apparent, however, that the sponge was rapidly recovering its pristine pale yellow colour, and after a few days its appearance was nearly normal, but it reverted to its former muddy hue soon after my return home. In this domestic incident we have an excellent illustration of one of the phenomena (adsorption) with which colloid chemistry concerns itself, and which are so common in almost every aspect of photography. Indeed, it is not too much to say that photographic chemistry is more concerned with the chemical behaviour of adsorption complexes than with the more generally understood reactions of ordinary chemistry. This fact is not so well appreciated by British photographers as it deserves to be, and therefore comparatively few have taken the trouble to acquire a knowledge of the elementary principles of that rapidly growing branch of science termed colloid chemistry, which deals with the peculiar effects that result when substances present an enormous surface in proportion to their mass.

The publication of a second edition of Luppo-Cramer's "Kolloid-chemie und Photographie" should not pass unheeded by British photographic chemists, or they will surely wake up one day to realise that they have slept while Germany made progress. Let us consider for a moment a few well-known photographic materials and processes from this point of view.

The difficulty of getting glass, which has once been emulsion-coated, sufficiently free from foreign matter for use a second time was well known to every photographer in the days when the collodion wet plate was the only one available, and during the war when large quantities of old negative glass were returned to the manufacturers for re-coating, it is probable that not a few cases of spoilt negatives were attributable to adsorbed impurities which the cleansing process had failed to remove, while it is certain that the manufacturers had to spend so much time, money, and labour on the problem that many of them regretted having touched it.

Gelatine is a typical colloid, with as many outstanding problems as there are facets to a housefly's eye. Possessing nearly equally-balanced acid and basic characters it is capable of displaying the most diverse properties according to the milieu in which it finds itself. Both in its physical and chemical characteristics it displays a remarkable memory of its previous history, owing partly to its power of adsorbing acids and bases and the hydroxides of the heavier metals, as well as a large variety of organic materials such as dyes, photographic developers, etc., and partly to the fact that solutions of gelatine near the setting point and the gels formed by further cooling possess some sort of complex physical structure which varies with the previous thermal treatment.

Paper again contains at least three, and generally more, colloids, viz.:—Cellulose, resin and alumina, besides dyes and sometimes other materials such as casein, and earthy loadings (for example, kaolin or barium sulphate), all of which present problems to the student of colloid chemistry.

When we turn to the processes employed in the use of photographic materials we are again impressed with the enormous extent to which we are dependent on phenomena of a colloid-chemical character. Print-out emulsions, whether they have been made in gelatine or collodion (another typical colloid), contain silver chloride and citrate in a colloidal condition and the purple photographic image formed during printing consists of colloidal silver. There is also strong evidence for the belief that when we expose a dry plate and form a latent image this latent image likewise consists of an exceedingly fine-grained form of colloidal silver within and upon the surface of the silver bromide grains.

One of the characteristics of all colloids and fine suspensions is that the ultimate particles of which they consist bear electric charges, some colloids carrying a positive and some a negative charge, and when this charge is neutralised the particles are either thrown out of suspension or solution or the characteristics of the solution are markedly modified. These charges can often be neutralised by the addition of opposite charges attached to other atoms or molecules in the form of a solution of a mineral salt or by oppositely charged colloid particles. For instance, an excess of any acid suffices to supply the positively charged hydrogen ions required to precipitate the albumen from white of egg or rubber from the latex, a colloidal solution of alumina or ferric hydrate (positively charged) will form an insoluble adsorption complex with a weak negatively charged gelatine solution. A suspension of fine particles of any kind, which may take weeks to settle, can be precipitated easily and rapidly by analogous methods, as is well known in connection with many systems of water purification. On the other hand, such suspensions, which are often very unstable, can be made extremely durable by the addition of certain colloids such as gum or gelatine. The possibility of preparing photographic emulsions largely depends on the stability conferred on the negatively-charged silver bromide particles by the protective action of the negatively-charged gelatine vehicle.

Other instances in which recent work in the department of colloid chemistry is of great assistance in guiding the experimenter in photography are the numerous applications of dyes, as colour sensitisers, as desensitisers, as toning agents in the mordant process of dye toning, the use of various metallic salts for tanning the gelatine of negatives where it contains a silver image, or again in the study of the causes and the avoidance of discolouration of the gelatine of prints or lantern slides during toning in various solutions, and so on.

It is impossible in a short note to do more than touch upon a few of the colloid-chemical problems which photography offers so abundantly, but there is scarcely a single photographic operation which does not involve the application of some property peculiar to matter in the colloidal state, and photographers will do well to acquaint themselves with the contents of Dr. Lüppo-Cramer's book. For those unacquainted with the elementary principles of colloid chemistry some general reading on the subject is advisable as a preliminary. Those who do not possess a copy of the first edition, published in 1908, should endeavour to procure one, since it covers a wider field than the second edition, which has just appeared, and which is devoted too exclusively to the author's own recent work to be a reliable guide for the general reader.

Many of the experiments he describes are very interesting, and must be accounted for by any satisfactory theories concerning photographic phenomena. It is perhaps necessary, however, to warn readers, since he seldom deals satisfactorily with other workers' views, that Lüppo-Cramer's explanations are not by any means generally accepted.

ingenious and suggestive of further modes of attacking these problems though they often are.

It is, for instance, still an open question how far sensitiveness is due to each or any of the factors—the size of the silver bromide grains, the presence of colloidal silver (amicrons) and gelatine in solid solution in these particles, or to their crystalline structure, and it is still unproved that chemical fog is due to excessive chemical reduction of the silver halide during the "ripening" process. In connection with these matters it is interesting to note his suggestion that certain dyes may produce chemical fog as a consequence of mutual precipitation of a positively charged basic dye and the negatively-charged amicrons of silver in ripened emulsion grains. This is equivalent to the writer's suggestions (see "British Journal of Photography," 1920, July 30, p. 466), with regard to the nature of the development process in general, that charged amicrons of colloidal silver do not, but electrically neutral silver gel particles do, operate as the active germ in development, but Lüppo-Cramer insists that these silver gel particles (see pp. 38, 52 and 53) are always the result of a chemical decomposition of silver bromide by light, catalytically assisted by the dissolved silver amicrons, in spite of the strong evidence that the energy available in the minimum amount of light which can give a developable image is insufficient for the work of splitting asunder one molecule of silver bromide per particle.

Again, Sheppard and Trivelli's recent work on ammonia gas ripening (see their monograph on "The Silver Bromide Grain") throws doubt on Lüppo-Cramer's explanation based on disruption by light of the silver bromide crystals, nor are Lüppo-Cramer's explanations of the phenomena of persulphate reduction or the action of dilute iodide solutions on dry plates by any means generally accepted.

His valuable work on desensitisers is too recent for any generally acceptable explanation to be possible, so that his view, that they act in the light as a mild type of oxidiser inhibiting the separation of bromine, remains an unsupported opinion at present, although some experimental evidence is put forward in its support. His observations on the powerful desensitising action of the old ferrous oxalate developer are particularly interesting as explaining the difficulties in avoiding fog from unsafe dark-room illumination which were encountered during the transition from this to the modern organic developing agents.

Many observations concerning colour-sensitising are recorded, particularly in connection with the influence of the nature of the halide and its fineness of subdivision; these will interest a large number of practical workers. Indeed, all who are engaged in photographic research work will greatly appreciate this second edition, for it will save them much time and trouble in consulting Lüppo-Cramer's very numerous and widely scattered original papers.

F. F. Renwick, A.C.G.I., F.I.C.

PROJECTION SCREENS FOR RELIEF EFFECT IN CINEMATOGRAPHY.

[Of late a great deal of inventive ingenuity has been expended on the making of projection screens for cinematography. In some cases the object is to secure greater brightness of the picture even under conditions of moderate illumination in the projection hall; in others, for the production of a certain measure of relief effect. In his "Paris Notes" of March 11 last, M. L. P. Clerc referred to the Pech projection screen, the feature of which is that it is concave. A relief effect of cinematograph projection on this screen was claimed, but M. Clerc reported that at a demonstration no such effect could be perceived. The question is, however, discussed in the following paper by M. Jean Brizon, in a recent issue of "La Nature," in which the theory is advanced that in the case of an image projected upon a screen which is not a flat surface, the eye endeavours to restore the natural vision, and so obtains a species of relief effect in the projection.—Eds. "B.J."]

In an article recently published in "La Nature," Dr. Pech set forth his explanation of the optical sensation of "relief," *i.e.*, of an impression of three dimensions, obtained by him by means of a screen having a curved surface.

I have studied this question extensively for several years, and I have obtained results which agree perfectly with the very interesting effects described by Dr. Pech. However, I explain these in an entirely different manner.

I was led to take an entirely different view of the matter by the results of the following experiment:—

If two exactly similar positive views on glass, taken from the same negative, are superposed and then examined by transmitted light, the eye will have a tendency to bring forward the first view to the foreground, while relegating the second to the background, thus making a sort of natural selection. This impression is quite unmistakable, of which fact anyone can readily convince himself by experiment; the eye receives an impression of depth in spite of the fact that the identical view is represented upon each of the two plates. The same thing holds true, and the eye continues to make a selection, even when there is only a portion of the view upon the first plate, while the rest of the view is shown on the second plate. Those parts of the foreground borne by the first plate will attract those portions which are shown upon the second plate, and those portions of the background which are represented on the latter will be sufficient to throw to the rear the entire background, and this will hold good *no matter in what manner the image is distributed between the two plates.*

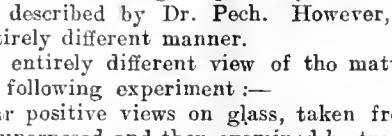

Fig. 1.—A Grating placed before the Screen.

This result, which is not very interesting from a practical point of view, inspired in me nevertheless a lively hope that it might find an application in cinematography. I, therefore, projected views upon screens composed of several planes and found that in all cases, no matter what the scene projected upon the screen, the eye at once made a selection so as to bring the first plane forward; in this manner a quite extraordinary sensation of stereoscopic relief was obtained, a sensation which increased in intensity the greater the separation of the planes of the screen. The screen can be made in various manners; for example, we can place in front of an ordinary screen, at a certain distance from it, a screen in the shape of a grill or grating formed of the elements of the screen (Fig. 1). We can also make use of a single screen having a series of grooves or corrugations as indicated in Fig. 2, which amounts in practice to the same thing as the former. Finally, a very amusing method of producing the screen may consist in making use of the well-known phenomenon of the persistence of vision upon the retina for a certain length of time; this third method enables us to give the spectator a complete and simultaneous view of the image

upon several planes with spaces between them. This method consists in placing in front of an ordinary screen one or more portions of screens to which there has been imparted a rotary movement in a plane parallel to the fixed screen; in Fig. 3 a simple solution of this device is shown in which circular sectors are employed for the first screen.

Unfortunately, and the fact is greatly to be regretted, it is necessary in order to observe the screens, to be as far in front of the front screen as the distance between the extreme planes: this is clearly evident, for when viewed from the side the image is in fact cut or deformed.

The screen employed by Dr. Pech offers a very happy method of obtaining a screen having several planes, since the edges alone of the screen are raised and this so slightly as not to discommode those spectators seated to one side; this curve has been so calculated, on the contrary, as to compensate at least in part for the error of lateral elongation which is the very one which annoys the spectator seated at one side

Fig. 2.—A Corrugated Screen.

when a plane screen is employed. This method, therefore, enables us to profit by a slight separation at the edges, in which location are often found the objects situated in the foreground. We thus obtain a slight impression of depth for these objects; unfortunately, this impression can be proportional merely to the amount of the separation at the margins which is limited in practice.

I hope that Dr. Pech will not bear me a grudge, since my object in saying this is purely scientific—but I am unable to believe that the phenomenon of the distortion of the image upon the retina upon which he bases his theory, plays any part whatever in the case of the present screen. To my mind the proof of this is to be found in the mere fact that the same impression of depth or relief may exist, at any rate so far as the spectator seated in the centre is concerned, with a screen composed of hollows and protuberances arranged at random.

Besides, the well-known fact which Dr. Pech employs as the basis of his theory, namely, that a photograph observed

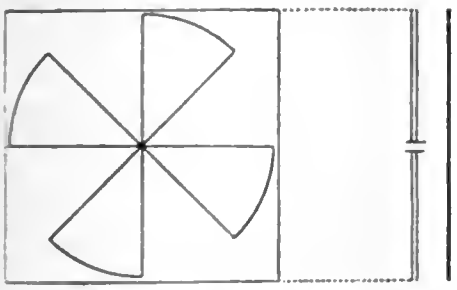

Fig. 3.—The Rotating Screen.

either under a magnifying glass or from a very short distance makes an impression of relief upon the eye, is, in my opinion, due simply to the circumstance that in both cases the observer unconsciously assumes his eye to be in the same position as the lens by which the photograph was made, *i.e.*, subject to the conditions which are involved in perspective. In most cases, indeed, we always look at a photograph from a distance much greater than that of the focal length of the lens used in making the picture. But it is only in case one transports oneself in fancy into the same conditions as those under which the picture was taken, *i.e.* when the eye represents the original lens, that one is able to observe the scene in its natural proportions; in other words, this is possible only when the relative magnitude of the planes is preserved.

In support of this theory I may state that I have made the observation that, so far as moving pictures are concerned, the most definite impression of reality is obtained, when the ordinary screen is employed, by a spectator seated in the centre of the room. The lens commonly used for taking pictures is, in fact, one having a focal length of 50 mm., and the degree of enlargement, which varies, of course, according to the size of the room where the pictures are shown, is about 300 diam. for a 30-m. room. Hence those spectators seated at a distance corresponding to 300 by 0.05—*i.e.*, 15 m. from the screen—are ideally placed to obtain the best results. Furthermore, attention may be called to the fact that when the spectator is too far off from the screen, *e.g.*, at the end of a very large room, the picture on the screen will look as if it were a painting.

The foregoing considerations appear to my mind to support a theory which may be stated as follows: The brain of man seeks always to recover the natural vision of the eye in the artificial images presented to it, and the sort of screen now in question merely lends its aid to this tendency.

In conclusion I may say that I believe it will not be very long before a method will be found—whether by making use of the principles I have just stated, or by means of others, of which it may be easier to make a practical application—to produce a true, but non-binocular, impression of relief in moving pictures.

JEAN BRIZON.

FOX TALBOT MEMORIAL FUND.

As already mentioned in these pages the Royal Photographic Society is establishing a fund for erecting a permanent memorial to William Henry Fox Talbot, to whose researches and experiments the development of photography as we know it to-day is most largely due. Hitherto the English pioneers of photography have gone without any permanent recognition of their work. In France, on the other hand, memorials to both Niepce and Daguerre have been established in several places. In the case of Fox Talbot it is proposed to provide a stained glass window in the church at Lacock, Wiltshire, the little town which for many generations was the home of the Talbots. We are sure that there must be many among the readers of these pages who will wish to contribute to this fund. Contributions are being received by other organisations, including the Royal Photographic Society itself, and we read in the "Revue Française de Photographie" that a sum has already been collected in France, and will be handed over to the Royal Photographic Society in due course. Donations may be sent to the editors of the "British Journal," 24, Wellington Street, Strand, London, W.C.2, and will be acknowledged in this column.

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Amount previously acknowledged ...	0	12	6
G. W. Atkins, Elstree	1	1	0

FORTHCOMING EXHIBITIONS.

September 19 to October 29.—Royal Photographic Society. Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tolleross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

EARLY BRITISH TRACKWAYS.—In a lecture delivered at Hereford last week Mr. Alfred Watkins gave still another illustration of his intellectual activity and originality. He brought forward a mass of evidence in support of his theory that in this island, long before the Roman invasion, a system of trackways extended in every direction according to a definite geometrical plan. The lecture is published in full in the "Hereford Times" of October 1 last.

Photo-Mechanical Notes.

Half-Tone Chromo Litho.

A RECENT patent specification, No. 146,143 of 1919, granted to L. Bassani, 4, Rue d'Armenonville, Neuilly-sur-Seine, Paris, describes a process for the production of negatives to be used in the reproduction of coloured originals by photo-lithographic and similar methods. The main claim is:—

An improved process for producing from coloured subjects screened photographic negatives intended to be used in chromo-lithography or similar purposes, and in which the screen may be displaced with respect to the negative or sensitive plate, the improved process being characterised by the feature that it consists in producing for each colour two superposable negatives which, by their combination, reproduce the picture exactly in all its shades, the screen being shifted gradually away from the sensitive plate during the exposure of the first negative in a direction parallel to the axis of the photographic camera, and during the exposure of the second negative, the screen being shifted in the same manner as for the first negative, but vertically, these two shiftings being preferably simultaneous.

The invention permits of dispensing with the adjusting or retouching of the screen on the picture by subsequent operations, such as those used in photogravure, and of obtaining the desired result by purely photo-mechanical means. It thus permits of printing

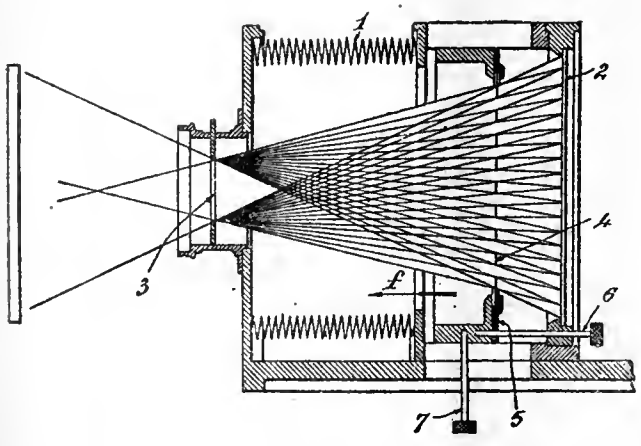

Fig. 1.

directly suitably reticulated photographic plates on to any lithographic surfaces (stones, zinc, and the like), which after being prepared as usual (by inking, gumming, etching, or the like) can be used for printing either by transfer or directly.

By means of the invention, an important economy is thus realised in time and materials. It permits of the use of "offset" machines to the best advantage, and of obtaining on such machines large numbers of prints upon any desired paper, fabric, etc.

The method essentially consists, as above stated, in taking from the original, whatever it may be (water-colour, painting or real subject), for one and the same colour and in identical conditions, two photographic plates which are exactly alike (superposable) and carefully in register with each other.

The first plate is strong, so far as duration of exposure and developing are concerned, so that the thinnest details and the lightest shades of the original will appear. It is produced by arranging a suitable screen in the camera in front of the sensitive plate, and progressively shifting the screen horizontally along the axis of the camera during the exposure.

The second plate is taken under the same conditions, but during the exposure the screen is subjected to an axial and a vertical displacement, both displacements being preferably effected simultaneously.

These displacements, which are independent of the variation in the initial position of the screen, effect, so to speak, a mechanical selection of the parts of the screen that are to be preserved from those that should be reduced or removed

In the drawings, fig. 1 is a vertical section of a camera adapted for use in carrying out the method; figs. 2 and 3 are diagrammatic views showing various positions of the light-rays.

1 is the camera, in which is arranged, between the sensitive plate 2 and diaphragm 3, a suitable stippled or reticulated screen 4 mounted in a frame 5 that can be shifted horizontally along the axis of the camera by turning a micrometric screw 6, and vertically by turning a micrometric screw 7.

Figs. 2 and 3 show on a larger scale the paths of the light-rays in the camera in accordance with the displacements of the screen. Fig. 2 relates to the first photographic plate and fig. 3 to the second.

In taking the first plate which should furnish an image upon which all the details will appear, the screen 4 is shifted, progressively during exposure, by means of the screw 6 in an axial direction as shewn by the arrow *f*. A maximum reduction of the screen is thus obtained even in the lightest shades. Fig. 2 shows, that

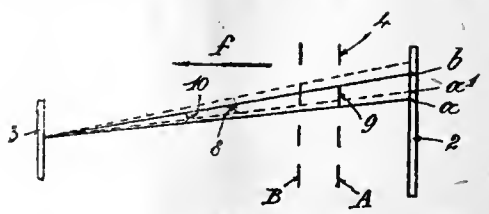

Fig. 2.

when the screen 4 is shifted from position A to position B, the light-beam 10 corresponding to the part 9 of the screen is shifted to the position shown at 8 in dotted lines; so that the unexposed part *a b* of the plate is substantially reduced to *a¹ b*. It will thus be perceived that by a displacement of the screen in an axial direction, as set forth, the screen can be reduced in any desired proportion.

In producing the second plate, which will furnish the dark shades and the junction thereof with the medium shades, the screen during exposure is shifted horizontally by means of the screw 6, and vertically by means of the screw 7. The horizontal displacement has for its purpose to move away the screen as much as necessary for obtaining a sufficiently reduced image of the screen dots so far as the value of the shades is concerned. The vertical displacement has for its purpose to cause the screen image to disappear in all places where required.

Fig. 3 shows that when the screen is shifted from position A¹

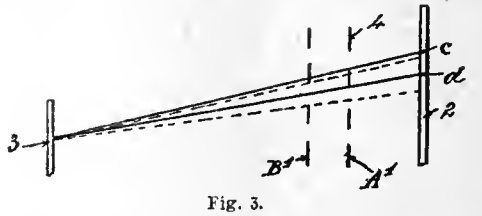

Fig. 3.

to position B¹, the part *c d* of the sensitive plate that was not shielded from the influence of the light-rays by the screen, is subjected in its turn to the action of the rays.

Such displacements may be effected either only once, or several times, according to the effects sought for, or the character of the original to be reproduced.

The reticulated plates obtained are then treated by the usual means, and the images may be transferred by exposure to light on to any printing surface: stone, zinc, etc.

Forcing the Sensitiveness of Bitumen.

THE old bitumen process is not dead. Indeed, I think it may have a useful future before it owing to the growing demand for a photo-zince process on grained zinc plates, which can be printed direct from any good dry plate negative without the intervention of a mechanical screen. The somewhat ancient method of washing bitumen with ether is both messy and costly. Valenta's method of adding a solution of sulphur in carbon bisulphide was an improvement, but the distilling took a long time and is a laboratory job. Seeing that the sensitiveness of bitumen depends on the amount of sulphur present in the compound, I have devised the following way with success. I take two ounces of bitumen powder and melt it in an

aluminium saucepan. When it is in a liquid state I add one ounce of flowers of sulphur and let the whole simmer for a short time, then pour the molten mass into cold water when it will solidify and can be ground to powder, or, instead, pour some turps and make a thick solution for stock to be thinned down with petrol for use. As to development, turpentine is too vigorous and requires much longer exposure, so I use turpentine diluted with petrol, or even petrol alone.

Bitumen takes ink badly alone, so must be reinforced with a little grease. I use a few drops of the well-known photo-transfer ink dissolved first in petrol. Whatever is used it must be first dissolved in the same solvent as the bitumen is dissolved in. Benzole is an ideal solvent for the sensitive bitumen, but is very costly, and unobtainable out here.—W. W. Watt, The Survey Office, Colombo, Ceylon.

The following patents have been applied for:—

Apparatus.—Nos. 24,260, 24,261, 24,262 Photographic copying or printing apparatus for making photo-mechanical printing plates. H. C. Boedicker.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, September 26 to October 1.

Copying. — No. 25,892. Copying apparatus for photographic pictures. W. Arndt.

View-Finders. — No. 25,820. View-finders for photographic cameras. J. Ascher.

Flash-Light. — No. 25,498. Flash-light photography. E. Chasseranx.

Packing Developers. — No 25,474. Packing photographic developers. J. Gray and T. Teichgräber Akt-Ges.

Photographic Type-Setting.—No. 25,804. Photographic type setting machine. J. Robertson.

Cameras.—No. 25,935. Cameras G. G. B. Tartara.

Exposure Device.—No. 25,495. Controlling exposure in photographic cameras C. M. and S. Williamson.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

Photographic Copies by Phosphorescence.—No. 160,739 (March 25, 1920). The object of the invention is to produce positive (photographic) copies of letterpress or paper prints by means of phosphorescent substances.

A phosphorescent substance, for instance, Balmain's powder or so-called Sidot-blende, is carefully comminuted. The comminuting is preferably affected by some powder being mixed up with a liquid such as water, and shaken for several hours in a bottle containing glass balls. A very uniform comminuting is effected in this manner. The mixture produced is mixed with a gelatine solution and some glycerine to a suitable consistency, and poured on a glass plate which has been provided with a thin covering of rubber. The gelatine soon solidifies, but before this has taken place a small quantity of the powder has settled to the bottom, and on the surface facing the glass the powder is especially dense and evenly distributed.

After the covering has been dried a solution of celluloid or collodion which has been dyed, for instance red, is poured over and likewise dried. Thereafter the gelatine film and celluloid film together are stripped off the glass plate, which can easily be done owing to the rubber coating, and a red film carrier cover with a phosphorescent layer of specially good qualities is obtained.

This sheet is illuminated, firstly from the gelatine side, for instance, for several minutes by a 100-candle-power lamp, or by daylight, whereby this side is caused to phosphoresce. Thereafter the phosphorescent surface is laid against the picture or printed matter to be copied, and is illuminated by light passing through the red film and through the phosphorescent layer towards the paper. The red illumination will destroy the phosphorescence, and it has been proved that it destroys the phosphorescence, especially where the light strikes and is reflected by the white paper, but in less degree where the light strikes, and is absorbed by the print or the like. After this illumination the phosphorescent plate or sheet is taken off and laid on a light-sensitive paper, for instance, bromide paper, where through phosphorescence it produces a latent positive picture which can be developed in known manner.

Instead of placing the phosphorescent substance in a gelatine film, it may be distributed in a collodion film, and also the coloured layer may consist of some other colloidal substance than nitro cellulose.

If a solid non-flexible plate is desired, both layers can be poured out on a glass plate either on top of each other or one on each side of the same. Also the two layers may be combined into one layer if a dye be added to a phosphorescent substance, so that the phosphorescent layer becomes coloured and acts itself as a light-filter.—Jens Herman Christensen, Villa Sterrehus, Sovejin, Sollerod, Holte, Denmark.

Automatic Ferrotype Cameras.—No. 165,652 (July 7, 1921.) The camera has a magazine chamber immediately above an exposure

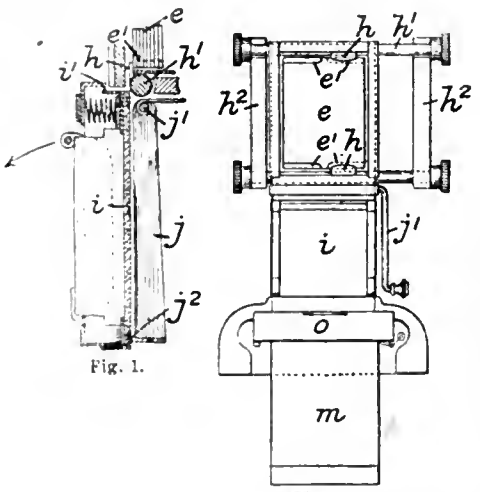

Fig. 1.

Fig. 2.

chamber and a developing tank or tanks underneath. Notched plates are released one at a time from the magazine chamber by laterally displaceable abutments and drop into the exposure chamber from which after exposure they are released and drop into a tank carried by a turntable. The plates e are pressed

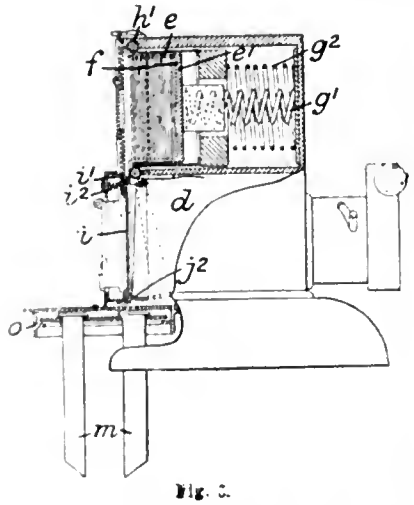

Fig. 3.

forward by a spring g^1 and the pack-holder f is held in position by a spring g^2, the plates being alternately provided with right and left hand notches e^1. The plates are retained in position by lugs h on a frame consisting of rods h^1 and connecting bars h^2,

and are released one at a time by reciprocating the frame. The bars h^2 may be disconnected to allow independent rotation of the rods h^1 and the insertion or withdrawal of the pack and holder f. The end plate e, after it is released from the pack rests upon the upper edge i^1 of a focussing screen i which pivots about its lower border and is retained in position at its upper end by a spring i^2. When the upper end of the screen is withdrawn the plate e falls into position in the exposure chamber d with its lower edge resting upon a lip j^2 on the U-shaped pivoted frame j, the pivot j^1 of which is extended outside the camera to form an operating-lever. After exposure, the U-frame j is turned to release the plate, which drops into one of the developing-tanks m carried by a turntable.—Herbert Edward Hickox, 18, Stanley road, Wimbledon, London, S.W.19.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

ZENITH.—No. 417,425. Chemical substances used in photography, photographic plates and photographic films included in class 1. Ilford, Ltd., Britannia Works, Roden Street, Ilford, Essex, manufacturers of photographic plates, papers and films August 4, 1921.

BAYRAPID.—No. 417,364. Chemical preparations for photographic purposes. Farbenfabriken vorm. Friedr. Bayer and Company, Leverkusen, near Cologne-on-the-Rhine, Germany, manufacturers. July 30, 1921.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

TREFOIL DESIGN ("AS DE TREFLE").—No. 415,911. Photographic chemicals, plates and films. Grieshaber Frères & Cie, also trading as Société des Produits Photographiques "As de Trèfle," 27, Rue du Quatre-Septembre, Paris, France, manufacturers, in class 1.

New Materials.

Illingworth Plates, Made by Thomas Illingworth & Co., Ltd., Park Royal, Willesden Junction, London, N.W.10.

FOLLOWING our preliminary note of a week or two ago we must now refer again to the dry-plates, newly issued by them, which Messrs. Illingworth have now added to their well-known manufactures in the shape of printing papers. The firm which takes up the manufacture of dry-plates at the present highly-developed stage of this industry is in the somewhat unenviable position of being compelled to come before the public with goods which are without strikingly novel features. Dry-plate manufacture having reached a high stage of development, the newcomer is doing a great deal if he puts upon the market products which worthily take their place alongside those of other makers. Anything revolutionary in photographic emulsions is hard to find, and, even if found, is of problematical commercial value, as experience during the last few years has shown in several instances. Therefore, a new claimant for photographers' custom in their purchases of dry-plates cannot be expected to do more than show his capacity for supplying the articles which are in constant demand. Such has evidently been the sound policy of Messrs. Illingworth, who, moreover, have the advantage that they are favourably known to great numbers of photographers by the excellence of their bromide, gaslight, and other printing papers. In now offering a full range, with one or two exceptions, of the various descriptions of plate in regular use, they have specially kept before them the requirements of portrait and press photographers, and for these in particular are manufacturing four grades of plate, all of high speed, and in one instance of the orthochromatic kind. Specially for daylight work in the studio, the two grades are the "Studio Fast" and "Studio Extra Fast," respectively issued of speed 400 and 500 H. & D. For use by artificial light the studio plate is the "Studio Ortho Fast" of 400 H. & D., whilst for outdoor work, such as press photography and other purposes calling for minimum exposure and ample contrast, the plate is the "Fleet" of 450 H. & D.

As the result of having taken their time in establishing the manufacture of these and other grades of plate, Messrs. Illingworth have been able to assure themselves of uniformity from batch to batch in speed and other qualities. Moreover, they make a strong point of the fact that the speed markings, while perhaps lower than those of other plates, represent the actual performance of the emulsions as regards sensitiveness. As the result of testing for ourselves the behaviour in practice of several of the grades mentioned above, it is evident that the plates are excellent examples of modern emulsions, fast working without stain or fog, and yielding negatives of extremely fine range of gradation. The developers specially recommended are pyro-soda, pyro-metol, and metol-hydroquinone, but it is clear that the plates afford equally good results with any well-balanced developing formula. On all three of the "Studio" plates ample density is readily secured, whilst the "Fleet" plate yields negatives of the cleanness and brilliance specially desirable in negatives for prints or enlargements intended for reproduction in the press.

Although we have here signalised only the four grades manufactured with the requirements of professional photographers in view, it may be repeated that Messrs. Illingworth are issuing slower grades, including an ordinary plate of fine grain for copying, as well as bromide and gaslight lantern plates. Photographers who have had the occasion to appreciate the good qualities of the firm's printing papers will have no hesitation in accepting the claims which are made for the plates now added to the list of manufactures.

LETO PLATES AND PAPERS.—The Leto Photo Materials Co., Roman Wall House, 1, Crutched Friars, London, E.C.3, send us samples of plates and bromide and gaslight papers, representing new issues of these materials made at their Edgware factory, which, in their original forms, have long been familiar to photographers under the trade mark XL. Among the plates are an ultra-rapid fine-grain emulsion of 400 H. & D., and an improved orthochromatic anti-screen emulsion of the same speed. A pair of plates of somewhat lower speed (350 H. & D.) is also introduced as Leto "Special Rapid" and "Special Rapid A S." We have been exceedingly pleased with the qualities of these plates, which are those of extremely high-grade emulsions. The new or revised introductions likewise include bromide papers of a full range of surfaces for contact printing and enlarging, and also a similar series of gaslight papers, vigorous and soft. A descriptive list of these manufactures has just been issued by the Leto Co., and may be obtained, together with instruction booklets dealing with other of the company's products, free on application.

JUDGES' PHOTOGRAPHS.—In the High Court on Tuesday last a case connected with postcards was being heard. A witness was explaining the superior artistic quality of his, and said they were as good as those made by Judges at Hastings. Mr. Justice McCardie: "Then no doubt they are very good. How much do they charge for them?" Witness: "Threepence each." Mr. Justice McCardie: "That seems a very reasonable sum for photographs made by a judge." Counsel here intervened to explain that Judge was the name of the Hastings firm. Mr. Justice McCardie had a reply pat: "Quite so," he said, "like Jury, the cinematograph people."

CAMERAS IN PUBLIC BUILDINGS.—Mr. Thomas Rodway writes to the "Westminster Gazette": "May I protest against the nonsensical and stringent rule that no cameras are allowed in most of the public buildings of London? There is not the slightest provocation for this rule, and it appears to me to be nothing more or less than a bright idea of somebody's to prevent the public from carrying away a souvenir of their visit to some building. This rule is particularly noticeable at the Tower. Almost half of the visitors to this building carry a Kodak with them with the object of obtaining a photographic record of their visit; but they are disappointed by being relieved of their camera as soon as they enter the gates until they come out again. May I ask, is any damage done to any ancient relic or oil painting, etc., by photographing it? Does it make any depreciation in the value of these? I doubt it.

New Books.

Kolloidchemie und Photographie. By Dr. Luppo-Cramer. 2nd Ed. Dresden: Theodor Steinkopff. Mk. 28.

This second edition is a complete re-writing of the work first published in 1908. In the preface to the latter Dr. Luppo-Cramer urged the importance of studying the properties of the substances which occur in silver-gelatine emulsions and in development. He laid stress on the fact that from the formation and behaviour of silver and silver compounds in the colloid state the extension of precise knowledge of photographic emulsions was to be obtained; and he now looks back with some satisfaction on the fruit which investigation in this field has borne from the work of himself and others. The predominant place which the reactions of colloid substances must have in future photographic research is emphasised by Mr. Renwick in the notes on another page. As these latter deal broadly with the chief controversial questions raised in Dr. Luppo-Cramer's book it will be sufficient here to point out the main divisions of the work.

The author first reviews the properties of metallic silver in the colloid state, drawing here and elsewhere freely from the voluminous researches of Carey Lea. Dr. Luppo-Cramer has collected and published Carey Lea's papers in a German translation and has thus made accessible to his countrymen the results of the American investigator, which have waited for many years to be appreciated at their full significance. In this chapter is discussed the direct reproduction of colours by exposure of silver halides (Farbenanpassung), of which so many hopes have been entertained from the earliest days of photography. The ripening of emulsions and the nature of the latent image provide the subject-matter of two chapters in which these questions are treated in relation to the properties of colloidal silver halides and metallic silver. The chapter on development leads the author to discuss at length his views on the germ or nucleus theory of the latent image, and next, in Chapter VI., the phenomena relating to the development of the more stable part of the latent image, i.e., the process which Luppo-Cramer calls "Keimblosslegung," or "denudation of the latent image germ," as it may be somewhat inadequately rendered into English. The chemical mechanism of optical sensitising and desensitising occupy the two last chapters, which contain a condensed review of the author's experiments which have led to the safranine process.

Throughout, the volume is largely a record of Luppo-Cramer's own work recorded in papers scattered through many periodicals. The personal character of the volume must not be overlooked by the student. Without wishing to say a word in disparagement of much valuable research, it is not possible to escape from the impression that, in the case of Dr. Luppo-Cramer, enthusiasm for a particular explanation appears sometimes to get the better of a cold judicial weighing of the evidence for and against. But as a contribution to the working knowledge of the chemical processes in photography the book is one which must receive the serious study of every experimenter.

Colour Photography.—No. 183 of the "Photo-Miniature," which has just been issued, is a concise review of two-colour and three-colour processes of photography and cinematography from the pen of Dr. C. E. K. Mees. It traces the development of these processes from the fundamental experiments of Clerk Maxwell and the initial practical success of Ives and Miethe. Dr. Mees briefly classifies the methods of making colour screen-plates, and gives an interesting diagram illustrating the rendering of colours by the so-called subtractive process. In comparing two-colour and three-colour methods, reference is made to the satisfactory results obtained by the former system in portraiture. A useful table is given showing the rendering of different colours when the customary two-colour method (recording red and green sensations) is employed. The latter part of the monograph describes processes of colour cinematography which have been commercially employed, namely, Kinemacolor, the Gaumont process of three-colour additive projection and the two-colour process by means of simultaneous optical printing on both sides of a double-coated film worked out in the Eastman laboratory. We miss, however, in this review the Prizma process of printing colour cinema films, the technics of which provide a subject worthy of Dr. Mees's powers of exposition. However, the issue of our little contemporary serves the useful purpose of providing a rapid and accurate glance over the chief methods of colour photography and colour cinematography which have obtained successful commercial application. The issue is published in this country by Messrs. Houghtons, Ltd., price 1s. 8d.; in the United States by Messrs. Tennant & Ward, 103, Park Avenue, New York, price 40 cents.

New Apparatus.

Burst Pipe Stop.—A very handy appliance to have on any premises where water is used has just been put on the market by the Quta Company, 252-254, Haydon's Road, Wimbledon, S.W.19, under the above name. It consists of a pair of metal discs of shallow channel cross section, provided on their concave surfaces with a layer of soft packing, apparently some rubber composition. By means of two screwed bolts the two parts may be fixed firmly in position on a pipe that has burst through frost, etc., forming an efficient preventive of leakage. The appliance is most readily fixed, and in these days when the charge for any little job by a plumber costs a considerable sum, will easily save its price several times over. The appliance is sold, post free, at 1s. 6d.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, October 17.

Bradford P.S. "Lantern Slide Making." C. E. Lawson.
Dewsbury P.S. "Bromoil." W. E. Gundill.
Southampton C.C. "Seltona." W. H. Trigg.
South London P.S. "Algeria and Tunisia." F. G. Newmarch.
Wallasey Amateur P.S. "Development of the Negative." E. Knowles.

Tuesday, October 18.

Hackney Phot. Soc. "The Subject: Its Selection and Treatment." J. Linley.
Leeds P.S. "Water-colour Art in England." H. Thompson, M.A.
Manchester Amateur Phot. S. "Barnard Castle." T. Murray Shaw.
Morley P.S. "Rochester and Canterbury." Mr. Nevin.
South Glasgow Camera Club. "Old Processes and New Methods." W. F. Slater, F.R.P.S.
Tyneside Phot. Soc. "Development."

Wednesday, October 19.

Accrington C.C. "Home Portraiture." John Rollinson.
Croydon C.C. "Some Aspects of Screen-Plate Photography." K. C. D. Hickman.
Dennistoun Amateur P.A. "Photographic Apparatus." A. Dordan Pyke.
Edinburgh Phot. Soc. "Sepia Toning." G. K. Ritchie.
Halifax Scientific Society. "Working up a Negative." H. Bairstow.
Ilford P.S. "Retouching the Negative." Miss D. Head.
Partick C.C. "Lucerne and its Environments." J. W. Downs.
Rochdale Amateur P.S. "Carbro Demonstration." A. E. Cooper.
South Suburban P.S. "Dutch Slides."

Thursday, October 20.

Edinburgh Phot. Soc. Ramble Prints Exhibition.
Hammersmith Hampshire House P.S. "The Story of the Cuckoo Spit." Geo. H. Rodman, M.D.
South Glasgow C.C. Whist Drive.
Wimbledon and Dist. C.C. "Enlarging on Vitegas." Kosmos, Ltd.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, October 11.

In the absence of the president, Dr. G. H. Rodman, through indisposition, the chair was occupied by Mr. W. L. F. Wastell.

The twenty fourth Traill-Taylor Memorial Lecture was delivered by M. L. P. Clerc, of Paris, who took as his subject, "Aerial Photography and Phototopography."

In first dealing with the apparatus and materials for aerial photography, M. Clerc briefly referred to the alteration in focal length of a lens at the low temperature prevailing at the height of 15,000 or 20,000 feet. He instanced a 21-inch lens, which has its focal length increased by one-half per cent. on cooling from 75 deg. to 0 deg. Fahrenheit. The effect of this elongation is increased by contraction of the body of the camera. A French firm had endeavoured to provide automatic compensation for alteration in focal length with temperature by a special construction of the lens mount.

As regards the importance of light-filters employed in conjunction with panchromatic plates, in aerial photography, M. Clerc described experiments made by the staff of the Eastman Research Laboratory for determining the effects of atmospheric haze. Quantitative measurements of haze were made and various degrees of artificial haze produced in the laboratory for the purpose of testing the efficiency of plates and light-filters in overcoming it. A panchromatic plate exposed through an orange filter, such as the Wratten E, allowed of photography being done through very strong haze.

M. Clerc likewise dealt with the employment of shutters, and mentioned that the focal-plane shutters, almost universally used during the war, were frequently employed at a lessened efficiency in consequence of too great a distance between the blind and the sensitive plate. For exact mapping work the focal-plane shutter could not be used, the movements of a high-speed aeroplane during the period of exposure by the shutter causing deformation errors. On the other hand, the construction of a diaphragm shutter operating at the requisite speed was a difficult mechanical problem. Two French constructors had endeavoured to solve it by giving a constant movement to the sectors of the shutters and bringing in the aid of supplementary sectors by which a particular one of the periodical openings could be selected for the exposure.

In referring to the size and shape of the plate for aerial photography, M. Clerc pointed out that the oblong has several advantages over the square shape of plate. At the end of the war almost all the armies had adopted plates of 18 x 24 cm. size, giving an effective image of 17 x 23 cm. M. Clerc also discussed the relative merits of plates and roll films, the shrinkage of the latter during development, etc., being a drawback in accurate mapping work. Films, moreover, called for special appliances to ensure flatness at the time of exposure.

Contraction of the camera body in consequence of a reduction in temperature of about 75 deg. F., such as is commonly obtained in flights at 15,000 feet, introduced errors of scale and of definition which were serious in phototopographic work. The use of metals and alloys for camera bodies was open to criticism from this point of view, and M. Clerc was inclined to think that the method of camera construction adopted by the Royal Naval Air Service on the suggestions of Mr Charles W. Gamble, was the best for the purpose. For protecting the metal camera body from contraction at the low temperature at a high elevation, the Germans employed electrical heating coils, and a heating envelope for the same purpose was patented by the French Government.

M. Clerc proceeded to deal with the methods and attachments for the production of registration marks on the aerial negative, and for the means of recording on the plates other data, such as compass and altimeter readings. He briefly reviewed, with the aid of a number of lantern illustrations, the various types of camera which had been developed during the war from the original hand-operated model to those providing completely automatic exposure of the sensitive material. Methods of suspending the camera for avoidance of bending or vibration were of great importance. He believed the British Air Force was the first to introduce a method of testing suspension devices by flying over lights on a dark background, one of the lights being periodically interrupted, and thus allowing of the nature of the vibration being recorded on the plate.

He next passed to the consideration of the correction of negatives taken with a non-vertical lens axis and to the interpretation of aerial photographs. In looking at an aerial photograph the best position is that in which the shadows are inclined at an angle of 45 deg. on the right and on the bottom side of the image when the print is held in the hand. A photograph clearly showing the advantage of this method was exhibited. The remaining portion of the discourse was a review of the current methods of mosaic mapping by aerial photographs and the application of aero-photographic methods to surveying. Lastly, M. Clerc outlined the principles of aerial stereoscopic photography, and concluded his lecture by showing a number of stereoscopic projections on the screen by the Anaglyph method, employing for this purpose a number of transparencies and viewing spectacles lent by M. L. Gimpel, of Paris.

On the proposition of Mr. George E. Brown, seconded by Major F. C. V. Laws, the thanks of the Society were accorded to M. Clerc for his lecture.

The chairman, in conveying these thanks, asked M. Clerc's acceptance of the medal annually struck in commemoration of the lecture.

CROYDON CAMERA CLUB.

Mr S. J. Tayler talked, and talked interestingly and instructively on the "Cussedness of Bromoil," that much-discussed printing medium given to the world many years ago by the late Mr. C. Welborne Piper, who later expressed his sincere repentance in metaphorical sackcloth and ashes for the escapade. Some of the soul revelations shown on the club walls from time to time, combined with the ingenious way in which shocked purists endeavoured to fasten a share of the responsibility on the inventor of the process, may have forced him to take up this attitude in sheer self-defence, for he was not a doughty fighter in debate, though ever peacefully content when others were engaged in deadly strife.

In Mr. Tayler's hopeless case additional interest lay in the fact that he is not only a skilful bromoilist, but clever with pencil and brush, for by common consent Bromoil is essentially a process only to be worked by artists, though as all bromoilists apparently regard themselves as such, the reservation does not cut much ice.

He started by saying that although Bromoil is not specifically mentioned in the Book of Genesis, there is no doubt it is included in the primeval curse pronounced on Adam. A few cocksure and brazen spirits pretend to infallibility, but his long experience with the process, if narrated in detail, would deter all contemplating starting on that steep and slippery path. It was paved with disappointment, bewilderment and exasperation, conducing to drink, and terminating, possibly, at the foot of the gallows. (Cheers.) Those, he continued, who had just given robust expression to their feelings, might always be recognised by their cold and calculated cynicism towards pictorial photography in general. Completely absent in their callous breasts was that enthusiasm which first induced amateurs to abandon the cultivation of harmless snapshots in favour of depicting Nature as nobody had ever seen her. He gloried in being one of this nefarious band, for, despite ethical laws, no other process was so alluring, and a bromoilist he expected to be so long as he could handle a brush.

The beginner will find, he said, that all experienced bromoilists are utterly at variance with one another on nearly every practical point of procedure, and flat contradiction is the order of the day. He strongly advised when once a method is arrived at leading to occasional success that it be adhered to, for alterations usually mean starting all over again. He prefers prints on the flat side, employs Kodak's "Permanent" bromide paper mostly, and their special M.Q. developer, and always adjusts exposure to full development. Each print is fixed separately in plain hypo solution to obtain uniform action over the surface (regarded as an important point), and the fixing bath is gradually diluted before the print is removed. In his opinion this reduces any tendency to blisters forming during pigmenting. For the same reason tap-water must never be allowed to fall directly on the prints, which are best individually washed for the first few changes. Surface moisture is to be removed before hanging up to dry, as tear-drops may record themselves in the final picture. When re-soaking papers with soft gelatine a shorter time should be allowed than with hard. Using the water at 75 deg. Fah. an average period is one hour. He had found Sinclair's bleacher very satisfactory, and the pigments supplied by this firm had worked well in his hands

The lecturer concluded by inking-up a bleached bromide print, and a first-class Bromoil eventually materialised with cotton-wool clouds complete (the latter "by request"). Unfortunately blotting paper had been forgotten, and damped brown paper sheets were

substituted. For pressing them into contact an empty whisky bottle proved a capital roller-squeegee, an emergency brain wave of the inventive Mr. Inskeep, who, it is understood, gives the idea freely to the world.

The discussion was brisk, and of the ancient "chestnut" order, Mr. Hibbert in particular distinguishing himself in this line. Another member pointed out that having regard to the successful picture secured, the prefix "cussedness" adopted had proved singularly inappropriate. "Quite the contrary, for under the conditions I confidently anticipated nothing but failure" replied Mr. Taylor.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Meeting held at 116, Hanover Street, Edinburgh, on Monday, October 3. Present: Messrs. Aikman, Norman Thomson, John Campbell Harper, W. J. Hutchison, George Balmain, Yerbury, E. D. Young, Swan Watson, William Fergusson, John Thomson and Charles Ross. Mr. J. Campbell Harper, president, in the chair.

The Secretary read a letter from Mr. W. B. Hislop, of the Process Engravers' Federation, who had been invited to the meeting, regretting his inability to be present. The Secretary stated that Mr. Hislop, who has undertaken the tuition of the class for optics and chemistry as applied to photography, inaugurated by the Education Authority, intimated that he had sixteen students at the class last week, and that he expected to have twenty-four this week. This was considered very satisfactory.

Mr. E. D. Young mentioned that the College of Art classes commenced on Wednesday, October 5, and that the College officials were to notify photographers in Edinburgh of the commencement of these classes and ask them to get their assistants to attend. The Society recommended its members to do their utmost to get their assistants to attend these training classes, so that better results might be obtained by the students in their work in the studio.

The meeting next considered the fixing of minimum prices for commercial photography. The Secretary submitted to the meeting the prices which were originally fixed and those which were afterwards substituted therefor, also the proposed costing basis table with a percentage of profit added proposed by Mr. Moffat. After considerable discussion it was resolved to allow matters to lie in abeyance for another month until the minimum prices fixed by the Process Engravers' Federation were ascertained, so that both societies might co-operate and fix a similar basis of minimum prices. It was agreed that members might meantime use either of the latter charges, whichever they considered suitable for their work. It was also agreed to invite Mr. Hislop to the next meeting of the Society and get the benefit of his views before fixing the minimum prices.

Mr. Balmain intimated that the golf match with the Glasgow Professional Photographers would take place at Turnhouse on Friday, October 21. There would be twelve players from each society, and the play would be in two-ball foursomes. It was agreed to entertain the Glasgow photographers at dinner at the Haymarket Restaurant in the evening.

After the conclusion of the business of the meeting the new president, as is customary on his assuming the chair at the first meeting after election, made a few cogent remarks about the Society, the responsibility of its members and duties to professional brother photographers. He gave an interesting retrospect of his early career in business and of his attitude towards his professional brethren. He gratefully acknowledged that by his personal association with them in business and in a society such as this his opinions had entirely changed, and from considering them as rivals he now found them friendly competitors. He urged the members to become progressive and keep in touch with things if they desired to go forward with the times, as it was the photographer who is able to show a personal and distinctive character in his work who will get work. He earnestly commended the members to endeavour to stimulate and foster a knowledge of art as applied to photography among their assistants so that the photography business may in the future be carried forward to greater progress and expansion on a stable basis.

Mr E. D. Young, in moving a vote of thanks to the president, congratulated him on his remarks and wished him a long and prosperous period as president of the Society.

Mr. Swan Watson associated himself with Mr. Young's remarks and said that he was confident that the Society would flourish under Mr. Campell Harper's guidance.

The President returned thanks and asked the members to co-operate with him and each other in the promotion of the best interests of the Society and for their profession.

LANCASHIRE SOCIETY OF MASTER PHOTOGRAPHERS.

The third annual meeting was held at the Palatine Hotel, Blackpool, on Wednesday, October 5, 1921. Mr. Fred. Read, president, in the chair.

Mr. Charles Howell, on a point arising out of the Minutes, informed the members that the letter written by the secretary with regard to the electric supply in one of the towns in which he had a studio, had been the means of him getting a reduction of £25 from his account, and, in addition to this, he had received a very important concession, viz.: "That in future he would only be charged power-rate," whereas, in the past he had been charged on the lighting rate for all his electric energy. In his opinion many photographers failed to recognise the advantage of being a member of the Society, and he hoped in the future that more progress would be made in that direction.

Mr. W. T. Carter, of Rochdale, also gave testimony to the advantages he had received by being a member of the Society, as he also had received a very considerable concession from the authorities in his town. Other matters arising out of the Minutes having been dealt with, the president, Mr. Fred Read, rising to give his address before he left the chair, thanked those members who were present for their kind co-operation during his year of office. He regretted, however, that during the period he had occupied the chair, there had been a number of factors, such as labour troubles, bad trade, which had prevented members from attending meetings. He regretted to have to admit also that a number of the photographers who had joined the Society, had not since its inception given the support that he had expected. There was a great deal of apathy amongst the members, and if they would only take to heart the experiences of Messrs. Howell and Carter and other members and compare testimony to the advantages they had gained by being members of the trade Society, he hoped his successor in office would have a better year than he had had.

The committee had unanimously recommended as his successor, Mr. Arthur Winter, of Preston, and it afforded him very great pleasure in proposing Mr. Winter as president of the Society. Mr. Gresswell, of Southport, seconded this proposition, and was supported by other members. Mr. Winter was unanimously elected, and was inducted into the chair by Mr. Fred Read. Mr. W. T. Carter (Rochdale) proposed that the vice-president be Mr. Charles Howell, of Blackpool. This proposal was seconded by Mr. J. S. Browne (Manchester), supported by Messrs. Read, Berry, and Huish, and carried unanimously.

Mr. Fred. Read, in proposing Mr. W. T. Carter as the hon. treasurer, stated that the committee has unanimously elected Mr. W. T. Carter for this position, and he sincerely hoped that at the end of Mr. Carter's year of office he will have had greater success than his predecessors, and those hon. treasurers, including himself, who had occupied that position. Mr. Berry (Rochdale) seconded this proposition, and Mr Carter was unanimously elected as hon. treasurer.

Mr. J. S. Browne (Manchester) proposed that Mr. W. H. Huish be re-elected as secretary, and stated that his only object in doing so was to give that gentleman an opportunity to maintain his reputation. This proposal was seconded by Mr. Gresswell, supported by several members, and carried unanimously.

Mr. Huish, in thanking the members for the renewal of their confidence, stated that he had intentions of seceding the election, but in consequence of his good friend, Mr. A. Winter having been elected as president, he had no alternative but to accept the position.

A lengthy discussion took place on the question of the election of a committee. In consequence of a number of members who were appointed last year not having attended, it was decided only to elect members on the committee who had taken an interest in the work of the Society. Mr. Read proposed that the following gentlemen represent the committee:—Messrs. A. Walmsley (Bolton), Cyril Foley (Wigan), W. H. Baylis (Chorlton-cum-Hardy), R. H. Gress-

well (Southport), W. P. Beck (Blackpool), E. J. Care (Eccles), J. S. Browne (Manchester), J. W. Berry (Rochdale), Dor Maclean (Blackpool). This proposal was seconded by Mr. W. H. Huish, and carried unanimously.

The hon. treasurer's statement of accounts was received and adopted, and showed a credit balance of £22 15s. 9d. It was proposed by Mr. Carter, and seconded by Mr. Gresswell, who had acted as auditors, that the best thanks be given to Mr. Arthur Winter for the admirable way in which the accounts had been kept and presented.

Mr. W. H. Huish stated that at the last committee meeting the president, Mr. Fred. Read, had referred to the apathy that had been displayed by many members of the Society, and it was reported that at that time sixty-seven members had not paid their subscriptions for the current year. He (Mr. Huish), therefore, considered that the time had arrived when the members should consider very carefully the re-construction of the Society. He would suggest for consideration that a limit be put on the number of members, so that those who were loyal to the Society would benefit most. He would like to make it difficult for photographers to become members of the Society, and he saw no reason why they should not have a "waiting list," the same as other exclusive societies. He advised that the membership be limited to 100, and that in future only four general meetings of the Society should be held during the year, and that at these meetings arrangements should be made for some expert to give a lecture or demonstration that would be of interest to the professional photographer. After a very lengthy discussion Mr. Gresswell proposed that the suggestions outlined by Mr. W. H. Huish should be carefully considered by the new committee, and it should be in their power to draft new rules and make all the necessary arrangements for the year's working. This proposal was seconded by Mr. Berry, supported by other members, and carried unanimously.

At the conclusion of the business meeting, Mr. Arthur Winter, the new president, entertained the members to dinner, and a very pleasant evening was the result.

GLASGOW AND WEST OF SCOTLAND SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

The annual meeting of the above Society was held on Friday, September 30, 1921. The Vice-President occupied the chair in the absence of the President, Mr. J. G. Mainds. Mr. Weir opened the meeting, expressing regret that owing to illness Mr. Mainds was unable to be present, and suggested that the Secretary convey meeting's sympathy and appreciation of his services during the past year.

The Chairman gave a *résumé* of the year's work, and said the Society had reason to feel gratified by the number of interesting lectures and demonstrations which had been given, and expressing the Society's indebtedness to Messrs. Kodak, Ltd., the President, Mr. Drummond Young, Mr. Allan Mainds, Mr. Weir and Mr. Polmont for their lectures and demonstrations, and to Messrs. Brinkley, Fairbairn and Mainds for the use of their studios.

The social event of the year took the form of a smoking concert, which was a great success, the talent being of exceptional merit.

A report on the committee's negotiations with the Glasgow School of Art re classes in photography was submitted, and it was regretted that owing to the small response the class intended to be started in September was unable to be gone on with, but when the advantages of the classes are more fully realised among employers and assistants a better response is expected, which will enable a start to be made early in the coming year.

The Secretary submitted the financial statement for the past year, which showed a credit balance, notwithstanding the period covered being 18 months, the adoption of which was duly moved and seconded.

A vote of thanks was proposed by the Chairman to Mr. Romney, junr., for the very capable manner in which he had discharged the duties of secretary and treasurer, which had contributed so much to the success of the Society in its first year. The meeting then proceeded to elect the following new office-bearers: President, Mr. J. R. Brinkley; vice-president, Mr. A. Fairbairn; committee, Messrs. Nimmo, Romney, junr., McGregor, Ritchie, Doig Polmont, McCracken, Shankland, Q. R. Whyte, MacLachlan, Donaldson and Phillips. Secretary and treasurer—Mr. Romney, junr., kindly agreed to carry on the duties until the vacancy could be filled.

The new president, on taking the chair, thanked the members for the honour they had done him and assured them he would do all he could in furthering the interests of the Society, and intimated he had approached Messrs. Kodak, Ltd., who had kindly consented to allow Mr. Luboshez to give a lecture and demonstration on artistic lighting.

This completed the business of the evening, and the Chairman, in closing the meeting, thanked Mr. Weir for occupying the chair during the early part of the evening. The next meeting of the Society will be held in Mr. Brinkley's studio, 230, Sanchiehall Street, on Thursday, October 27, at 7 p.m., when Mr. Luboshez will lecture and demonstrate on artistic lighting. This meeting will not be confined to members of the Society, and an invitation is extended to all principals and managers in the profession.

Commercial & Legal Intelligence.

NEW COMPANIES.

Lincoln Studio, Ltd.—This private company was registered on October 1 with a capital of £1,000 in £1 shares. Objects: To acquire the business carried on at 148 and 149, Holborn Bars, E.C., as "Isograph and Rudos Camera Service," and to carry on the business of atists, designers, photographers, advertisement agents and writers, art exhibitors, art gallery and exhibition proprietors, cinematographers, etc. The first directors are: S. P. Dobbs, 8, Shaftesbury Avenue, New Barnet, artist; Mrs. R. Dobbs, 8, Shaftesbury Avenue, New Barnet; A. R. Crouch, Redcot, 1, Rutland Road, Wanstead, Essex, artist. Registered office: 148 and 149, Holborn, E.C.

Lloyd and Ramsden, Ltd.—This private company was registered on October 4 with a capital of £3,000 in £1 shares. Objects: To take over the business of manufacturers of cinematograph projectors and general electricians carried on at 17 and 19, St. Michael's Street, Nottingham, as "Lloyd and Ramsden," and to carry on the business of manufacturers of cameras and parts thereof, film manufacturers and renters, photographers, etc. The first directors are:—E. G. Lloyd (permanent managing director), 4, Friar Yard, Nottingham; Capt. O. W. Redgate, Inglenook, East Leake, Notts.; C. E. Ramsden, 10, Wilford Grove, Nottingham. Qualification: £100. Remuneration of managing director: £400 per annum; of other directors, as fixed by the company. Registered office: 17, St. Michael's Street, Nottingham.

A Link with the Past.—The name of Dollond has been an honoured one in the optical and photographic world for generations, and the death of Mrs. Fanny Dollond at her home in Streatham a few days ago removed the last direct descendant of John Dollond, the eminent English optician of the eighteenth century

Family History Photography.—The making of a series of weekly or monthly portraits of babies is no new thing among amateur photographers (writes a correspondent), and one wishes it were more common in the studio, and that parents could be persuaded to bring their children more often. It might, by the way, be a good thing for professional workers to advertise and make a specialty of, say, monthly portraits of newly-arrived babies. Cinematograph producers have, it appears, opened up a new branch of work, for last week's newspapers stated that a firm of film producers are at present busily engaged in making films for private families. These films range from 300 to 1,000 feet and upwards in length and form a permanent record of families' histories. Supposing the family came over at the time of William the Conqueror, their cinematographic tree may commence then, the characters of their ancestors, of course, being enacted by living members of the present generation, and the history brought right up to date to the first tottering footsteps of the latest baby. The continuation of the film by additional scenes, when opportunities occur, will enable the present heads of the family—say, on the occasion of their golden wedding—to enjoy an entertainment harking back through the dim years to their happy childhood and subsequent marriage. There is, we are told, a wonderful field for this new method of recording family history.

News and Notes.

R.P.S. Pictorial Group.—On Thursday next, October 20, at 8 p.m., Mr. George Clausen, R.A., will deliver an address. Members of the Group are asked to note the special interest of the occasion.

Missing Overcoat.—The gentleman who by mistake took a green-grey waterproof coat after the lecture at the Royal Photographic Society on Tuesday evening last is requested to communicate with the secretary.

A Compact Camera.—Among the latest American inventions is a camera which can be built up cheaply of cardboard or other sheet material, cut in blank form in such a manner that it may be folded flat to remain convenient for carrying until required for use, when it may be formed into a temporary camera by joining the edges with flexible gummed binding strips. The camera is so constructed as to use daylight-loading photographic film packs. The patentee is N. E. Brown, of Grand Haven, Mich.

Wray Lenses.—Messrs. Wray, Ltd., Ashgrove Road, Bromley, Kent, send us the descriptive price list, newly issued, of their photographic lenses and other optical instruments. Their series of objectives includes the "Lustrar" lenses of *f*/4.5, *f*/6.3 and *f*/8 aperture, casket anastigmats, wide angle and cinematograph lenses and those of the Petzval portrait type. The catalogue contains particulars and prices of cameras fitted with these lenses, and is obtainable free on application to Messrs. Wray.

Kodak £1,000 Competition.—Messrs. Kodak, Ltd., have organised a competition to run from the present month until March next for prints or enlargements by amateurs, in which altogether £1,000 will be awarded in prizes. The results may be made with cameras and materials of any make, not necessarily those of the Kodak Company. The competition will be advertised largely in the provincial press, and circulars giving full particulars may be obtained from all agents for Kodak goods.

Messrs. Taylor, Taylor & Hobson, Ltd., announce that their sales department has been transferred from Leicester to 74, Newman St., London, W.1. Correspondence relating to orders and all other commercial matters will be conducted from this general sales office. This commercial side of the business will be under the direction of Mr. Ronald Taylor, who organised and then managed the firm's American business for many years. Mr. F. A. Jones, who has managed the London office for the past thirteen years, will in future act as general sales manager.

Correction.—By a printer's error, which escaped detection, it was not stated in the article on "Two-Colour Studio Portraits," p. 39 of last week's Supplement, that the process there described has been perfected by Mr. J. Newlands Thomson, for Colour Photography, Ltd., of 3, St. James's Street. In remedying this omission we also are requested to point out that it is not correct to say that the business of Messrs. J. A. Thomson, at 22, Brook Street, is being carried on by Mr. Newlands Thomson, the executors of the late Mr. John Thomson having not as yet come to a decision in this matter.

Fireside Portraiture.—Messrs. W. Butcher and Sons, Camera House, Faringdon Avenue, London, E.C.4, have just issued a new booklet, entitled "Portraiture by the Fireside," written by Mr. P. R. Salmon, F.R.P.S., and describing in simple language the many methods of indoor portraiture by artificial light which can be followed during the winter months. The booklet is illustrated by a number of diagrams, showing how to use magnesium ribbon, flash lamps, and flash powder for single portraits, groups, and for special effects, such as silhouettes or firelight studies. There are also hints on developing and retouching the negative. The booklet likewise serves as a descriptive price list of the goods which are required in these branches of photography. Dealers who are alive to the opportunities of business in photographic accessories and materials during the winter months should obtain a supply of these booklets for distribution. They may do so at the cost of 5s. per hundred, inclusive of the printing of their name and address on the covers.

Chinese Prejudices Regarding Colour.—The fact that the Chinese give evidence of decided ideas of their own as to the use of colours in materials, wrappings and poster advertising was recently commented upon by the United States Bureau of Foreign and Domestic Commerce. Such prejudices have been known to cause a Chinese customer to change his patronage merely because of the colouring of packing paper used. Though no definite rule can be applied to all commercial uses of colour, it can be said generally that gold, yellow, red, bright brown, purple, and certain shades of pink are good colours. Gold is a dignified colour, red the colour of good fortune. Imperial yellow is good for rugs, carpets and curtains. White and blue are mourning, and should be avoided as well as green, which is associated with misfortune. The designing of posters and advertising matter should always be handled by agencies in China who are familiar with the tastes and prejudices of the communities involved.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

FINGER PRINT PHOTOGRAPHS.

To the Editors.

Gentlemen,—The interesting article you published last week on the photographic methods of the French police reminds me of a very simple plan of making finger-print "photographs" without a camera.

Mr. Leslie Dunton White, writing in "Dactylography," points out that an easy method of making very good finger prints is by exposing a piece of Seltona paper to daylight until it becomes almost black, impressing the finger on it for three seconds, and then immersing the paper in a solution of potassium permanganate. The finger print then shows up black on a white ground. The paper can be washed in water for a few seconds, and placed in a hypo solution (four ounces to the pint) for half a minute, washed and dried. The method has the advantage of not soiling the fingers; there is no ink to clog up the ridges and whorls of the skin. The result is clear and permanent, and also bears magnification.—Yours truly,

H. Green.

THE ORIGIN OF PICTORIAL BACKGROUNDS.

To the Editors.

Gentlemen,—The reference in the last issue of the "B. J." (page 600) to the late Mr. John Thomson being one of the first to use pictorial backgrounds in studio portraiture is interesting, and the publication of the date would be of even greater interest to those of us who have a taste for photographic history.

I have in my possession two studio portraits (wet plate positives) taken by Thomas C. Lawrence, and dated 1857. These portraits have the original background scraped away, leaving, of course, the bare glass, and are backed up with paper on which is painted a background, a separate hand painted background being made for each portrait. The actual portrait has black paint behind it.

Mr. Lawrence is believed to have been the first photographer in Greenwich, where these two portraits were made, and I understand from his relatives that he used a plain background (afterwards scraping it away and backing it up with a design as described), until he thought of the plan of painting a background and photographing it at the time of making the exposure upon the sitter.

Happily the examples I have are dated in Mr. Lawrence's own writing, but I am unable to ascertain the date of his making pictorial studio backgrounds. It must have been in 1857 or very shortly afterwards, as very few of his combination portrait and background pictures are in existence.—Yours faithfully,

L. Tennant Woods.

EARLY CINEMATOGRAPH PERFORMANCES.

To the Editors.

Gentlemen,—In your correspondence columns of October 5, 1921, under the heading "America's first Movie Show," Mr. Henry Leffmann gives dates, etc., but he does not seem to differentiate between experimental and commercial "shows." I feel obliged to

say that the really "first commercial picture show in America" on a machine using the now standard perforated film was the "Idoloscope," renamed later "Eidoloscope," in Broadway, N.Y. It was built by my father, Mr. Eugene Lauste, for the Lambda Co., of Beekman Buildings, N.Y., in 1894. I was only 14 then, but I well remember the show; in fact, I figured in some actual pictures, taken on the roof of the N.Y. "Police Gazette" building.

I take pleasure in enclosing you a reprint from "The Railway Magazine," December, 1897. You will see on page 5, line 5, that it here mentions the Eidoloscope. Though whether correct or not, it mentions MM. Lumière as having exhibited in France in 1892 "The Cinematograph." Personally, I think it was not shown publicly till 1895, though a Mr. Maisson was working on it in 1894. (*Vide* "Conference sur la Cinematographie," by Ernest Kress, 1912, page 12.)

It simply comes to this: there were many books on cinematography and its origin and history, but none are actually correct, according to the country in which the book is published. So some means are proved that that country is the one where it was first thought of or made possible, whereas, really, it is the outcome of the brains from many inventors working along the same lines unknown to one another, and perfected by the commercial men who had the foresight of its possibilities.—Yours truly, EMILE L. LAUSTE.

70, Wendell Road, Shepherd's Bush, W.12. October 10, 1921.

NEGATIVES AND ENLARGING COSTS.

To the Editors.

Gentlemen,—We are particularly interested in your remarks in "Ex Cathedra" referring to present-day negatives and hydroquinone.

In the course of our business we naturally handle a large quantity of negatives from photographers all over the world, and, judging from the great variation in quality, even in batches of negatives from the same photographer, we think that time and temperature are practically unheeded. Consequently, in order to get even fairly uniform results we have to carry a very large stock of various makes and grades of both bromide and gaslight papers, whereas if time and temperature were considered in development of the negatives we could carry a much smaller stock, could very much increase our output per man, and thereby reduce costs; the reduction of costs would mean a reduction in price to the photographer.

In our copy negative department we use hydroquinone invariably for line work, and also for getting a brilliant reproduced negative from a flat original.

Yours faithfully,
For Raines & Co. (Ealing), Ltd.,
R. H. CHENNELL,
Managing Director

Ealing, W. October 7.

EXHIBITION AND COMMERCIAL PORTRAITURE.

To the Editors.

Gentlemen,—The letter under above heading and signed Godfrey Wilson interests me greatly, it being exactly my own experience during the last twelve years. The present gap between high art portraiture and high-class commercial portraiture is too wide. I certainly would not dare attempt turning out commercially the class of picture I produce for exhibition purposes, and I tremble to think even of the comments of your critic if I were to send up to any exhibition specimens of the ordinary, everyday high-class work turned out by my establishment, and which evidently suits the clients we have.

A few years back I tried an experiment which opened my eyes to the above facts. With every suitable client, when I had taken the number of negatives required for the sitting, I made an extra exposure or two, with the object in view of obtaining a picture something above the ordinary style of commercial photograph, but on submitting a proof of this, which I considered far and away above the other positions, in almost every case the latter were preferred to the picture portrait.

I look forward to more letters on this subject.—Yours faithfully,

GEO. J. HUGHES, F.R.P.S

2, The Mall, Waterford. October 8.

To the Editors.

Gentlemen,—Since my name is mentioned two or three times in the letter signed Godfrey Wilson under the above heading, you will perhaps allow me to add a word or two upon a question which is an old one, and yet seems as far as ever from settlement.

Your correspondent's classification of portrait photography into "exhibition" and "commercial" varieties at once makes a diagnosis of his trouble easy to come at. There are hundreds who are suffering from his complaint, which is art-indigestion. I, too, feel very sick, frequently, at what is offered me to swallow in the name of art, and I think I can help Mr. Wilson if he will try to get my meaning.

He says that the two shows "are not nearly so useful" as the little P.P.A. show. This means that he has little sympathy with the things at the larger shows, but more with the professionals' exhibition. Then he says that between good professional work and "high art" (I accept his bantering term) there is a big gap, across which only men like Crooke and Thomas are able to get. But I take it he thinks it worth while to get across to reach this "high art" which infests the larger shows, not the lesser. It seems to me that he thus cancels out two of the points of his argument and knocks the bottom out of his further complaint that "the average worker fails to do so," *i.e.*, to get across the gap. What is the trouble, then? Is the fault with Thomas and Crooke, or with the average worker who "fails" to follow them across the gap?

I suspect a *soupçon* of the taste of sour grapes. In jumping for these things many an average worker tumbles into the gap. Once there he joins Mr. Wilson in believing professional work more "useful" to him than high art, although to excuse the jump he has to admit that though high it is "excellent" and "not out of place."

The next point is as to the "utter uselessness" of such works as two by Mr. Crowther, about which I waxed rather enthusiastic in a review in this paper. Mr. Wilson instances the case of a very successful man of business who made a practice of showing these useless things outside his studio, but never produced them inside. There are two facts here that want reconciliation: (*a*) This man cannot have thought them useless or he would not have shown them; (*b*) his numerous customers *must* have seen them before they entered. We are not told that his customers were disappointed at getting portraits "produced commercially" instead of the showcase article; but we are told of his prosperity. Where, then, does the uselessness come in?

I think that Mr. Wilson is "bewildered and troubled" because he is mixing up subject-matter in portraiture with feeling and artistic quality. He seems to take the stand that things like "The Showman's Wife," or, to mention another case, Luboshez's clever parody of Orpen's "Chef," are useless because sitters do not wish to be taken as show women and chefs. But sitters are not such fools as that. All they want is evidence of artistic skill in the photographer. I am constantly asked to recommend such. Fanciful and freakish things are, in themselves, no recommendation at all. Mr. Wilson is quite right there; but if they are done well and artistically enough to catch the admiring eye of the passer-by, they are surely a lure. Having lured, it is up to the photographer not to break faith with the lured one by fobbing him off with something "produced commercially." A print in a window is like a hanging sign: virtually it says, "I can sell you this." Too often it is the sitter that is sold.

It seems to me that the professional should shake himself up and get points of view outside of that condition of things which Mr. Wilson says is "of the greatest interest to average studio workers"—the manufacturers' specimens. The manufacturers display these things to show the excellence of their materials, not to attract sitters. The manufacturers look after the professional's technical requirements only too well. The need is all on the artistic side. It is not, I repeat, showmen's wives and theatrical studies, but the eye and the feeling which presents such things in a way that arrests and charms: it is not the sitter, it is the way the sitter is given that professionals must worry about: it is the message that finds conviction in the spectator's experience and catches at the heart; it is the truth and beauty of posing, lighting, modelling and quality. These things matter far more than perfect negatives and immaculate prints. Mr. Wilson says that "given such models" . . . "most studio workers could produce similar results." I ask, then, why

do not they get on with it? The fact is that the actor is not an easy person to treat artistically. He usually leaves too little to the photographer, and Mr. Wilson pays me the compliment of detecting an instance of this defect—a pretty obvious one in a general way

Many years ago I said, what is now a by-word in everyone's mouth, that the amateur is the pioneer of professional photography. Mr. Thomas and Mr. Crowther are scarcely full-fledged professionals, and one could reel off a long list of amateurs whose high art does really mean business.

It is useless to keep on snarling at art. The tradesman has amused himself and his followers a long time with this pastime, doubtless because he rightly despises the freaks and stupidities of which Mr. Wilson complains with justness. But, Heaven help us! These are not art!!—they are stunts!!! harboured by the exhibitions in the hope that they will provide reputation for liberal and up-to-date views as well as a live show.

I am as convinced that the future of photography lies on the lines of true art as I am that the sun will rise to-morrow. But professionals, as a class, cannot see this because, for the most part, they do not know what art is. They think it is "tulle" and "backlighting" and fancy mounting; or they imagine that girls half-dressed in jazz-rags must be art because there is nothing else they can be. One cannot explain, and the case is hopeless except by a long, quiet, reasoned training in appreciative observation and the cultivation of feeling and responsiveness to beauty. When a man knows what is beautiful it is impossible for him to do really ugly things, whatever the subject-matter. A child, a blushing bride, or a weasened old man—either can be beautiful in a picture, but you must know where the beauty lies, and if you are nothing but a technician you never will. The public knows: that is obvious, because the artistic amateur gets on and makes art pay.

F. C. Tilney

To the Editors.

Gentlemen,—I must express my sympathy for Mr. Wilson in his letter of last week. He mentions he has "done" the exhibitions. I rather fancy the exhibitions have "done" him and so bewildered him that I am afraid it will take some time for his recovery. However, I sincerely hope he will rally in time to send of his best to our next exhibition.

I fancy I am in a position to speak, having been the only professional this year who has seen every picture sent to London for our three great photographic exhibitions—the Congress P.P.A. Exhibition, the Royal and the London Salon of Photography—and I contend that Mr. Wilson makes statements in his letter which are entirely misleading. He has expressed himself in bewildered language.

The standard of works submitted this year, on the whole, was higher than I have ever seen. Of course, it is foolish to think that every picture selected is a masterpiece. This is impossible, but if one feels a work is uninteresting why bother about it? Pass it by and dwell in peace on the beauty of the pictures you do appreciate. Mr. Wilson is very unfair in his judgment of the shows, inasmuch as there are pictures on those walls that are real masterpieces of photography and art, and I contend any client would be very proud to receive portraits as distinctive as many in this year's shows.

With regard to the Miss Margrethe Mather portrait of a lady, it is a fine piece of work. I care not what anyone says, it is a masterpiece of photography and has a big lesson to teach us all! Only a clever mind could have dared such a big bold stroke. This is where the ordinary professional man is lacking. Firstly, he is not educated to the point of seeing; he is asleep in the slumber of conventional thinking, and all the time he thinks in plain ordinary thoughts, and this is just one reason why photography is stale and photographers all classed as a dull, uninteresting set

I do not think Mr. Wilson realises it is just such pictures as these that will help to keep the photographer awake and induce the public to seek the live man; it stimulates talk and creates business; not necessarily the photographing of backs.

Again, Mr. Wilson is misinformed when he makes the broad statement regarding commercial portraiture. He has much to learn on this point. All I can say is, I am glad the world is large enough and has enough people in it to satisfy Mr. Godfrey Wilson and several others whose works are hung on the walls of these exhibitions, although Mr. Wilson has avoided mentioning their names in his letter of bewildered depression.

Mr. Wilson will be glad to learn that Mr. Pirie MacDonald expressed to me his appreciation of the wonderful advance British portraiture is making, judging entirely from these exhibitions.—Yours very sincerely, Marcus Adams.

43, Dover Street, Piccadilly, W.1.

ILLUMINANTS IN ENLARGING: FILMS v. PLATES.

To the Editors.

Gentlemen,—Absence on holiday is my excuse for these somewhat belated remarks. It is unfortunate that your article of September 30 does not draw attention to the fact that some anastigmats do not work to focus when used on an enlarger with electric light, either arc or incandescent. Before buying the projection lens it should be ascertained if it suffers from this disability, which may be shown by instruments that give exquisite definition when used on a camera in the ordinary way.

In the films v. plates controversy, it should not be lost sight of that the grain of films is much coarser than that of plates having considerably greater rapidity. The enclosed test pieces show that the film grain is unpleasantly apparent at two diameters (quarter to whole-plate), while that of a 400 H. & D. plate is practically invisible.—Yours faithfully, Old Hand.

Canonbury, N.1. October 5.

PLATES v. FILM.

To the Editors.

Gentlemen,—That such an unusual step as that taken by us in discontinuing the manufacture of glass plates should have caused a very considerable amount of comment in the photographic Press was to be expected. We have not, therefore, been surprised at the number of letters "to the Editor."

To answer the minor points brought out by your correspondents, although we believe them to be readily answerable, would be to continue a useless controversy.

There is just one answer: the quality of Portrait Film is such that its universal use is inevitable. We have been making film for more than thirty years. For more than twenty-five years we have felt profoundly certain that the day would come when film would displace plates for professional use. Eight years ago Eastman Professional Film was placed upon the market with modest claims. Since then it has made its own place, both in the finest studios and in studios where the greatest volume of work is turned out, simply because it makes better negatives than plates ever made or can make.

There is an inherent advantage in the use of a thin film base over the use of glass: the prevention of that arch enemy of quality—halation. Film does not merely give somewhat better negatives with the usual lightings. It unfetters the photographer, enables him to do the bold and unusual things in lightings, and, at the same time, retain quality. It has a plasticity that no mere plate has had or ever can have.

Some of your correspondents have expressed the opinion that Portrait Film is not fast enough for their particular requirements. We have realised for some time that, especially in the winter months, a faster emulsion would be a help to a large number of professional photographers. With this in view, we have for several months past been experimenting, and are now in a position to announce that, within the next few weeks, we shall put upon the market a very much faster grade of Eastman Portrait Film called "Super speed." This "Super-speed" Film will be approximately twice the speed of our regular Eastman Portrait Film.—We are, yours faithfully,

Kodak, Ltd.,
F. C. Mattison, Managing Director.

October 11.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply, 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

R. L.—So far as we know, no such paper is manufactured, and up to the present it has not been found possible to make a printing paper which will make colour prints from colour negatives.

R. K.—We cannot see any advantage in the proposed alteration. If you had a northern aspect the steeper pitch would help to keep the sun out, but in your case it will avail nothing. Also from your plan, which is not very clear, it would appear that you would sacrifice something in the height of the side light, which is low enough now

E. L.—(1) You can have the lens tubes slit and Waterhouse stops fitted in the case of most anastigmats, although not all. If the work is properly done a thick elastic band round the tube should be sufficient to prevent entrance of light into the mounting. (2) An elastic band could be used if no loose diaphragm was inserted. (3) There is no means of readily calculating the place for the insertion of the stop. The makers could give this information, and in fact it would be best to allow them to fit the diaphragm.

J. S.—(1) The distance required between the sitter and the plate when taking a full length cabinet with a 9½-inch lens is almost exactly 12 feet, supposing the sitter to be 68 inches high. (2) "Cabinet head" is a little vague, but if the sitter's head is reproduced one-third scale, that is, 15 inches to 5 inches, the distance required between the sitter and the plate with a 14-inch lens is just over 7 feet. We cannot attempt to reconcile the figures given in the "Almanac" table with those which you quote from a lens maker. If you like to send the lens maker's booklet we could perhaps do so.

E. J.—We should think that, on the whole, incandescent gas would be your best choice. About a dozen Howellite inverted burners would allow you to give quite short exposures with such a plate as the Iso Record. The acetylene would probably be a little quicker, but you would get nothing like 8,000 c.p. out of twenty burners; 1,000 c.p. would be nearer the mark. You have also to consider the fumes from the light while burning; with twenty burners in a small studio the operator would probably get a bad headache, even if the sitter did not. If you had not very many sitters a flashlight on the Tress principle in which incandescent gas is used to focus by and a gas ignited flash for the exposure is worth considering.

D. C.—You will find your first three questions answered more fully than is possible by letter in the little book, "The Portrait Studio," obtainable from our publishers, price 1s. 3d. post free. Referring to your more particular inquiries, we do not think that you could do better than to get the *f*/3.5 Cooke lens. This will cover well for groups, and will also do for outdoor work, and has besides a convenient soft focus adjustment for portraiture. At the same time we would point out that 12 inches is rather a short focal length for large cabinet heads, and as you contemplate having a large studio a 16-inch or 18-inch lens would be a better choice. You would, however, require a 12-inch lens, or even one of rather shorter focus, for full lengths and groups. It should not be difficult to convert an army hut into a good studio. You would not, in any case, require the full 60 feet in length, but by fitting partitions you could arrange for work and reception rooms.

G. M.—Messrs. W. Butcher and Sons, Ltd., Camera House, Farringdon Avenue, London, E.C.4, and Messrs. Houghtons, Ltd., 88-89, High Holborn, London, W.C.1, supply cinema cameras of simple construction. The best journal for you is the "Kinematograph Weekly," published by Messrs. Odhams, Ltd., Long Acre, London, W.C.2, price 3d. You can get second-hand machines from the City Sale and Exchange, 81, Aldersgate Street, London, E.C.1, and other dealers. The mechanism of a camera would require to be radically altered in order to make it suitable for taking single exposures one after the other, and so that the portrait could be focussed in each instance. For this it would probably be necessary to use a lens of, say, 7 or 8 inches focal length. Such a lens can be adapted to many cinema cameras. For satisfactory work postcard size is about as large as the little cinema negatives can be enlarged. We do not quite understand what you mean by using cinema film for bromide contact work. Certainly transparencies can be very readily made on the cinema positive film

SALE OF NEGATIVES.—I recently purchased the negatives (view and portrait) of a firm of photographers when they went into voluntary liquidation. I purchased simply the negatives, and not the right to use their name. The firm I am now with are open to purchase a quantity of the negatives. About the view negatives I presume there is no difficulty. But can I sell outright to my firm negatives taken in the ordinary way of business of ordinary sitters that may be useful for show-card advertisement purposes?—N. E.

The copyright in the portrait negatives, or in any others which were made by the original firm in execution of an order from somebody or other, is the property of that somebody or other, and any use of the negatives for the purpose of making show-cards, etc., will be an infringement of the copyright. We have no doubt you are entitled to sell the negatives (it is rather an obscure point on which there have been no cases in the Courts), but certainly the purchaser will have no right to print from them, and you are not competent to grant him such right.

D. N.—It would be easier to answer your query if you had enclosed a sketch of the stands on which your lamps are mounted, as upon the form of these the nature of the reflector must largely depend. If the stands are those supplied by the General Electric Company you cannot do better than to adopt the company's hemispherical reflector. The diffusing arrangement supplied with this is not quite effective, and a great improvement can be made by fitting a conical wire shade covered with thin nainsook over the entire front, as shown in sketch we send. If you find these reflectors too expensive, a D-shaped tin reflector with a nainsook front will answer as well, but will not be so sightly. To get even lighting of full lengths the lamps should be 8 feet from the floor. This will give too much light to the head, so to avoid this you should use a semi-transparent head screen to cast a slight shadow on the upper part of the figure, and thus allow you to expose fully for the legs and feet. With groups this screen will not be necessary, as the light will have about the same distance to travel for the heads of the back row (standing) and those of the front row sitting. Reflectors are used as with daylight.

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Contents.

SUMMARY.

It is fifty years since the foundation of the modern gelatine dry-plate emulsion was laid by the publication in the "British Journal" of the paper by Dr. R. L. Maddox. (P. 321.)

In a leading article we describe a method of producing portrait negatives of semi-soft focus which has just been made known in France, and is attracting considerable interest there. Two plates are exposed, one behind the other, and are differently developed. (P. 622.)

In a contributed article Thremit deals with some of the technical and commercial points connected with at-home portraiture. (P. 626.)

The opportunities for the arrangement of portraits within a horizontal oblong space are perhaps not sufficiently realised by portrait photographers. (P. 622.)

Further correspondence on the commercial advantage of artistic portraiture will be found on page 634.

Messrs. O. F. Bloch, F.I.C., and F. F. Renwick, F.I.C., discuss the mechanism of desensitising with potassium iodide according to Freund's process in reference to the recent paper on this subject by Mr. Thomas Bolas. (P. 627.)

A Canadian contributor, Mr. Charles Macnamara, in a realistic description of outdoor conditions during the winter in northern America, emphasises the disabilities of certain items of photographic equipment. (P. 623.)

Mr. A. Lockett has worked out a rule for calculating the nodal space of a lens, that is, the interval which requires to be taken into account in exact calculations of the distance from object to image, or *vice versa*, in copying or enlarging. (P. 624.)

An ingenious method of electrically indicating the setting of a copying camera in focus for any particular scale of reproduction is described in an article on a new equipment of the U.S. Geological Survey. (P. 628.)

Professor Carroll B. Neblette, in a paper in "American Photography" on the fixing bath, prescribes a rule for the number of plates which can with safety be fixed in a given quantity of hardening-fixing bath. (P. 626.)

Dr. B. T. J. Glover discusses the conditions requiring to be fulfilled in the systematic use of a single printing paper for printing or enlarging from negatives of different subjects. (P. 634.)

Stereoscopic cinematograph projection and a gas-heated dry mounting fixing iron are among the patents of the week. (P. 629.)

The Scottish Salon will be held next year at Hamilton, from February 11 to 25. (P. 630.)

A precaution in the use of a roller-blind shutter out of doors is the subject of a paragraph on page 621.

EX CATHEDRA.

Roller-Blind Shutters. Those photographers who use the popular roller-blind shutter should be on their guard when working out of doors, when a breeze is blowing, against the possibility of spoiled negatives. We refer to the probability of the wind catching the cord of the shutter while the latter is open for the exposure of the plate, and turning it round some portion of the camera front, so that a proper closing of the blind is prevented. Some time ago we had this happen when using a large field camera, the shutter cord getting caught round one of the milled heads operating the swing front, with the result the plate was spoiled. It is a good plan to guide the passage of the cord with the palm of the hand while an exposure is being made, especially if of "bulb" or "time." This, of course, does not apply so much to the before-lens shutter, since in all probability it will be far enough away from the camera front to ensure that its progress during the exposure will not in any way be impeded.

* * *

Fifty Years of Gelatine Emulsion. It was in the autumn of 1871, the year of the Tichborne trial, that Dr. R. L. Maddox published, in the "British Journal of Photography," the paper describing the preparation of a gelatine emulsion which, within the subsequent ten years, had begun to revolutionize the practice of photography throughout the world. Yet the publication attracted scarcely any notice at the time. The energetic Thomas Sutton, in the following issue of the "B.J.," prophesied the approaching substitution of gelatine for collodion as the vehicle of sensitive silver salts, but in his review of the year's progress in the succeeding "Almanac," Traill Taylor did not even mention Dr. Maddox's contribution. And when the principle of process described by Maddox is studied, it is perhaps not surprising that photographers of that day should have failed in discerning any great possibilities of gelatine displacing the established collodion process. In point of fact nothing more was heard of gelatine emulsions for nearly two years; the next sign of interest in it was an advertisement in the "B.J." of July 25, 1873, by Mr. J. Burgess, offering for sale what was afterwards discovered to be a gelatine emulsion. That publication, however, did much to promote subsequent experiment with, as the names of Kennett, King, Johnston, Burnett, Watton, and others are associated. The succeeding five or six years were characterised by great activity in the new field, and those who may wish to trace the evolution of the gelatine emulsion during this period cannot have a better means of doing so than the article by W. B. Bolton in the "B. J. Almanac" of 1880. It is notable in all this how closely experimenters clung to traditions of the collodion emulsion process, and how, by slow degrees, the technical conditions which applied particularly to the latter were discarded.

Wide-Angle Lenses. The equipment of most photographers includes a wide-angle lens, though many workers do not seem to realise that these instruments may be of great value, apart from the particular purpose for which they are primarily designed. When copying has to be done upon a fairly large scale, and the camera extension at the photographer's disposal is not enough to permit the required size of picture with the lenses ordinarily employed for this work, the short-focus wide-angle lens may be pressed into service with excellent results. In this branch of work the violent perspective too often in evidence in pictures taken with short-focus lenses is not generally noticeable. Again, most wide-angle lenses are separable; their components, in common with other lenses of the doublet type, are usually about twice the focal length of the complete lens, and with smaller stops give quite good definition. This fact may sometimes be of advantage in giving an additional choice of focal length not possessed by any complete lens at the photographer's command.

* * *

Vertical or Horizontal. Many photographers are at times in doubt as to whether a particular picture should be taken the vertical or the horizontal way of the plate. In effect, the vertical picture conveys an impression of strength and dignity, while the other rather of breadth, space, and distance. This is, of course, mainly applicable to landscape or view work, though in some ways the idea may be applied to portraiture. It is sometimes possible to strike a new and distinctive note, by composing a portrait photograph in the horizontal, instead of the usual vertical way of the plate, particularly when the sitter can be posed so that the lines run to length and breadth, rather than height. We were recently shown a very charming garden portrait of a lady reclining in a deck chair, and this particular portrait required a certain originality of treatment, simply because the lines of its composition took a form different from the usual vertical. Sometimes the choice of a horizontal position for the plate is a decided mistake. Some time ago we noticed one of the ordinary "bride and bridegroom" pictures, taken upon a lawn. The plate had been exposed in the horizontal position, with the result that far more of the surroundings were included than there was any need for. These pictures should seldom be attempted other than with the plate in the vertical position.

* * *

Hardening Roll Films. Those who use roll films after a long experience of dry plates are inclined to treat their negative medium rather too harshly when developing and fixing. It must be kept in mind that film in any form is decidedly more tender than glass negatives, and will stand very little ill usage without softening or frilling, in which case it is very prone to scratches and other forms of mechanical damage. This is especially the case in hot weather, when it is practically impossible to keep solutions at a temperature low enough to ensure immunity from trouble without the use of ice. It is always a good plan to use a hardening bath, such as formaline or alum, preferably the former, between development and fixing; or, if this is not done, an acid fixing bath, which will also harden the film, should be employed. One caution should be given when using an alum bath between developing and fixing. The alum bath must not be too strong, or the film may be given a dirty appearance difficult to remove; also, the film should be well washed, after being taken from the developer, before being put into the alum bath, or the alkali remaining in the emulsion may contaminate the alum bath, with the same result. In this respect chrome alum is better than ordinary alum. Another cause of scratches may often be traced to the rough ends of the film travelling over the strip when in the washing water. These should always be cut off, or they may be attached to a cork with a drawing pin, the film being suspended in a loop in the washing water. If this is done, scratches will not occur, even though the gelatine coating is in a soft state.

A TWO-NEGATIVE SYSTEM FOR SOFT-FOCUS PORTRAITS.

A process of more than ordinary interest to portrait photographers is described and illustrated in the current issue (No. 44, October 15) of our contemporary, "La Revue Française de Photographie." It is a method of introducing a certain amount of soft definition into a portrait and at the same time of modifying to a very considerable extent the scale of tones and even such features as the texture of the background. The method has long been employed by a painter and sculptor, M. E. Artigue, son of the M. Artigue who formerly made a direct pigment paper with which the early triumphs of Demachy, Puyo and other French pictorialists were obtained more than twenty years ago, but which is no longer manufactured. M. Artigue has disclosed his method to a contributor to our contemporary, M. W. Quatreboeufs, who, in an introduction, gives his reasons for regarding it as the realisation of an ideal technical method hitherto sought in vain among soft-focus lenses and other devices. According to M. Quatreboeufs, whose curious name is, perhaps, a nom-de-plume, one must have in a portrait—or in a landscape, for that matter—acute definition, or "sécheresse," as the French call it. But having got that, it must, so to speak, be enclosed or, as our French writer puts it, be given an "enveloppe." From this standpoint the result obtained with a lens which yields an image more or less wanting in definition is unsatisfying, since it lacks the precision which is regarded as the first essential; and the customary retouching, in the view of the writer, is worse still. On the other hand, M. Artigue's method is found to yield results which exhibit this union of definition and "medium." We hear that his work in portraiture has received the cordial admiration of French art critics.

In practice, M. Artigue's method is very simple. He exposes two plates in the camera, one behind the other, and with the emulsions' films of both directed towards the lens. The two sensitive surfaces are therefore separated by the thickness of the front plate. It is necessary to give an exposure about half as much again as for a normal negative, in order to obtain sufficient light-action on the rear plate. The front plate is very lightly and superficially developed; its function is to yield detail and sharp definition. The rear and somewhat under-exposed plate is, however, developed thoroughly in order to obtain a vigorous scale of tones. The two negatives, when superimposed in register, should together form one of about the normal density. For use, they are thus bound together in register with gummed strips in the same relative positions as when exposed in the camera. From the composite negatives prints are made in the ordinary way, that is to say, with the paper in contact with the film of the sharp negative of the pair.

Nothing is said in the article in our contemporary respecting the working aperture of lens which is suitable to this process, but presumably a large aperture, such as $f/4$ or $f/6$, is intended to be employed; otherwise the degree of softness of definition produced on the rear plate will be insignificant. Moreover, in view of the longer

time of exposure which requires to be given, a large aperture may be assumed to be a necessity under the ordinary conditions of portraiture. Two half-tone reproductions of photographs obtained by the process are certainly a recommendation of it. One of them, a half-length portrait of a woman, has an indefinable mixture of softness and sharpness, and also exhibits what apparently is the result of considerable after-work upon the rear negative. It seems that M. Artigue does not tamper in any way with the thin sharp negative obtained on the front plate, but as regards that made on the rear plate permits himself to carry out any description of work, in the way of retouching or local reduction or intensification, which, it is judged, will fit in with his artistic aims. Apparently, in the portrait which we have just referred to, a good deal has been done to the rear negative by way of introducing a species of soft hatching of the background. Evidently, work of this description may be done somewhat coarsely, the separation of the rear negative from the printing paper serving to soften such handwork in the final print. The other specimen, having as its subject the head of an old man, shows a print from each component negative alongside one from the two negatives combined. It is evident that a large-aperture lens has been used, the negative on the rear plate being quite out of focus. Apart from the intermingling of a certain degree of soft focus in the prints, the method would seem to provide the means for securing a rendering of detail throughout a wide range of light intensities in the subject, and possibly in this respect has as much to recommend it as in its introduction of soft definition. The possibilities of two successive emulsion films for the rendering of a long scale of tones have in the past been proved in the case of double-coated plates, such as those formerly manufactured by Mr. Sandell. Here the result is somewhat similar, but with the added facility of producing localised effects by treatment of the rear negative.

BELOW-ZERO PHOTOGRAPHY.

If I say that where I live in the Ottawa Valley we never have any excessively cold weather I may seem to be echoing that patriotic resident of the Yukon who deprecated the reports of extremely low temperatures alleged to occur in his country. "These stories," he said, "are all greatly exaggerated. I have lived there for many years, and the lowest I ever saw the thermometer was only 65 deg. below zero!" After that, our unassuming minimum in Eastern Ontario of 35 deg. below is scarcely worth mentioning. And even this moderate—that is to say, *relatively* moderate—temperature is seldom suffered by the photographer in the pursuit of his art in the open. For the lowest record invariably occurs just before sunrise, and the temperature goes up steadily with the sun, so that by the time the light is favourable for photography the thermometer rarely stands lower than 20 deg. below zero.

I do not think there can be any finer weather in the world to be out in than 20 below zero on a bright, still morning, when the well-packed snow affords good snowshoeing. The keen, dry air is so stimulating that one can travel all day without fatigue; and, strange to say, in the cold the camera loses its well-known property of doubling its weight every hour it is carried. If there has been a fall of snow in the night, the surface glitters under the early sun in millions on millions of diamond sparks. The dry snow creaks under the snowshoes, but the woods are very silent. Only a few birds stay with us through the winter, and none of them move around much in very cold weather. But now and again a sharp crack rings through the forest like a pistol-shot. Water lodged in some crevice of a tree has been expanded into ice by the intense frost, and has suddenly riven open the wood. Everything is rigid with the cold. The pine-needles stand out in tufts as stiff as wire, and as one pushes through low-hanging branches the twigs break off like glass.

As long as I keep moving I am quite warm and comfortable, but when I come to set up my camera I begin to realise that it is really a cold day. To manipulate small screws and make fine adjustments with thick buckskin mitts on is an impossibility. It has to be done with bare hands. In less than two minutes my hands are numb and aching with the cold, and the mitts must be put on again for a while until feeling and circulation come back into my fingers. There may be trouble getting a firm footing for the tripod in the deep snow, but by tramping around heavily on snowshoes a fairly solid bottom is obtained. An utter abomination when working in the snow is a flimsy tripod. One winter morning I proudly started out with a beautifully-made little wooden tripod of several ingenious folding and sliding sections. On firm ground it was, perhaps, strong enough for my camera, but in the uncertain foundation of the snow one leg sank deeper than the others, it toppled over, and the weight of the camera pulled it down sideways. When I picked it up I counted eight places where it was split or broken. The loose tripod top and the three separate legs that have to be carried like a bundle of sticks are also anathema in the cold. Indeed, any apparatus that demands avoidable handling is to be shunned in zero weather.

When focussing with my head under the cloth, if I happen to breathe on the ground glass, my breath freezes on it in a coat of rime that has to be scraped off before I can proceed. Late one cold afternoon I was preparing to make an exposure, and as I bent down to set the diaphragm I inadvertently breathed on the lens. Instantly it was coated over with ice. Without thinking, I breathed on it again, with the foolish idea of melting the coating. But the effect was merely another layer of ice over the first one, and as there was no possibility of getting the lens thawed out before the light was gone, I simply had to pack up and make for home.

Low temperatures have no bad effect, I believe, on the speed of plates, indeed, all sensitive materials keep excellently in our dry, cold winter weather. But Jack Frost plays what the photographer must consider very stupid tricks with apparatus. Many wooden cameras of European manufacture warp and split here over winter. Strong-springed shutters of the "Compound" type continue to work quite satisfactorily at the lowest temperatures I have ever experienced, but some of the lighter patterns of diaphragm shutters are slowed up or stopped altogether by the cold, and the focal plane shutter also gives in when the thermometer sinks to anywhere near zero. Consequently, the reflex camera is practically useless here in winter. Our ruffed grouse has a habit of burying itself in the snow as a protection from the cold, and I have long wanted to photograph the bird bursting out on the wing from its burrow in the drift. My sector shutter set at 1/50 second on the scale goodness knows what the speed really is—only gave me a negative with a streak of grouse 6 ft. long. So I tried a reflex camera that I had used with perfect satisfaction in the summer. But after the first half-hour in the open the inexorable cold gripped its inwards, and when I reached the grouse resort the shutter was so stiff with the frost that even at the highest spring tension it refused to work. And so the grouse still leaps from its snow burrow unphotographed by me to this day.

If you demand mist in your landscapes, you won't go out

to photograph them at 20 below zero. In such weather you will find no soft, hazy vistas; everything is clear-cut and keen. The naked branches of the distant hardwoods are wiry sharp, and you can see the pine trees fringing the skyline of the blue and silver hills thirty miles away. There is nothing vague or illusive about the scene. A Canadian winter day is a hard, cold fact.

For the nature photographer the season affords many interesting subjects. For instance, there is a new kind of botany to be studied in the numerous plants that stand above the snow, leafless and flowerless now, but frequently offering fine compositions against the pure white background. An even more interesting series can be made from wild animal tracks in the snow. Only a few of our animals hibernate, and although the soundless woods and fields seem bare of life, the snow betrays the presence of many creatures large and small, and relentlessly publishes all they have been doing. The moose, the wolf, the lynx, the otter and other rare fur-bearers must be sought farther north; but even in the settled country where I live tracks of the red deer, beaver, porcupine, fox, mink, hare, marmot, weasel, red squirrel and sundry mice and shrews are more or less common.

With a modicum of woodcraft, the snow-gazette is not hard to read. It gives news of many intimate happenings in animal life, of friendly visits and social gatherings in the moonlight, of courtships, hunting expeditions and intrepid travels; and, alas! all too often, of battle, murder, and sudden death.

In photographing the tracks the best results are obtained with panchromatic plates and colour screens, a red screen being sometimes useful to give contrast in the snow on a cloudy day. And a tilting top for the tripod is more than a mere convenience—it is a practical necessity.

CHARLES MACNAMARA.

FINDING THE NODAL SPACE OF A LENS.

PRACTICALLY all popular formulæ dealing with the distances necessary for enlarging or reducing stop short after stating the conjugate foci for an image in a given ratio, with a lens of a given focus. It is left to the uninitiated worker himself to discover, often with bewilderment and chagrin, that the sum of the two conjugates is seldom the precise total distance requisite for a desired size of image.

As anyone acquainted with optical theory will be aware, the explanation is that the two conjugate distances should not usually be measured from one identical point, but from separate points, known as the first and second nodes, or the nodes of admission and emission. The nodes may be defined as those points where converging rays from the object, or diverging rays to the image, would cut the lens axis, if they were to continue through the glass, or be produced back in a straight line, without refraction or bending. According to the optical design of the lens, the nodes may either be inside it or outside, and sometimes the second node is in front of the first instead of behind, in which case the nodes are said to be crossed. They rarely coincide.

The foregoing will make it evident that the correct total distance between negative and enlargement, or original and copy, will be the sum of the two conjugates plus the distance between the two nodes, called the nodal space; while if the nodes are crossed the nodal space must be subtracted from the sum of the conjugates instead of added.

But how is the nodal space to be ascertained? If the photographer knows the precise focal length of his lens that is an easy matter. He has only to focus an enlargement or a copy carefully to an exact ratio, to measure the distance from negative to image, or from original to ground glass, and to find the difference between that measured distance and the sum of the conjugates required for the given ratio with a lens of the given focus. Thus, suppose the lens is known to be of 8 in. focus, the ratio of enlargement or reduction is 2 diameters, and the measured distance between object and image is 35¼ ins. Looking up the conjugates for a ratio of 2, in a table of distances, we find them to be 24 ins. and 12 ins., or 36 ins. altogether, and subtracting 35¼ from 36, the nodal space is found to be ¾ in., the nodes in this case being obviously crossed.

Providing all the measurements have been very carefully done, we can now always enlarge to any desired size with that lens, or reduce, by simply calculating or looking up the sum of the conjugates, subtracting ¾ in., measuring the resulting distance between negative and easel, or object and plate, and moving the lens alone until sharp focus is obtained with the largest stop.

But when, as most frequently happens, the worker does not know the exact focal length of the lens, or disbelieves its supposed focus, matters are more involved. As far as the writer is aware, no formulæ have yet been published dealing with such circumstances, except those calling for the use of an expensive optical bench and a nodal slide or turntable. The following formula, the result of much patient calculation and experiment, may therefore be of service to many. In spite of its somewhat forbidding appearance, it is really quite simple, while the whole of the measurements and reckoning can be carried out in a few minutes, requiring nothing but the every-day appliances of the studio.

Two different ratios and total distances have to be measured. Much the easiest way of doing this, in the case of an enlarger, is to use as the negative a plain glass having on it a black line exactly 1 in. long. Then the measurement of the line in the enlarged image will itself be the ratio. Thus, if the image measures 2 ins., the ratio is 2, and so on.

Having first focussed one image sharply with the largest stop, measure the ratio, and also the total distance from negative to image. Then focus another image sharply a diameter or two larger, again measuring the ratio and the total distance.

Let D_1 = first total distance, D_2 = second total distance. R_1 = first ratio, and R_2 = second ratio. Then,

$$D_2 - \frac{(D_2 - D_1) \times \left(2 + R_2 + \frac{1}{R_2}\right)}{(R_2 - R_1) - \left(\frac{1}{R_1} - \frac{1}{R_2}\right)} = \text{the nodal space.}$$

For example, suppose the two ratios are 3 and 5, while the two distances are 54 1/3 ins. and 73 ins. Then,

$$73 - \frac{(73 - 54\ 1/3) \times (2 + 5 + 1/5)}{(5 - 3) - (1/3 - 1/5)} =$$

$$73 - \frac{18\ 2/3 \times 7\ 1/5)}{2 - 2/15} =$$

$$73 - (2016/15 \div 28/15) =$$

$$73 - 2016/28 =$$

$$73 - 72, = 1 \text{ in., the nodal space.}$$

Since 73 ins. is the actual total distance with a ratio of 5, it is evident that 72 ins. is the sum of the conjugates for that ratio. Knowing this, it is easy to find the true focal length of the lens, which is always equal to the sum of the conjugates divided by $\left(2 + R + \frac{1}{R}\right)$. Thus, $72 \div (2 + 5 + 1/5) =$ $72 \div 7\ 1/5, = 10$ ins., the focal length.

Having once ascertained the nodal space and the focal length of his lens, the worker will in future be able to make enlargements or reductions to any desired ratio without further trouble, in a manner that is far quicker and more

satisfactory than the usual rough-and-ready series of shiftings and readjustments. Suppose, for instance, it is wished to enlarge to exactly 2½ diameters. Then, $10 \times (2 + 2\frac{1}{2} + 1/2\frac{1}{2}) = 10 \times 4\ 9/10, = 49$ ins. Adding 1 in. for the nodal space, the required total distance is 50 ins., when it is only necessary to place the easel 50 ins. away from the negative, and to focus sharply at full aperture by moving the lens alone.

Should the calculated amount obtained by the nodal space formula prove to be greater than that from which it is to be subtracted, the remainder is a minus quantity, through the nodes being crossed. Thus, suppose the calculation were to end as 65 – 65 8/10, the result would be – 8/10 in., indicating that 8/10 in. (the nodal space) is always to be deducted from the sum of the conjugates instead of added, when in future measuring the total distance for an enlargement or reduction.

In the case of a copying camera, when making the preliminary tests to ascertain the nodal space, the best way is to fix up a 2-ft. rule horizontally in a good light, and to mark two vertical lines on the focussing screen exactly 2 ins. apart. The position and focus of the camera are then adjusted, using the full aperture of the lens, until a certain number of inches in the image exactly fill the space between the lines, taking care to keep the camera back parallel to, and square with, the rule. The number of inches included, divided by 2, will obviously give the ratio; for instance, if the number is 8, the ratio is 4. The distance from rule to ground glass should then be measured carefully, and the operation repeated for the second ratio, this time getting a larger number of inches between the lines.

A. Lockett.

THE FIXING BATH.

(A Paper in "American Photography")

After the plate has been developed it is still sensitive to the action of actinic light because of the undeveloped bromide of silver. When development is complete there is still a layer of emulsion next to the glass and coming to the surface in the deepest shadows which neither the light nor the developer have acted upon. It is the function of the fixing bath to remove the unaltered silver salt and render the negative permanent by leaving only metallic silver embedded in gelatine.

There are but few substances which will readily dissolve silver bromide. Sodium thiosulphate, which we commonly term "hypo," is used to the practical exclusion of all others because of its efficiency and cheapness. Hypo has the formula $Na_2S_2O_3.5H_2O$. It is prepared by the treatment of calcium thiosulphate with sodium sulphate. The salt is easily recrystallised and the commercial samples are sufficiently pure for photographic purposes. It should be free from acid and the crystals should not possess a yellow tinge. It is soluble in one to two parts of cold water and in one part of boiling water.

Hypo dissolves silver bromide by uniting with it to form soluble silver thiosulphate.

$$AgBr + Na_2S_2O_3 = AgNaS_2O_3 + NaBr.$$

If the bath is too weak, due either to improper composition or to over-use, instead of the soluble salt $AgNaS_2O_3$ there is formed an insoluble double salt having the formula $Ag_2Na_2(S_2O_3)_2.2H_2O$. The incomplete elimination of this insoluble salt is the chief cause of fading and staining of prints and negatives.

We may classify the various fixing baths into three types—plain hypo, the acid fixing bath, and the acid fixing and hardening bath. The first is still in use in Europe but is gradually passing there with the introduction of D.O.P. In this country it has completely gone out of use. A certain amount of developer is carried over on the surface of each print or negative transferred to the fixing bath. Since all developing agents are easily oxidised, particularly when in very dilute solutions, even this small amount will soon oxidise and colour the bath, causing stained negatives. In the case of prints the developer is absorbed by the paper and consequently there is greater danger from stain than is the case with glass negatives, so that for prints some addition to the bath is absolutely necessary to prevent oxidation.

The sulphites have the property of preventing the oxidation of the developing agents and it is for this reason they are added to our developers. The preservative action of sulphite is greater if the bath is kept in a slightly acid state. If an acid alone is added to hypo, the hypo will be decomposed and sulphur will be precipitated. This is owing to the fact that acids convert sodium thiosulphate into thiosulphuric acid, which decomposes into sulphurous acid and sulphur. The action is reversible, since we can prepare hypo by boiling together sulphur and sodium sulphite. Consequently the acid and sulphite in the fixing bath, in a sense, work in opposition to each other and we can prevent decomposition of the hypo by the acid, providing there is the proper amount of sulphite added. This is accomplished in two ways: by the use of acetic acid and sodium sulphite, or by sodium bisulphite which has the composition $NaHSO_3$ and is equal to a combination of sulphite and acid.

The following is a suitable formula, using sulphite of soda:—

Sodium thiosulphate ("hypo")	16 oz.
Sodium bisulphite	3 oz.
Water	64 oz.

In large establishments the bisulphite should be made up as a stock solution and added to the hypo, one ounce of a 50 per-cent. solution to each twenty ounces of plain fixing bath.

Sodium bisulphite lye is often used in making acid fixing baths. It is obtainable commercially, but is easily made by adding one-half ounce of sulphuric acid to seven ounces of water and then adding, after cooling, four ounces of sodium sulphite. This quality may be used in the above formula.

Potassium metabisulphite may be used in place of sodium bisulphite. It does not decompose quite so readily but has the disadvantage of costing more and practically the bisulphite is to be preferred.

The third type of fixing bath, the acid hardening bath, is an acid bath to which an alum has been added to harden the gelatine. It contains the following ingredients:—

a. An acid to stop development—usually acetic.

b. A hardening agent, such as alum or formaline.

c. A preservative—usually sodium bisulphite.

There is another, less common bath, in which sodium bisulphite replaces acetic acid and sodium sulphite.

In mixing the hardener it is best to use two separate solutions. Dissolve the alum and sulphite each in one-half the total amount of water. Then add the acid to the sulphite solution and finally mix the two solutions.

If the bath turns milky upon standing it is due to:—

1. Too much acid or the use of too strong acid (most formulas call for 28 per cent. acetic acid).

2. Too little sulphite, bad sulphite, or high temperature of solution.

If the milkiness disappears on standing it is due to the use of an insufficient amount of acid or not enough hardener in the bath to overcome the developer carried over by large amounts of prints.

If the bath does not harden the emulsion it is due to:—

1. Insufficient or impure alum.

2. Alkaline bath.

The hardening action of alum is due to the aluminium sulphate and some grades do not have the correct proportion. Alkaline baths harden gelatine slowly because alum hardens best in an acid solution.

It is false economy to overwork the fixing bath. The difficulty is in knowing when the limit of the bath has been reached. By experiment the writer has calculated that each ounce of a solution of acid hardening fixing bath containing 50 per cent. solution of hypo should fix twenty-five square inches of plate surface.

Directly over the fixing tanks he has fixed an ordinary slate with a pencil attached to a string. The two sizes of plates in use are 5 × 7 and 8 × 10, and their areas are 35 and 80 square inches. As each tank or batch of plates is developed notation of the number of square inches is placed upon the slate. Our tanks hold one gallon each, and, therefore, when the total surface area fixed is approximately 3,200 square inches, the bath is discarded and a new one made up. If only one size of plate is used the record is kept more easily. This may seem to be too much trouble, but once you are accustomed to it, it is very simple, and if plates are fixed for 20 to 30 minutes in a bath, which is correctly compounded and not overworked there need never be a stained or faded negative. Those of us who have lost good negatives from these causes should appreciate the value of their elimination.

CARROLL B. NEBLETTE.

AT-HOME PHOTOGRAPHY.

FROM time to time, sidelights on this profitable branch of photography appear in these pages, and are of undoubted value to those who read. In view of the importance of at-home photography, however, a general review will not be superfluous.

Everyone will not go to a photographer, and if we leave things at that, it means that quite a large slice of humanity is of no use to the profession. But of those who won't go to the photographer, many will not object to the photographer going to them, and some will be only too delighted to welcome him. In the course of a fairly long experience, I have never deliberately sought this class of work, being fully occupied in other directions, but even so I have met a continual demand and numerous openings for it, and, in my opinion, trade which comes to one unasked should flourish for anyone caring to cultivate it.

The first essential for successful at-home work is what I might call a "personable" disposition. The individual who cannot stroll into a stranger's mansion or cottage and make himself and his tackle quite at home, and do it without gush or offence, is handicapped to start with. To make a good impression on the client and to be able to work in comfort under difficulties, one must be neither rude nor timid. It is not always easy to study one's camera position and the customer's carpet in the same breath, but it will not do to sacrifice either.

An assistant, if not absolutely necessary, is very valuable. He or she need have no photographic knowledge. Sufficient intelligence to be able to carry out simple instructions, is quite enough.

The time of day, in its relation to the lighting of distant places, has been treated exhaustively by Mr. D. Charles, and his device for ascertaining the direction of the sun's rays at any place at any time has been published in this Journal. This, the weather, train times, and suchlike details should all be thought of when negotiating with distant clients.

The correct equipment to take to an at-home engagement will depend largely on the job and on the operator. I have found a triple-extension field camera with a light but strong tripod to be worth its weight more often than not. For carrying a field camera, I think an attaché case much better in every way than a canvas bag. It is neat, waterproof, and capable of standing a knock or two without the contents suffering. A folding tripod can be strapped along the bottom of such a case and the lot carried without any great exertion. For cameras larger than half-plate, a suit case would be the equivalent. The advantages to be derived from the possession of a small camera have already been described and emphasised, and I can endorse all that has been said in the small camera's favour. But one point should not be overlooked. A small camera alone is not at all impressive with the average customer. Something large and unwieldy looks professional, while the vest pocket or quarter-plate even if it cost ten or twenty guineas looks too much like a toy, particularly with clients who are in the habit of playing with this kind of "toy" themselves. Even though the small camera does most of the work, a larger camera should always be in evidence, though it might be feasible to camouflage a vest-pocket folder to look like a 10 by 12 outfit!

For half-plate work lenses of about 7 and 13 inches focus will cover most things. Anastigmats are not absolutely essential for at-home work, though this type of lens has the advantage of speed which is often needed in dark interiors. Much can be done with a good R.R., however. Single lenses are not much use unless one is taking busts, when excellent results can be obtained with them if the diaphragm is made large enough to be equivalent to about $f/8$, the sitter being posed in a window. Large single lenses can be picked up in brokers and pawnshops for a few shillings, but apart from this use—for which they were not designed by the way—they are no use for at-home photography.

After using numerous brands of plates and film I have found it extremely easy to get first-class negatives on Guilleminot's Radio-Eclair and Eastman Portrait Film; but I must add, in justice to other plates and film, that I have yet to find one that will not give good results for the proper treatment. As to a choice of developers or developing methods, every man has his own pet ideas, and with regard to the avoiding of halation, harshness and other evils, enough has been written to satisfy everyone's requirements. I agree with the view that amidol is very good when under-exposure is known to have occurred, and that pyro formulæ most readily give negatives for the "slow-development" papers, but more than this I will not include here.

When portraiture is the object of an engagement, it is wise to take with one a background and reflector. These should be as small and light as possible for the sake of smooth handling in the customer's drawing room. A double-sided, plain, or nearly plain, background is the most generally useful; and the reflector, which need be nothing more elaborate than a couple of yards of linen, is best held by the assistant, though a light frame for the job can be bought or made. Shutters for this sort of work are superfluous if working indoors, as very short exposures are not advisable or of use; but for taking children or animals on the lawn, a shutter is an advantage. I favour a studio type such as the Guerry or Packard Ideal. The former, though perhaps never intended for outdoor work, has the advantage in the open of forming an excellent sky shade. The Packard Ideal is a very delicately balanced piece of mechanism which will give time, bulb or instantaneous exposures without any setting. When one is used to it, this shutter is almost human in the way it can answer the slightest pressure of the operator's hand. I may arouse disagreement in not restricting myself to focal-plane or other graduated shutters, but from experience I consider the studio type to be the more satisfactory for all work other than high-speed snapshotting.

Last but most important is the matter of prices. Unfortunately, there is no recognised scheme for charging on at-home or any other kind of outdoor photography, and if anyone were to draw up a list there would be little hope of it being universally adopted. If the photographer works for one class of people only there should be no difficulty in settling prices. They will depend on the styles and sizes of his work, the kind of people he deals with, and the outside expenses incurred. When there is no restriction as to the class of customer a fixed list will not serve without modifications. For example, one could hardly charge on the same scale when taking photographs for a middle-class artizan as when working in the grounds of a Bishop's palace, and there are plenty of places where both classes of work would be available to the same photographer. Whilst saying this, however, I do not mean that wealth should of necessity be plundered, but that a higher rate, accompanied by a higher standard of work, will pay much better and be more satisfactory to all concerned when the customer is a high-class one. Outside expenses, such as train fares, the length of time one is away, meals, etc., must not be a loss to the photographer, but at the same time they should be charged up with an eye to the effect on the client. No matter how important a person he may be, he is hardly likely to relish paying more for a man's time and journeying than he does for the photographs, and if he is a customer worth keeping it may be as well to keep the outside expense as inconspicuous as possible. It is not a bad plan to submit an estimate for the job, the charge to include one copy of each of so many exposures, further copies to cost so much. Details of travelling expenses, if necessarily large, need not be set out in particulars.

An important point for the man who does not practise outside work regularly is to make reasonably sure of payment before going to expense. In my first experiences of at-home engagements I have lost rail fares and half-days, to say nothing of plates and work. Now I am more careful. It is difficult to say, "Don't give any credit," since many good customers are not kindly disposed to the business man who does not seem to trust them. The best plan is to discriminate; a personal interview with a prospective client is advantageous. If there is every prospect of the account being settled without recourse to the courts, payment is best not suggested at all until proofs have been furnished. In this way, larger orders than have been hoped for may accrue. But the reliable customer will nearly always mention the question of expenses if the scene of operations is any distance from the photographer's headquarters, and a deposit should not be refused from a stranger. Working for people in moderate circumstances and at no distance I have found the following plan serve excellently. I make no mention of expenses at all, but quote prices that will not leave me at a loss. No cash is asked for, the customer being told that payment is not essential until proofs are shown. Then, if the party is known to me and I am sure of a straight deal, the order is completed with or without payment; but in other cases an invoice marked "Terms strictly C.W.O.," is forwarded with a note of thanks for the order, also a definite statement that the order will be delivered within so many days after the return of invoice. Since working on this system, I have only been done once, and that was by a life-long friend. Admittedly the "C.W.O." touch may look more like commercial manners than professional etiquette, but when the former means a profit it is preferable to the latter at a loss.

THERMIT.

DESENSITISING WITH POTASSIUM IODIDE, FREUND'S METHOD.

THE most recent work published on the above subject is to be found in two papers by one of us ("Journ. Soc. Chem. Ind.," Vol. 39, No. 12, p. 156T reprinted "Brit. Journ. Phot.," 67, pp. 447 and 463, and in more detail in "Phot. Journ." 1921, 61, 12-15), so that we naturally read Mr. Bolas' article, "B.J.," September 9, pp. 532-4, with interest.

There are many points in it which invite criticism, but we will confine ourselves to a description of some experiments we have just made with the object of testing some of his statements, and to an invitation to Mr. Bolas to produce evidence in support of them, and of the rather remarkable theoretical views he places on record.

The article is apparently only intended to revive interest in an old process which hitherto has failed to find any useful practical application, but if Mr. Bolas' statements are justified, he must have obtained better results than other experimenters, and he should give us fuller details, so that the whole subject can be thoroughly worked out and applied in practice.

The following series of experiments were made on Ilford Empress plates. A number of plates were given identical exposures in a sector-wheel machine (one slow revolution) to the light from a controlled metal filament lamp at 1 metre distance, all the strips being cut from quarter-plates taken from the same box. After exposure, the plates were treated as follows:—

Nos. 1 and 3. Treated for two minutes with 4 per cent. pure colourless potass. iodide solution: 2 grs. cryst. sodium carbonate were added to the 25 *ozs.* batch as an extra safeguard (*vide* Bolas' article).

No. 2. Same iodising solution as above, to which one-tenth its volume of 10 per cent. potass. bromide solution was added before use. Treatment, two minutes.

No. 7. One minute only in same solution as 1 and 3.

Nos. 4 and 5 were iodised in the solution recommended in "Photographic Journal," 1921, 61, p. 13, and containing 1 per cent. sod. meta. disulph., 2 per cent. neutral (cryst.) sodium sulphite, and 3 per cent. sodium thiocyanate, for five minutes.

After iodising, the plates were well rinsed for about two minutes in repeated changes of water, which, in the case of Nos. 4 and 5, contained 2 per cent. neutral sodium sulphite.

No. 6 was not iodised, and was developed in pyro soda (Ilford formula) without bromide for four minutes. Bolas' developer, made up exactly as recommended on page 533 of his article, was used for plates 1, 2, 3, 5, and 7, No. 3 being developed in artificial white light, while plate No. 4 was developed in the alkaline amidol developer recommended in the above "Photographic Journal" paper by one of us. All except No. 3 were developed in darkness. In all cases, except No. 6, ten minutes' development at 70 deg. F. was given, and a neutral "hypo" bath 1:4 was employed for fixation.

The following table shows the resulting densities:—

DENSITIES PLUS FOG.

Plate	1	2	3	4	5	6	7
Exposures (relative)							
Fog	.03	.03	.06	.16	.04	.02	.04
1						.18	—
2				.25		.32	—
4				.36	.12	.65	—
8	.08	.06		.51	.23	1.14	.08
16	.14	.14	.11	.70	.39	1.70	.13
32	.24	.23	.17	.97	.55	2.21	.21
64	.30	.30	.26	1.32	.71	2.66	.31
128	.38	.40	.35	1.81	.84	—	.41

The results show clearly that, in our hands, ordinary development of the untreated plate (No. 6) gives the best result, iodising with the hyposulphite-thiocyanate mixture comes next (4 and 5),

the amidol sod. carbonate developer (No. 4) bringing out far more in a given time than Bolas' hydroquinone developer (No. 5). The values in columns 1, 2, and 7 indicate that it makes no practical difference whether the Bolas iodide solution is allowed to act for two minutes or one minute, or whether bromide is added or omitted.

No. 3, which is the worst, shows the further loss of image resulting from development in white light, whereas many experiments with the iodiser used for Nos. 4 and 5 have shown us that, after rinsing in several changes of dilute sulphite for two minutes, there is no further destruction of the latent image when development is carried out in white light; the plates may even be dried and kept for a week, and possibly much longer, without further loss.

In conclusion, we should be glad if Mr. Bolas would state what evidence he has in support of the statement in paragraph 3 of his article that the process depends on the *partial* conversion of the silver bromide to iodide in the unexposed parts, *while the exposed parts undergo little or no change*. If this were true, it should be possible to demonstrate it by fixing out the unchanged silver bromide from the iodised washed plate in a hypo solution, or, better still, in a 10 per cent. solution of aluminium sulphocyanide, in which the solubility of silver bromide is stated by Valenta to be over 200 times that of the iodide. Our tests of iodised plates with both these solvents entirely failed, however, to discriminate between the exposed and unexposed areas.

On consulting Meldola's article in Watts' "Dictionary of Chemistry" we failed to find the word "gelatinobromide" used in connection with the reversing action of iodides on photographic plates, while his book, "The Chemistry of Photography" (1904 edition, p. 217), refers only to this effect in connection with the wet collodion process.

It would interest us to know wh- Mr. Bolas states that "the photolyte being uncoloured, it is by no means surprising to find that the red light of the dark-room may have in this case a very considerable action," unless his statement is founded on the article in the "Photographic Journal" already cited, in which it is shown that very dilute solutions of iodides are able to confer red sensitiveness on gelatinobromide of silver.

The theoretical views put forward by Mr. Bolas, including the explanation, due to Meldola, of the reversing action of potassium iodide in the light, appear to us to rest on very slender foundations, and to require much further experimental support before those who hold different views are asked to accept them.

O. F. Bloch, F.I.C.
F. F. Renwick, F.I.C., A.C.G.I.

FORTHCOMING EXHIBITIONS.

September 19 to October 29.—Royal Photographic Society. Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

November 23 to 26.—Rotherham Photographic Society. Latest date for entries, November 9. Particulars and entry forms from the Hon. Exhibition Secretary, Sydney G. Liversidge, "Orissa," Gerard Road, Rotherham.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

February 11 to 25.—Scottish Photographic Salon. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

Cambridge Photographic Club.—At the annual meeting of the Cambridge Photographic Club held last week, Mr. J. Winship was elected to the presidency and the retiring president, Mr. E. C. Ogle, to the treasurership, and Mr. W. Farren was re-elected secretary. The reports of the secretary and treasurer showed that the Club was in a flourishing condition both numerically and financially.

A MODERN PROCESS AND COPYING CAMERA.

A popular but interesting account of a new camera installation, recently established by the United States Geological Survey, appears in the current issue of the "Scientific American." It will be seen that the installation, which has been designed by Mr. A. H. Linsenmeyer, chief photographer to the Survey, is distinguished by elaborate electrical methods of operation, and particularly by an electrical device indicating the setting of the optical system to a given scale of reproduction. As in the case of the installation employed by the Egyptian Survey Office, and fully described in "B. J.," August 20, 1920, pp. 511-513, the sensitive plate is placed in the dark room itself.

The three-and-a-half-ton giant, hanging from the ceiling, dispenses with the perplexing problems of alignment, focussing, etc., and responds to direction by electricity or by hand more readily than does the tiny Kodak to the grasp of a steady pair of fists. Nowhere are higher standards of accuracy maintained than in the Federal Survey, and that absolute scale is secured in the reproduction of every map is due largely to the fact that the big machine is exact in every movement to the smallest fraction of an inch.

Save for the bellows and curtain-slide, which are of rubber, the camera is an all-metal affair. A rigid tubular steel frame, ten by sixteen feet, is suspended from the ceiling by springs so attached as to offset any possible vibration of the building. From this

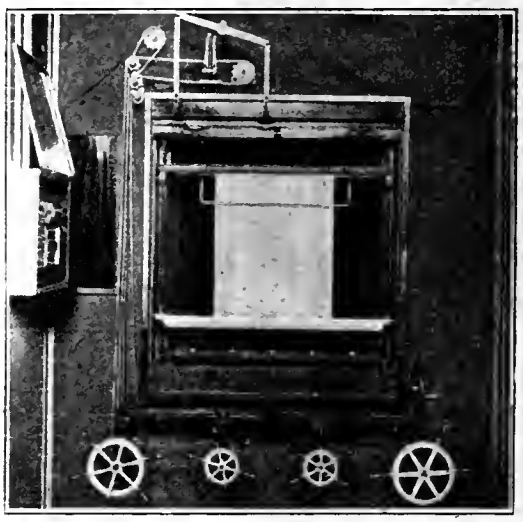


Plate-holder seen from behind the instrument inside the dark room.

massive frame hang the several parts of the camera, in the operation of which the usual method of copying is reversed. In one corner is the plate-holder, placed inside the dark-room. In front of this is the bellows, terminating in lens and prism, attached to a carriage which moves on two parallel rod-rails. Resting on this carriage and travelling at right angles is a second carriage supporting the copy-holder. And here is where the process differs from the ordinary practice; the lens and copy-holder move toward or away from each other, according to the size and scale of map desired, but the plate-holder remains stationary inside the dark-room. This dispenses with the constant squaring up of camera and copy-holder and practically eliminates the time-consuming operation of focussing. The lens is moved forward or backward by the motion of the first carriage, which opens and closes the bellows in accordion-like fashion. The uniformity of bellows movement is regulated by lazy-tongs on each side which give the camera front the appearance of a huge jack-in-the-box.

As previously pointed out, the plate-holder of the machine is firmly attached to the main frame and extends into the dark-room. It has an automatic plate-centering device, aluminium drip-trough, half-tone screen-holder, screen-distance-regulator, spring support for holding the plate in position, and a rubber curtain which keeps out the light during exposure. Just beneath the plate-holder are four hand-wheels which make one think of a pilot-house. Two of the four actuate the lens, giving it horizontal or vertical motion. The

others move the bellows and regulate the copy distance. All four wheels are connected by chain gear to square revolving rods, along which slide bevel gears, an assembly which permits motion to be communicated to the gears at any point in their travel. And if the photographer chooses to operate the machine from the dark-room, he can peep through a little red window and watch the copy-holder and lens swing into position for the picture.

The copy-holder is a steel frame carrying two heavy glass plates, four by six feet. The copy is placed between them; but perhaps you are wondering how, for the illustration seems to have them permanently fixed. This is true as regards the front plate, which is ever in correct alignment with the lens and plate-holder. The rear glass, however, drops back from the top, bookwise, when you turn a hand-wheel at the side of the frame. This releases eight felt-covered cams (four on each side of the frame) and when the copy is inserted, either from the top or from the side, the wheel is again turned and the rear plate is jammed against the front. If perchance the copy should fall between the glasses at the bottom, the operator can "fish" it out with a specially designed rod which grips the edge of the paper without injuring it. The construction of this plate-holder makes it possible to copy directly from tracings and whatnot and renders

Operating the new prismatic-process copying-camera from the electric switchboard.

easy the making of positives and transparencies—those beautiful pictures on glass for which the Geological Survey is famed.

A curtain made of nearly transparent material wound on a spring roller at the back of the frame is employed to get the desired lights and shades. Another unique feature of the copy-holder is the centering device. This consists of four cords, two of which cross the plate vertically and two horizontally. They are manipulated by a slide at the top of the holder which, moved toward either end of the frame, gives the exact margins for the sheet to be photographed. A slide-rule, perfected for this machine, determines at once the size of plate to be prepared for exposure without the usual measurement on the ground glass.

Focussing is a simple process. There are two scales, one on each carriage, on which the degree of reproduction is indicated, and the two carriages are moved until the figures read alike on both scales. That is the thing in a nutshell, but in detail it is worked out like this. An electric contact is set at the desired point on the scale of the copy-holder carriage which, with another contact, is then put in motion. When the two points meet and the circuit is completed, a small incandescent lamp flashes the signal to stop, that the copy-holder is in exact position. Should it happen that the carriage runs past the point of contact, the operator uses a fine adjustment hand-wheel to bring it back, when the little lamp will again send out its glow. The photographer then turns his attention to the primary carriage with the lens and prism. He sets the scale, corresponding to that on the other bar, and starts the motor which drives the carriage along until the proper figure is reached, again using a hand wheel for accurate adjustment. It is all so easy that the picture-maker can be up and away to another job while his friend with the ordinary copying camera is fussing and fuming over details.

Reversible motors drive the two carriages with astonishing ease and precision. As has been stated, the copy-holder is always in correct alignment with the lens and plate-holder, so that the camera front never budges a hair's breadth unless the copy-holder moves in the same direction, but both can at once be driven forward or backward as occasion demands.

Cooke lenses of 31 and 42 in. focal length are used in combination with a Cooke prism. These, attached to a heavy brass plate, will make a picture large or small. As accuracy is the paramount consideration, the optical parts must be in just the right position and absolutely rigid. Plate and copy-holder are plumb or, if not, can be made so by screw movements on each part, while the prism is brought into alignment by a thumb-screw passing through a strong brass bracket which runs out beneath it from the front-board.

Patent News.

Process patents applications and specifications—are treated in "Photo Mechanical Notes."

Applications, October 3 to 8:—

APPARATUS. No. 26,552. Photographic apparatus. G. W. Cooper and Stereo Kinema Syndicate, Ltd.

RELIEF PHOTOGRAPHS. No. 26,128. Process for producing relief photographs. E. Howard.

LENSES. No. 26,629. Lenses for photography, etc. Kapella, Ltd., and H. W. Lee.

FOCUSSING DEVICE. No. 26,188. Roll-film focussing device. A. E. and V. C. Perry.

STEREOSCOPY. No. 26,429. Single-picture stereoscope. A. E. Stanley.

COLOUR PHOTOGRAPHY. No. 26,509. Photographic cameras for reproducing objects with their natural colours. G. Russo.

PHOTO MICROGRAPHY. No. 26,486. Apparatus for photographing microscopic objects with an ordinary camera. F. Stanley.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

DRY MOUNTING FLATIRONS.—No. 169,036 (July 2, 1920). According to the invention the fixing iron comprises a single gas tube upon which is mounted a handle. At one end of this tube is attached a control tap with nipple connected by a flexible tube with any convenient gas supply. The operating head, which is of the more or less hollow type, is secured to or forms a part of this tube. An ordinary gas nipple is fitted midway within the tube, or for convenience the tube may be broken at this part and united again by the nipple. Immediately in front of the nipple the tube is cut away at the sides and has a number of perforations, permitting of an outward supply for the gas issuing from the nipple, and that

Fig. 1.

portion of the tube between the perforations and the hollow head serves as a combustion chamber.

In the drawings A is the body portion of a gas conduit, comprising a single tube upon which is mounted a handle B fixed by washers C nipped against the shoulders D of the fixed collar E and the flange F of the burner or nipple G when securing the head section H of the tube to the section A. The bore B' of the handle B is larger than the tube A so as to leave a suitable

clearance and prevent the possible heating of the handle B. The sections A and H of the gas conduit are coupled together, preferably by the nipple or burner G, one part of which screws into A : the other part screws into H with the flange F acting upon the washers C as before described. The tube or section H forms the combustion chamber J upon which is preferably cast the operating head K; or the head may screw thereon, as desired. The tube H has a cut away portion or a number of spaced open

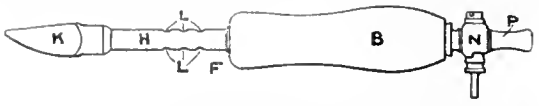


Fig. 2

ings L on opposite sides in advance of the burner G, the distance between each pair of these openings being predetermined, and representing in the corresponding length of flame a variation in its heating capacity to an extent approximating 50 degrees F. The combustion chamber J opens into the hollow part of the head K, which may vary in size and shape and be formed by boring or coring according to whether the head is detachable or cast upon the part H. An exhaust port M is provided in the head K for the escape of the waste heat or hot air in the chamber J. N is a control tap attached to section A for regulating the supply of gas to the burner G, and P is a nipple formed thereon to which is secured the flexible gas supply tube, not shown.

When about to use the device the gas is turned on at the tap N : the small jet issuing from the burner sucks into the com

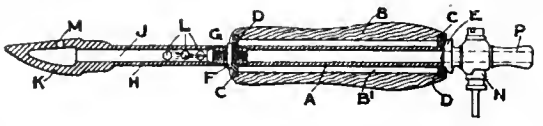
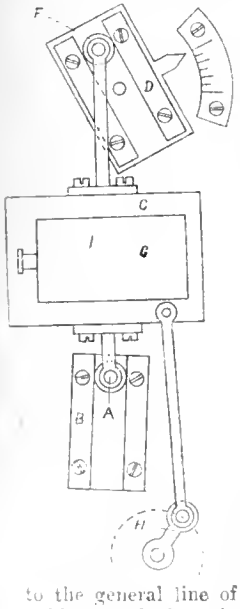


Fig. 3.

bustion chamber J atmospheric air through the cut away parts or the holes L, so that upon a light being applied the mixtures ignite. The resulting flame will extend as far as the last pair of holes and give a maximum heat for quickly heating the head to the desired temperature. When this is attained, the tap N may be adjusted to reduce the flame in order that the desired temperature of the head may remain constant throughout the use of the device. Any variation in the length of the flame amounting to the length of the cut away part or to the distance between each pair of holes L will lead to a variation in heat approximating to 50 degrees F.—John Goodrick, 52, Hare Street, Halifax, Yorkshire.

Stereo-Cinematography.—No. 165,587 (April 22, 1920). The invention relates to means for imparting a stereoscopic effect to pictures presented on a cinema screen, and consists in the mechanical means employed for giving transverse reciprocating movement to the camera while at the same time keeping the lens axis directed on the subject.



Reciprocating motion is applied to the camera by means of a crank and connecting rod, operated by a handle through suitable gearing; the periodicity of the reciprocating motion being varied in relation to the speed of the handle by variation of the gearing.

The handle may be made to also operate the photographing mechanism of the camera through a chain, gearing, or flexible wire.

The distance through which the camera reciprocates may be varied by variation of the radius at which the crank pin, of the crank imparting the reciprocating motion, works.

In the drawing, which is a plan view, the pivot A on the camera platform C (or an extension thereof) has a reciprocating motion on a straight line directed by the guide B mounted upon the base K; the reciprocating motion being on a line at (or having a component at) right angles to the general line of direction of the camera G.

If now during the reciprocating motion of the pivot A the camera platform C is given a certain small angular motion about the pivot, the camera, whilst being moved from side to side, will be continuously pointed upon a distant object.

A roller guide block F is mounted upon the camera platform C (or an extension thereof), and is directed on a straight line by the guide D, the latter being mounted upon the base K on a line at an angle to the line upon which the guide B is set.

An angular motion will then be imparted to the camera platform C about the pivot A depending in magnitude on the magnitude of the angularity of the guide D; the distance of the object upon which the camera will be directed being indicated upon a scale, this scale reading being varied by variation in the angularity of the guide D.

The crank H may apply motion to any point of the camera platform C (or extension thereof) as may be convenient.

The crank may be mounted upon the base K as shown, or it may be mounted upon the camera platform C; and it may be mounted horizontally or vertically.

The base K is fixed to the camera tripod or stand.

It will be seen that the action of the apparatus, in producing the combined reciprocating and converging motions, will be the same if the construction hereinbefore described be reversed, that is to say, if the guides B and D were mounted upon the camera platform C, or extension thereof, and the pivot A and the roller guide block F were mounted upon the base K or extension thereof; all parts being placed relatively to each other as in the first, or primary arrangement.—Alfred Reginald Boorman, 130, Francis Avenue, Southsea, Portsmouth.

Trade Names and Marks.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register :—

Aerozon.—No. 412,022. Spraying machines included in Class 6. The Aerograph Co., Ltd., 43 Holborn Viaduct, London, E.C.1, manufacturers of spray painting plant, air compressors and general engineers.

Tender for Aerial Cameras.—The Department of Overseas Trade is informed that the Venezuelan Government wishes to obtain tenders for three sets of photographic apparatus for topographical work from aeroplanes. Applications should be made to the Venezuelan Minister in London, Dr. P. C. Dominici, 7, Richmond Mansions, Earl's Court, S.W.

R.P.S. Scientific and Technical Group.—At the meeting to be held on Tuesday next, October 25, the following papers are to be read :—"The sensitivity of silver halide crystals which are geometrically identical," by F. C. Toy, M.Sc., A.Inst.P.; "The darkening of silver bromide grains on exposure to light as further evidence of their heterogeneity in photographic emulsions," by J. Brooksbank, A.R.C.Sc., B.Sc.; "The uniform development of dry plates," by O. F. Bloch, F.I.C.; "Experiments relating to the rendering of gradation in photogravure," by H. Mills Cartwright.

The Picture Postcard Trade.—Strong efforts are now being made to secure a reduction in the postage on picture postcards. The increase to 1½d. is said to have caused a decrease of 50 per cent. in sales. A well-known picture postcard producer says he is assured that the Government has the subject under consideration. He asks that the rate should be reduced forthwith, or at an early date, so that publishers will be able to save the export market for next year. The immediate result of the three halfpenny postage has been that stocks have been left on the hands of publishers, wholesalers and retailers.

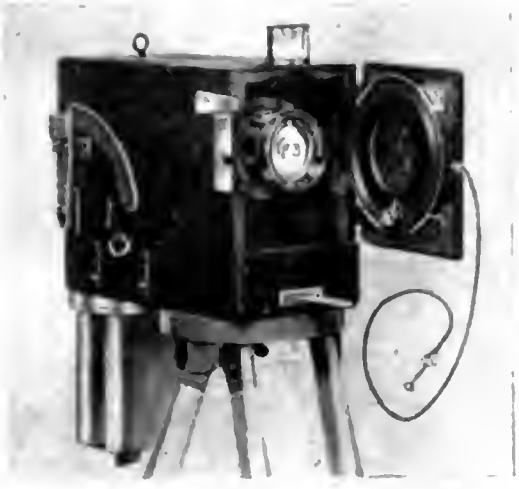
Scottish Photographic Salon.—The attention of our readers who are interested in pictorial photography is directed to the fourteenth annual salon of the Scottish Photographic Federation, which will be held in the Parish Halls, Hamilton, from Saturday, 11, till Saturday, February 25, 1922. Sir Henry S. Keith is the honorary president, and the Board of Selectors is as follows : Messrs. Arch. Cochrane, Barrhead; Robt. Chalmers, Sunderland; and J. Campbell Harper, Edinburgh. Full particulars and prospectus from the secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

New Apparatus.

Aptus Automatic Ferrotype Cameras. Made by Moore and Co., 101-103, Dale Street, Liverpool.

THE inquiries which frequently reach us for particulars of "while-you-wait" cameras for outdoor use in the streets and at seaside and other pleasure resorts, indicate the large amount of photography of this kind which is done. Cameras of American make, some of them in the form of a cannon, have been supplied in this country in the past, but Messrs. Moore are now the makers of a series of excellently designed and constructed cameras for this branch of work. In each model the camera is loaded with a magazine containing 100 ferrotype plates, and is provided with a tank allowing of the plate being simultaneously developed and fixed immediately after exposure and delivered to the customer within one minute. The lens, in models A, B and C, is fitted with two diaphragms, and with simple shutter, and in all three models with a focussing scale allowing of portraits or groups being taken at distances within 2 yards to 12 yards from the camera. The lens is set in focus on any given distance by pulling out to the required extent the brass bar seen immediately above the tripod head in the photograph. Direct-vision finder also is fitted for sighting the subject on the plate.

A pneumatic device is used for holding each plate in position for exposure. By turning down the upright lever seen at the back of the camera to the lowest point of the curved guide bar a rubber mouthpiece is brought down on the back of the top plate contained in the magazine. A plunger, operated from beneath the camera, presses the plate against the mouthpiece, a rubber bulb connected with the mouthpiece being first pressed. On releasing pressure and bringing back the bar to the upright position, the plate is brought into position for exposure. It is transferred to the developing tank by a slight pressure on the bulb, the plate being guided directly into the vertical tank seen below the camera. This tank is made in two divisions and rotates, so that by turning it the part into which the plate has been delivered is brought round for removal of the developed and fixed portrait whilst the second part is placed for the reception of the next exposure. The finished plate is then lifted out of its tank by means of a small horseshoe magnet. The whole apparatus is most solidly and substantially

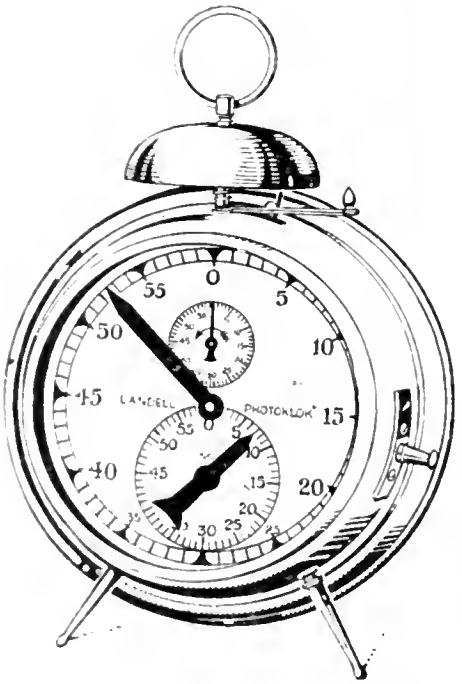


made and of attractive appearance. In the A pattern, for pictures 2½ x 1¾ inches, the price is £6. The B pattern is similar, but has a revolving back by which upright or horizontal pictures may be taken. The price is £8. The C pattern takes the two sizes, 2½ x 1¾ inch and 3½ x 2½ inch, and is also fitted with revolving back. The price is £12 10s.

The De Luxe model, illustrated (for 2½ × 1¾-in. plates), is fitted with a British anastigmat lens of *f* 3° aperture, and everset diaphragm shutter with Antinous release. This model is fitted with revolving back and is sold for £18. It may also be obtained to take the two sizes of portrait already mentioned at the price of £25. Messrs. Moore supply the ferrotype plates in these two sizes in 100, 500, or 1,000 lots, and also the necessary developing and fixing powders and mounts for the metal portrait plates.

The Landell Dark Room Clock. Sold by Lingwood and Lowen, 10, Chadwell Street, London, E.C.1.

HABITUAL users of a clock in a dark-room for factorial development and for other purposes in timing photographic operations, would seem to be fast [illegible] people, otherwise it is scarcely possible to find



an explanation for the successive issues on the market of a considerable number of patterns of clock. The present introduction, a combined French and English make, embodies a range of facilities such that the most exacting user of a clock can hardly ask for more. As shown in the drawing, the clock has three separate dials. That arranged on the outer circumference of the face record minutes from 0 to 60, moving just like the large hand of an ordinary clock. The smaller dial in the lower part of the face is provided with a seconds hand, the finger traversing the dial in one minute. The small upper dial is the setting for the alarm, which it will be observed, may thus be set to ring at the termination of any given interval of time up to one hour. On the right hand side of the clock is the stopping and starting lever, and immediately under the gong a second lever which silences the alarm, if so required. The drawing does not exaggerate the boldness of the dials, an important feature nowadays in a dark-room clock when the latter has frequently to be used in dim illumination. In operation, the clock is exceedingly simple. For example, in case of factorial development the clock is stopped with the seconds hand at 0, and the minute hand also at 0. After pouring on the developer and simultaneously starting the clock, the number of seconds to the appearance of the image is then noted on the lower dial. By multiplying this time by the factor of the developer, the total time of development is ascertained and the alarm can then be set to this time on the upper dial, and development continued without further attention until the signal is given for the plate to be taken out. The clock is evidently exceedingly well made and of nickel steel finish. Its price is 25s.

A NEW DISH ROCKER. Mr. H. W. Harrington, 43, Ellesmere Avenue, N.C.R., Phœnix Park, Dublin, sends us a simple form of dish rocker for the dark-room, which he is supplying, price 4s. 6d. each post free. The rocker consists of a wooden frame on which pivoted on a horizontal axis, a wooden platform for the developing dish. The platform being free to rock over a small angle by

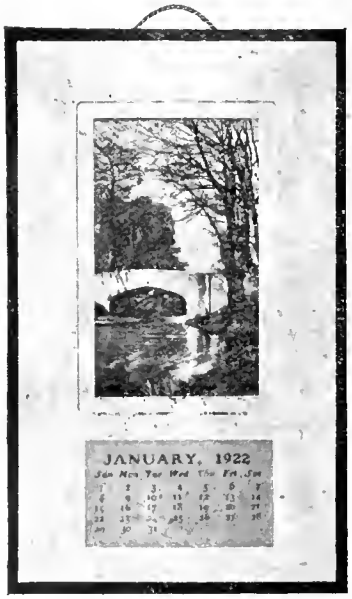
the operation of the finger, the solution in the developing dish is readily kept in constant movement. The device is an extension of the old dodge of laying a split lead pencil on the working bench midway under the developing dish, but, of course, the rocker is an improvement on this primitive plan, since the axis on which the dish is rocked is made a fixture.

New Materials.

Artist Passe-Partouts Mount-Frames. Made by W. Butcher and Sons, Ltd., Camera House, Farringdon Avenue, London, E.C.4.

Messrs. Butcher have produced so many different and admirable styles in ready-made passe partouts that it is not the easiest thing

to find fresh comments to make upon their latest series. However, those which have just been issued as the "Artist" are characterised by an excellent simplicity which fits them for almost any



description of print. The cut-out behind which the print appears is of matt white card, whilst the binding strip is black. The result, in conjunction with a plate mark round the opening of the cut-out, is of most refined appearance. For the benefit of those unfamiliar with the previous issues of these passe-partout frames, let it be said that the print has simply to be laid behind the cut-out and a card backing secured against it, by moistening and pressing down a gummed flap. The passe-partout is then complete without any of the trouble of applying the gummed paper binding. The present "Artist" series includes eight different sizes, four for upright postcards, quarter-plates, No. 1a F.P.K. and C.d.V.; the other four, for the foregoing sizes, but the "landscape" way of the prints. The prices range from 1s 3d. to 1s. 6d. each.

In a companion series Messrs. Butcher embody in the passe-partout a removable calendar immediately below the print, as shown in the second illustration. This calendar series provides an eminently welcome and agreeable form of photographic Christmas greeting card. The prices of the calendar series are from 1s. 9d. to 2s. each As we have said on the occasions of noticing the earlier styles of Messrs. Butcher's passe-partout mount frames, these articles provide a most neat and tasteful means for the display of photographers' window specimens, and have the special merit of keeping the latter clean and allowing of their being regularly changed. Moreover, the display of prints in this form is an inducement for sitters to purchase portraits framed in the same style.

Christmas Card Mounts.—Messrs. Jonathan Fallowfield, Ltd, 146, Charing Cross Road, London, W.C.2, send us samples of the Christmas card and calendar mounts which they have in readiness for the forthcoming season. The cards include a variety of styles, most of them of the folder pattern, and of the slip-in type; a few, however, are for mounting of the prints or for insertion of a print by a touch of adhesive along one side. We observe a commendable diversity of styles appropriate to the variations of taste among the public. The purchaser from Messrs. Fallowfield may obtain mounts in quiet grey, buff or cream colour with a minimum of embellishment, or, on the other hand, those with a cheerful design in bright colours, including the time-honoured sprig of holly. The calendars, in particular, are exceedingly choice examples of mount-making, and are obtainable in sizes from V.P.K. to postcard in both upright and horizontal patterns. Messrs. Fallowfield hold a large stock of these mounts, and can execute orders for them without delay.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, October 24.

Bowes Park and District Photographic Society. "What to See in an old Church." H. Creighton Beckett.
Bradford Photographic Society. "From the Ionian Sea to the Golden Horn." Rev. W. Hargreaves Cooper.
City of London and Cripplegate Photographic Society. Outing Print Competition.
Dewsbury Photographic Society. Y.P.U. Shield Portfolio.
Leeds Camera Club. "The Yorkshire Coast from Flamborough Head to Runswick Bay." Hugh P. Kendall.
Southampton Camera Club. "Marine Photography." Eng.-Com. E. J. Mowlam, R.N.
South London Photographic Society. "Gloucester Cathedral." E. W. Harvey-Piper.
Wallasey Amateur Photographic Society. Artificial Light Portraiture. Members.

Tuesday, October 25.

Royal Photographic Society. Papers by members of the Scientific and Technical Group. (See p. 630.)
Exeter Camera Club. Ramble Competition.
Hackney Photographic Society. "Easter by the Torridge." A. J. Linford.
Leeds Photographic Society. "Transferotype." J. Brown.
Manchester Amateur Photographic Society. "Enlarging by Artificial Light." C. J. Unsworth.
Morley Photographic Society. "Intensification and Reduction." H. Walsh.
South Glasgow Camera Club. "After-Treatment of Negative." A. Dordan Pyke.
Tyneside Photographic Society. "Pictorial Side of Photography." R. Chalmers.
Welfare Camera Club. Home Portraiture.

WEDNESDAY, OCTOBER 26.

Accrington Camera Club. "Art in Relation to Life." A. Plunkett.
Croydon Camera Club. "Photography in Advertising." Elwin Neame.
Dennistoun Amateur Photographic Association. "Old Processes and New Methods." W. F. Slater.
Ilford Photographic Society. "Rye and Winchelsea." Algernon Brooker.
Partick Camera Club. "Lantern Slide Making." James Baillie.
Photo-micrographic Society. Members' Evening.
Rochdale Amateur Photographic Society. "Sulphide Toning." A. F. Barnes.
South Glasgow Camera Club. "Development."
South Suburban Photographic Society. "Landscape." E. W. Brooks.

THURSDAY, OCTOBER 27.

Camera Club, The. "Waste Products." J. P. Boland.
Glasgow & W. of Scot. Soc. of Prof. Phot. "Artistic Lighting." N. E. Lubóshez.
Hammersmith Hampshire House Photographic Society. "A Visit to Shetland and a Whaling Station." Rev. Preb. Cowan, M.A.
North Middlesex Photographic Society. "English Mediæval Architecture." H. W. Fincham.
Wimbledon & District Camera Club. "Mounting and Finishing." F. N. Smart.

FRIDAY, OCTOBER 28.

Partick Camera Club. "Enlarging." C. E. Daniels.

CROYDON CAMERA CLUB.

Mr. B. J. Rose, of mechanical genius, produced "More Chips from a Workshop." One of the most energetic and youthful members of the club in all but years, he confessed, a little sadly, to three-score and ten. Truly, "those whom the gods love die young," for the genial demonstrator in spirit will never grow old.

He spoke, he said, subject to the good behaviour of a new set of false teeth, which he had found endeavoured to part company on the first sign of rhetoric on his part. Also, the ball of a cistern ballcock, in some mysterious way, had disconnected itself in the dead of night, and a veritable flood in his workshop was the result.

Ostensibly for the benefit of new recruits, he then narrated the special talents of many older members, some of whom appeared slightly embarrassed during the complimentary recital. Luckily the topic was inherently limited, and he soon passed on to a plain exposition of the right and wrong way to use familiar tools. Following, came the transformation of old cocoa-tins into hinges, flour-dredgers, combined nut-graters, and super skin-titillators, match-holders, and other useful articles of the Sixpenny Bazaar nature. There was no deception, the mighty deeds were wrought in front of all. An aeroplane wing, purchased for five shillings, had furnished 7 gross of screws, and a variety of elegant furnishing contrivances. The examples shown were of the sort usually described as "occasional," possibly because they are not invariably in the way.

After other ingenious excursions, Mr. Rose exhibited a focussing pinhole camera, which, he carefully explained, was always in focus. This somewhat ambiguous way of putting things engendered no open revolt, but some *sotto voce* comment. "If the thing is always in focus, why, in all cussedness, do you want to focus?" inquired an elderly member, whose angle of view was certainly more limited than that of the pinhole. A most hearty vote of thanks was accorded for a highly practical and interesting demonstration. The teeth behaved admirably, and were a pleasure to gaze upon.

SOUTH SUBURBAN PHOTOGRAPHIC SOCIETY.—Retouching portrait negatives and the working up of landscape negatives were demonstrated before the South Suburban Photographic Society last Wednesday by Mr. Robert Coombe, of Lee. The president (Mr. P. R. Salmon), in introducing the lecturer, stated that although retouching of a sort was practised by the Daguerreotype workers, the retouching of negatives was generally believed to have been introduced in 1866 by Herr Ranbending, of Vienna, who for a long time kept his methods secret. In his earliest work he is said not to have used lead, but to have utilised the precipitate formed by adding ferrous sulphate and pyro to a dilute solution of silver nitrate, which corresponded in colour to that of the film worked upon; the precipitate was applied by means of a stump of felt or pointed pieces of wood. It was also stated that about this time Rejlander started retouching his negatives, but his methods were not made public. Mr. Coombe dealt, of course, with all the most modern materials and methods, speaking highly of Bruce's retouching medium, Kodak's matt varnish and Johnson's spotting medium. Among the many hints given to would-be retouchers were those of using a No. 3 (H.B.) pencil for general work, the scrumbling (or scribbling) touch, and a No. 3 sable with Indian ink and Payne's grey—sometimes with a touch of Prussian blue—for spotting. Many beautiful examples of retouching work, and work with the knife, were shown.

News and Notes.

PENROSE'S ANNUAL.—Messrs. Percy Lund, Humphries, the publishers of Penrose's Annual, announce that the 1922 volume will be ready on November 1 next. The price has been reduced to 8s.

AT HANDSWORTH, on Wednesday in last week, a fire broke out in the dark-room of Mr. Walter Bellamy, 112, Hamstead Road. Mr. Bellamy writes that no explanation is forthcoming of the cause other than the presence of some amateurs' films in a printing box. Neither gas or electric light were left on.

FOX TALBOT MEMORIAL FUND.—The current issue of "La Revue Française de Photographie" contains the first list of the subscriptions invited by our contemporary for the Fox Talbot Memorial Fund. The amount subscribed is 215 francs, the donors including the firms of Lumière, Lobel and Poulenc, M. L. P. Clerc, and the proprietors of our contemporary.

HOW JUDGES WORK AT EXHIBITIONS.—The methods judges adopt for allocating marks to pictures are not usually made known, but we learn from an Australian contemporary that at a New Zealand show the headings under which the 100 marks were awarded, and the maximum for each heading, were as follow: Composition, 35; technique, 25; conception, 20; treatment, 15; and presentation, 5.

A "POSITIVE" RECORD.—We have grown accustomed to the sight of suburban young ladies who spend the time travelling by tram or train to and from town in knitting jumpers, doing crochet work, or needlework of some description. But the record in this field of time-saving (says the "Daily Chronicle") was surely set up by a young lady, obviously on her way to work, who was observed walking along the sunny side of a central London street about 8 o'clock yesterday morning with a frame in each hand in which she was printing photographs!

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

EARLY PHOTOGRAPHY BY MAGNESIUM LIGHT.

To the Editor.

Gentlemen, Dr. Eder is at perfect liberty to dispute my translation or question the accuracy of the construction that I put upon his language; but he has no right to charge me with being profuse in the use of italics for the purpose of giving prominence to something that he never wrote. This is a very grave charge of dishonesty and deliberate falsification or, in plain language, of lying on my part.

Dr. Eder gives his own version of what he said; but to support his charge of dishonesty he omits the passages that I italicised, and to which I took exception. These passages are, in their original, as follows:—"Die Photographie mit Magnesiumpulver in Form von 'Blitzlicht,' wie man es dann nannte, gelangte erst durch die

Arbeiten J. Gaedickes und A. Miethes in Berlin, 1887, zum Aufschwunge (s.u.) und bald beschäftigte sich alle Welt damit, etc.." and "Nachdem Gaedicke und Miethe den neuerlichen Anstoss zur Magnesium-Blitzlichtphotographie gegeben hatte, etc." I consider that the expression, to quote your correspondent's own version, see p. 559, "was first brought to a successful issue," and the statement that Gaedicke and Miethe had given the new impetus to this work as historically erroneous. Dr. Eder now admits that the reduction in price and the gelatine plate may have played some part in the more general use of flashlight.

I did not state that your correspondent called this "epochmachenden." This was quiet sarcasm on my part, and the word was put in inverted commas because it was a foreign word, and because it is a favourite gambit of so many German writers—when recording so-called German discoveries.

The subject is closed as far as I am concerned.—Yours faithfully,

E. J. WALL.

Wollaston, Mass.

NEGATIVES AND ENLARGING COSTS.

To the Editors.

Gentlemen.—The interesting letter from Messrs. Raines and Co., Ltd., in your issue of October 14, raises two points which must be of interest to the many firms who undertake to make prints from negatives developed by other photographers. They are:—

(a) Whether it is possible to get fairly uniform negatives by developing batches of plates by time and temperature.

(b) How many grades of printing paper there really are upon which prints can be made by artificial light out of all the numerous makes and varieties of one make upon the market?

In order to obtain a number of negatives suitable for printing on the *same* printing paper by development to some chosen time, according to the temperature, etc., it is necessary that—

(1) All the plates should be of the same make and batch.

(2) The subjects taken should all present the same total range of light-intensities.

Development by time and temperature together with the fulfilment of condition (1) is what Messrs. Raines wish to obtain in order that they shall be able to reduce the stock of their papers. The subject proviso, however, is equally necessary, and cannot be fulfilled. The range of light-intensities presented by various subjects varies a great deal, and in the same subject it varies according to the lighting. From a flatly-lighted open landscape to a sunlit scene with ordinary transverse shadows in the foreground is a step from a range of brightnesses of about 1—3 in the former to 1—30 in the latter. Similar plates exposed on these subjects would produce, when developed together for the same time, negatives whose printing ranges differed from one another in precisely the same degree as the subject ranges differed. The negative exposed on the 1—3 subject would, if developed for a normal chosen time, require, may be, a vigorous gaslight paper to render a presentable print, whereas the negative exposed upon the 1—30 subject, and developed for the same time, would then require a bromide paper to yield an equally appropriate print. It is usually necessary to exaggerate the range of light-intensities (contrast) in flat subjects, and occasionally necessary to diminish the range of light-intensities (contrast) in subjects of high contrast, in order that harmonious prints may be obtained on similar printing papers, and the only way to do it is to develop each negative for its own appropriate time. Such a procedure is the very antithesis of the "development of a batch of plates for the same time," no matter with what care and accuracy the time according to the temperature be chosen. My own negatives, made on holiday this year, are a striking example of variation in printing quality occasioned by variations in the subject. Those negatives were all made upon plates of the same make and batch. They were developed for the same time under conditions in my dark room which, I venture to hazard, are more accurate than one would usually find prevailing in the workrooms of firms who develop plates on a commercial scale, yet those negatives would break the hearts of Messrs. Raines's printers. They vary in their printing range from 1—10 to 1—60, and they present every conceivable range in between. Their printing requirements have been more or less met by the use of printing papers from vigorous gaslight to "soft" bromide paper, with the occasional use of a "condenser" enlarging lantern to give more contrast to the most feeble of them. It is quite certain that negatives of even printing quality cannot be turned out unless the photographer knows:—

(a) The range of the subject,

(b) The exposure range of the printing paper,

(c) The time of development of the plate which will exactly correlate (a) and (b).

Condition (c) varies nearly every time we expose a plate on a subject, and none of us have more than a very vague idea what that time should be.

The second point, namely, how many grades of gaslight paper and bromide paper there are presenting real differences in printing properties, is worthy of discussion, and is certainly of importance to commercial photographers. Personally, I have never been able to find more than about four, viz., a paper whose exposure range is about 1—10, usually labelled vigorous gaslight paper; another whose exposure range is 1—20, called usually soft or normal gaslight paper; a third, with an exposure range of about 1—35, usually a slow bromide paper; and a fourth, whose range is about 1—50, usually a fast bromide paper. There are several paper makers who can supply these four types, but there are others who do not supply more than two of them, or possibly three. Advertisements, however, read to the contrary, and the reason for the continued faith of photographers in the multiplicity of papers deserves attention. I have on several occasions bought three samples of Messrs. Blank's bromide paper labelled so as to indicate that one packet contained paper giving soft contrast, another paper giving hard contrast, and the third giving contrast of intermediate degree. On each occasion that I have tested them they have yielded identical prints from the same negative. It must be remembered, however, that in testing them they were given equivalent exposures and equivalent degrees of development, a precaution which most photographers overlook. When the exposure and development properties of these papers are worked out, it is found that the "contrasty" paper is *slow* in exposure and very *quick* in development. The "soft" paper is *quick* in exposure and *slow* in development, the very reverse. The tendency is to under-expose and over-develop the "contrasty" paper, and to over-expose and under-develop the "soft" paper. It would be equally efficacious to buy one packet of paper only, and *deliberately* over-expose and under-develop, if one wishes, or *vice versa*. But when normal treatment is given to each paper, namely, equivalent exposures and equal degrees of development, the resultant print differences simply disappear. And it is to be feared that there are a great number of printing papers in existence whose sole differences are their speed and the rapidity with which they develop, and whose gradation qualities (exposure ranges) are identical.

In the present stage of manufacture of gaslight and bromide paper emulsions it is doubtful whether Messrs. Raines can gain anything by stocking more than these four emulsions with real differences. The number of papers will, however, have to be increased where it is desired to possess choice of colour in the paper base and choice of variety in surface. These two features, however, have comparatively little to do with the type of printing negative.—Yours faithfully,

B. T. J. GLOVER.

Sunnymere, Birkenhead Road, Meols, Cheshire.

October 17.

COMMERCIAL V. ARTISTIC PHOTOGRAPHY.

To the Editors.

Gentlemen.—Mr. Wilson, it would seem, has greatly offended the *amour propre* of a section of the high-brows of photographic art, and indeed it is amusing to notice the lofty manner with which they have endeavoured to point out to him that he is really to be pitied in his bewildered ignorance of what constitutes "art" in photography, albeit they have written lengthy letters which do not sound half so convincing as does Mr. Hughes's short but interesting communication that precedes them in to-day's issue of your valued journal.

In Mr. Hughes's letter I find some sort of dismal consolation in that my own abortive attempts gently to persuade the public to

except something more than a mere photograph have had exactly the same results in an entirely different locality. I have for some time past followed precisely the same lines as Mr. Hughes, in so far as submitting extra specimens in which I have flattered myself was displayed a certain amount of "art."

I am quite prepared to receive retorts that evidently mine is not true art, but at the same time I am convinced that a vast majority of the public do not and will not take kindly to the portraiture (so-called) that is perpertrated by many "camera artists."

It is admittedly a good thing to strive to turn out artistic photographs, but the superimposing of a systematic arrangement of fly-blows on otherwise useful portraits (as was to be seen at the London Salon of Photography) and much-faked shadowgraphs will not help the photographer who endeavours to earn some sort of living by his profession, and, more important still, does not happen to live in an ultra-modern district.—Yours faithfully,

Duke Street, Chelmsford. October 14. G. A. SMITH.

To the Editors.

Gentlemen,—I have been interested in the correspondence relating to an article by Mr. Godfrey Wilson, in which the medal pictures of Mr. R. H. Lord, of Cambridge, are mentioned. As I was 20 years with the photographer mentioned and printed all the pictures exhibited and for which he won about 30 medals, I am in a position to know the commercial value of the same to Mr. Lord. I should be within the mark if I state I have printed *hundreds* as ordered and numbers have been sent all over the world right up to the last two years or so, when, unfortunately, the negatives were destroyed by flood in a terrible thunder-storm. Orders have reached me since then. Good prices were obtained for the copies and the total amount paid in those years must have been considerable.

Apart from their artistic merits, they were a valuable advertisement, as he was careful to let people know they were *not enlargements* executed by a trade enlarger, but *taken direct* on 20 x 22-inch plates with a camera of that size. That scored considerably and greatly enhanced his reputation as an artist and photographer.

I had all the negatives till they were destroyed, and have the camera and Voigtlander Euryscope with which all Mr. Lord's medal pictures were taken still in my possession.

It may interest many of Mr. Lord's friends to know he has made a considerable fortune and is living retired near Manchester.—Yours faithfully,

E. A. BASEVI.

48, New Road, Chippenham, Wilts. October 16.

REVERSAL IN DEVELOPMENT.

To the Editors.

Gentlemen,—Referring to Mr. Cooper's letter and illustration *re* the freak half-negative and half-positive photograph published on page 319 of the "B.J." for May 27, 1921, I enclose print of a studio photograph showing a similar result to that of Mr. Cooper's, which may interest you. This "negative," however, was developed with a batch in the ordinary way, but was not exposed to the slightest white light during development; the other negatives of the same person were perfectly correct.—Yours faithfully,

7, Easy Row, Birmingham, October 15. J. HALSON.

[The negative print sent by our correspondent is evidently made from a positive of quite ordinary character.—EDS. "B. J."]

PAPER FOR ALBUMENISING.

To the Editors.

Gentlemen,—Referring to your "Answers to Correspondents," R. B., in your issue of October 7 *re* albumenised papers, I beg to say that albumenising paper has always been a specialty and, as a fact, a monopoly of the Papeteries de Rives and Messrs. Steinbach & Co., of Malmedy, Belgium. The General Paper Company of Brussels, whom I represent in this country, has the sole sale of the photographic papers of these two mills, and albumenising papers can be obtained from them.—Yours faithfully, F. C. MILLER.

PLATES *V.* FILMS.

To the Editors.

Gentlemen,—With reference to the above controversy, there is absolutely nothing in it. With a plate it is possible to get as good a result as with a film; back the plate and you can even get those bold and unusual things in lightings. The backing is not objectionable; it washes off during development.

Mr. Mattison states in his letter that films make better negatives than plates ever made or can make.

I should like to know how he arrived at this decision. Is it by results produced with his own hands, or from what have been shown to him?

Anyhow, my answer to that statement is, that until quite recently I have produced better negatives on Royal Standard Lightning Plates than on films, and since the Kodak Co. have ceased to make plates I have found another plate capable of producing the same results.

Therefore if the Kodak Co. care to send and take some portraits on their films in my studio I will at the same time take and produce an equally good negative on a plate.—Yours faithfully.

ALEXANDER CORBETT.

48, Baker Street, Portman Square, London, W.1. October 18.

To the Editors.

Gentlemen,—The last word of this discussion can surely remain neither with Messrs. Kodak nor with the experienced photographers who have expressed their views in your correspondence columns at length and with singular absence of unanimity. Having neither an adequate amount of knowledge nor experience, I do not presume to enter the controversy, but as an amateur modestly interested in the scientific aspects of photographic processes I have read Messrs. Kodak's letter of the 11th inst. with much disappointment, although it bears the name of Mr. Mattison, the managing director.

Apart from the concluding paragraph of their letter, in which Messrs. Kodak announce a concession to critics of the speed of their film, the whole communication would, I submit, find a more suitable place in your advertisement columns as an *ex parte* statement and a choice example of that form of bold assertion which is found by many advertisers so usefully to produce the effects which they desire.

Messrs. Kodak are believed to have an unrivalled staff of photographic scientists. Would not the firm's assertions carry greater conviction if they were supported by a paper from the Kodak Research Laboratory? Or is there no eminent English worker who would make accurate comparative tests and place this highly interesting and important question beyond discussion by the issue of a comprehensive account of his results?

Given a truly non-halative, truly flat film, having adequate speed and fine grain, sensitive to the whole of the visible spectrum, and non-inflammable, few photographers would, I think, hesitate to use such a perfect material. Messrs. Kodak, however, do not appear to claim that their potrait film is either panchromatic or non-inflammable. Personally, I would sacrifice the latter condition for the sake of the former, but this view differs from the question of the non-halativeness of film in being a matter of individual preference rather than a disputed point of importance which can be settled satisfactorily only by exact, authoritative and impartial tests.—Yours faithfully.

H. JERVIS, M.A.

—Carisbrooke, Isle of Wight. October 17.

[This discussion, having now been continued for seven weeks, is closed for the present.—EDS. "B. J."]

ILLUMINANTS FOR ENLARGING: PLATES FOR SMALL CAMERAS.

To the Editors.

Gentlemen,—In his letter on p. 619 of your current issue "Old Hand" refers to the inability of some lenses to work to focus in an enlarger with electric light, arc or incandescent. I have an anastigmat of exquisite quality that fails with incandescent gas. I cannot recollect having seen any mention of this possibility anywhere except in the editorial article on enlarging in the "B.J. Almanac" for 1915, p. 379.

The somewhat pronounced grain of films may explain why most miniature cameras are built for plates. None of the special fine-grain emulsions seem, however, to be coated on extra thin glass in the miniature sizes. There is, furthermore, no such plate in the "Non-Screen" series, either normal or miniature.

Telephotography is based on coarse grain. If one could expose at *f*/6 and enlarge 8 diameters without breaking up the image, it would be simpler—in most cases—than taking a telephotograph at *f*/48.—Yours faithfully, "MAGNIFIER."

October 18.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply, 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

PELMAN.—The firm to which you refer is Messrs. Ventiheta, Ltd., of Argyle Street, Oxford Circus, London, W.

S. B.—If the photograph was taken in the ordinary way, that is to say, not by invitation of the photographer, the sitter has complete rights in the portrait, and at her wish you are perfectly entitled to make any copies.

C. WHITE.—If we understand your question correctly, you wish to re-sensitize old negatives. There is no means of doing this except by completely cleaning off the gelatine coating and re-coating with emulsion.

LANTERNIST. —Oil-colours suitable for the colouring of lantern-slides may be obtained from Messrs. Winsor & Newton, Ltd., 37-40, Rathbone Place, Oxford Street, London, W.1, or through any dealer in artists' materials.

C. M.—Rights to photograph on the beaches of seaside resorts are almost always administered by the local authorities concerned, Town Councils or Urban or Rural District Councils. Very frequently they are offered to tender. You should apply to the Clerk to the district council in the places in which you are interested.

T S.—We have indicated size and position of glass on your diagram. You can, if you please, have more glass, but as the room is also to be used for another purpose too much glass will cause it to be cold in the winter. Ordinary strong horticultural glass will answer perfectly. The 6-ft. fence will not materially interfere with the light; it would, however, be as well to whiten it.

N E.—All we can say is that there have been a number of instances of commercial travellers for the photographic manufacturing and wholesale firms having been recruited from professional photographers of experience. The rule however, is for travellers to be drawn from the lower ranks of employees in a firm, such as salesmen and other assistants. There is no special journal used by the wholesalers.

E. M.—We do not know that there is any definite remedy for skin poisoning caused by hydrochloric acid. The best recommendation which we can make is that the skin be kept soft by regular use of an emollient paste, such as Lanoline cream. Also, the fingers should be well rinsed in tepid water every time after they have come in contact with the acid.

S. C.—(1) On the whole, we think the gas lamp is the best, at any rate if the studio is of ample size and well ventilated. If otherwise, the heat of a gas installation is liable to become excessive if much in use, and particularly during the warmer part of the year. (2) As a rule about 20 mantles, preferably of the Howellite inverted pattern. (3) If you allow 4 ft. for the space behind the sitter and behind the camera you can use a 7½-inch lens for cabinet full lengths and c. de v. half-lengths. In an 18 ft. run of studio you would require a shorter focus lens for c. de v. full lengths.

C. E.—As the London photographer appears to be exhibiting the portrait by way of trade, that in itself is an infringement of your copyright in the portrait, and if you like you can take action to make him withdraw it from exhibition. Apart from that, the act of passing off your work as his is a civil offence, in respect to which, we think, you have a perfect legal remedy. If the photographer is not immediately disposed to do what you require, we should think that a letter from your solicitor would speedily have the required result.

H. W.—The best book is "Photography in Colours," by Dr. Lindsay Johnson. Our own publishers supply this, price 6s. 6d., post free, or you could obtain it through any bookseller. But actually the processes available at the present time for three-colour photography are very few in number. Apart from the Paget and Autochrome processes, the only one for which the materials are commercially available is the Raydex of the Raydex Co., 71, Lavender Hill, London, S.W.11. The instruction booklet of this firm deals very fully with the process.

W. B.—You will require from 12 to 18 burners, and we do not believe you can do better than to arrange them upon a portable stand similar to that used for the Kodak "Powerful" gas lamp. It is necessary to have a white reflector behind the burners, but if these are not placed too close together you will not require any diffuser. If you could get a powerful lamp and change the burners it would save you a lot of trouble. Be sure to keep the studio well ventilated, as a large number of acetylene burners in a small space will rapidly vitiate the atmosphere and cause headache.

J. BLICH.—The choice of gas installations for studio portraiture is limited. At the present time the only equipment on the market is the Howellite, supplied by Messrs. Griffins, Kemble Street, Kingsway, London, W.C.2. This is a very good outfit of about twenty inverted incandescent burners, and is quite effective for single portraits, and, at a pinch, for small groups. But you require to consider that twenty such burners give out a good deal of heat, and in such a small space as you have available the heat at times might easily be uncomfortable. In any event, you would require to provide ample ventilation.

L. J.—We do not know the composition "Claricit," but it evidently acts by producing a slight, greasy film upon the glass. A method which was long kept a secret by professional window-cleaners is to rub a little glycerine over the window, and then to polish off as thoroughly as possible. Ordinary petroleum is said to have somewhat the same effect. We should not recommend putting anything upon the surfaces of lenses. These may be cleaned with a drop or two of pure alcohol. When not in use, they should be protected with front and back caps, and in the winter should be kept during the night in a warm, dry place. Nothing can be done to prevent windows becoming dull in foggy weather, as the dullness is due to the deposition of soot and tarry matters from the smoke, but steaming is preventable by using glycerine.

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HENRY GREENWOOD & CO., LTD., Proprietors and Publishers, 24, Wellington Street, London, W.C.2.

THE BRITISH

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Contents.

SUMMARY.

In a contributed article Mr Henry J. Comley maintains the importance of individual style in present-day portrait photography. (P. 640.)

An article by the late C. Brangwin-Barnes, and conceived in a spirit of imaginative forecast, will be found on page 643.

Dr. H. D'Arcy Power, in a recent issue of his journal, "Camera Craft," examines the form of optical reproduction which is most closely in accordance with natural vision, and expresses his preference for that produced by lenses giving a certain degree of diffused focus. He gives particulars of the properties of the commercial quartz lenses introduced as the result of his own experiments. (P. 641.)

In a leading article we refer to the Safeguarding of Industries Act in its present relation to the sale of ex-enemy goods. (P. 638.)

In a brief communication from the Eastman Research Laboratory, Mr. E. R. Bullock discusses the behaviour in a developer of the faintly alkaline substances, such as borax and bicarbonate, which are occasionally employed as restrainers. (P. 639.)

A correspondent of "Abel's Weekly" gives formulæ for the preparation of a hypo-alum-gold toning bath, which has been found to be exceedingly reliable and satisfactory in use. (P. 650.)

At the Royal Photographic Society on Tuesday evening last two papers dealt with different aspects of the silver-bromide grain of emulsions, and another with a roller method of more uniform development. (P. 648.)

A labour-saving device for getting rid of litter on the dark-room floor is the subject of a paragraph on page 637.

Repeated intensification of a negative or print by means of the Carbro process is a method for rendering visible faint impressions in copies of documents such as those which have been severely damaged by fire. (P. 638.)

The Mannl process for the contact copying of originals by the light selectively reflected from different parts of them is described in "Photo-Mechanical Notes." (P. 645.)

A contributor to "Assistants' Notes" gives a table of factors for the use of the B J pyro-soda formula. (P. 645.)

The exhibition of the Royal Photographic Society closes to-morrow, Saturday, October 29.

Full re-development is a precaution in the use of the chromium intensifier which is sometimes overlooked. (P. 638.)

A note on the rare defect of small red markings on bromide paper will be found on page 637.

Repair of studio roofs, efficiency of the focal-plane shutter, copyright in a portrait, and defects in negatives and prints are the subjects of brief replies to correspondents. (P. 651.)

A profuse symbolism is employed by a German patentee of systems of producing silhouette photographs. (P. 647.)

EX CATHEDRA.

The Dark-Room Floor. Recently, in the dark-room of a commercial photographer friend of ours, who prides himself on his labour-saving devices, we noticed an arrangement which does a great deal towards keeping the dark-room floor free from litter at the minimum expenditure of labour. An assistant was sweeping up the floor of the room, and we expected to see him stoop to gather together the accumulation of plate wrappings, separators, and other paper refuse which in many dark-rooms is scattered on the floor. Instead, he opened the door of a small cupboard on the floor level in the corner of the room, and there, inside, was a hole in the floor about 8 or 9 inches in diameter, into which the collection of rubbish was quickly delivered with a stroke or two of the broom. A visit to the basement showed that a piece of wide stove piping was connected to the hole, and immediately below it a sack was placed for the collection of the paper refuse. There are, no doubt, many dark-rooms, such as those situated in basements or immediately above rooms required for more ornamental purposes, to which this arrangement cannot be applied; but in those in which it is possible the plan is plainly a most effective one for keeping the floor of the room in a neat and tidy condition.

* * *

Red Marks on Bromide Paper In a long and daily experience of dealing with defects in prints and negatives sent to us by our readers, it is very seldom that we have to come to the conclusion that the cause of the defect is a fault in manufacture. The standard maintained in the examination of their products by makers of plates and papers is an extraordinarily high one, and users are no more than discreet if they exhaust every possibility of error or accident in manipulation before they attribute defects to faults in manufacture. When, however, the latter appears to be the only explanation, it is also our experience that manufacturers, obviously in their own interests, are most ready to investigate the case. We had an instance of this the other day, when a correspondent sent us a batch of bromide prints bearing minute markings in the shape of short almost straight lines of a bright red colour. We could find no explanation of the defect and advised reference to the makers. Our correspondent has since informed us that the makers immediately identified the markings as due to a fault in the preparation of the raw base, namely, the escape of the colouring matter on to the paper. In immediately admitting a fault which should have been noticed by the examiners and the material thrown out, they expressed their readiness to replace the defective material. Since we have advised the reference of these exceptional cases to the makers, we must also urge the further recommendation that the fullest particulars of developer, fixer, and mechanical manipulation of washing and drying should be stated in making any inquiry. We have our

own experiences of the futilely vague questions which are addressed to us, and we daresay the makers have theirs.

* * *

Intensifying Faint Impressions. In a recent article in the French technological journal "Génie Civil" appears a review of the photographic methods employed in deciphering faint impressions in documents, such as faded manuscripts or the charred remains of papers which have been burnt but have afterwards been pieced together. In this branch of work it is an old method to copy and re-copy several times, on plates giving a high degree of contrast, the faint impression in the original document. According to a French technical worker, M. Faworski, a more rapid and certain method of carrying out this principle is by means of a form of the Ozobrome process, or Carbro as it is now termed. The gelatine-pigment tissue, soaked in the mixture of bichromate, ferricyanide and other salts, is applied to the negative first developed. After twenty or thirty minutes' contact, development is done in warm water and the paper support of the tissue stripped off. The original image is thus intensified by the addition of pigment, and is itself left in the form of silver ferrocyanide. It is reduced again to the metallic state by any developer, and this process may be repeated as many times as is necessary, employing a fresh sheet of carbon tissue for each operation. From the negative so obtained a print is made on bromide paper which, again, may be intensified in like manner, if the extreme faintness of the original impression renders this procedure necessary.

* * *

Clerical Portraits. The average portrait photographer is often somewhat at a loss with clerical sitters, and the portrait generally resolves itself into the usual thing, the sitter in a pulpit attitude, hand on book, and generally with a strained expression. For no matter how much at home the parish priest may be in his pulpit, he is inclined to feel rather uncomfortable when posed accordingly for his photograph. The cassock may often be pressed into service to lend a note of character to the picture, and while the idea is often carried out successfully, it need not exhaust the possibilities of successful portraiture of the more popular among the clergy. We see no reason why the surplice and stole should not be employed more for clerical portraiture, and even the altar vestments. Such pictures appeal not only to the cleric himself, but also to the wider circle among his friends and parishioners. One word of caution may be added. If the portrait is to be made with the priest attired in richly-coloured vestments, it is most important to use a colour-sensitive plate, since a proper colour rendering is most desirable. If permission can be obtained, it is possible that good business may be done by the issue of postcards from negatives taken as suggested. There is also a possibility that the idea may be extended to choirmen, servers, crucifers, thurifers, and other officials of the Church attired for their various offices.

* * *

Chromium Intensifier. Those photographers who use the popular chromium intensifier, and who have not had results as good as anticipated from descriptions, verbal or written, as to what this process is capable of producing, should ask themselves if they have given the negative long enough in the developer. If the process is carefully watched it will be seen that re-development is fairly rapid up to a certain point, when the action seems to stop. Many workers that we have known have taken the negative out of the developer at this stage, under the impression that the maximum effect of the intensifier had been reached. In order to obtain the fullest advantage of the process the worker should leave the plate in the developer for a much longer period than is customary. It will be noticed that density is gained quite slowly, but the effect of the intensification is greatly enhanced; in fact, no harm will result if the plate is left in a non-staining developer for twenty minutes or half an hour. One of the advantages of this method of intensification is that the process is completely under control, and little or much density may be added to the original image, either by partial bleaching or by the removal of the negative from the re-developing solution before its fullest density is obtained. Many workers do not allow enough light to fall upon the plate while this is being done.

THE ACT AND EX-ENEMY GOODS.

The Safeguarding of Industries Act, which came into operation at the beginning of the present month, does not seem so far to have aroused any great degree of enthusiasm among manufacturers or merchants who are affected by it. In the trade journals of the industries to which it chiefly applies, namely, those of optical instruments and chemicals, little cordial confirmation of its value has appeared. The chief signs of such sentiment which we have noticed are one or two announcements of reduction of prices of goods by British producers, made, as is said, in anticipation of increased demand. But in these cases it may be seriously questioned if reductions have been made possible by the Act; the recent further fall in the value of the mark may perhaps have been a not negligible determining fact. For it can hardly be supposed that the 33⅓ per cent. duty imposed by the Act on goods imported from whatever country to which the Act applies is an adequate measure of protection against competition by makers in countries where the currency is so depreciated as in the States of the former Central Empires. It may be, and apparently is, effective in respect to France and Italy, but very partially so as regards the chief source of lower-priced goods. But in this respect the Act is inelastic, taking no account of the degrees of depreciation of the currencies of foreign countries, but taxing the goods of all alike. In another respect, however, the Act has already shown itself elastic in a manner which was not generally anticipated. Designed ostensibly, as its title conveys, for the protection of industries in this country, it has already been found to be taxing goods, *e.g.*, certain chemicals, which are not made and never have been made in this country; and, generally speaking, the criticism of it in the chemical journals is that in its administration the distinction between the "fine" and "heavy" chemical trade has been lost in great measure, and that the tax has been applied to chemicals used and sold in bulk, which it was not anticipated would come within its scope. Even in the photographic trade we have an instance of the same wandering of the Act from its alleged purpose of safeguarding industries here. Cameras are included within its scope as "optical instruments," and are taxed without relation to their very various types, some of which have never been made here. It may, perhaps, be argued that the taxation of all-metal 45 x 107 mm. stereoscopic cameras, a specialty of several French makers, is a safeguard for our own camera industry; but, if so, it is one of microscopical proportions. We do not believe that the tax on them will foster the manufacture of those cameras here or, alternatively, enhance the sales of cameras of the kinds made here. On the other hand,

its imposition invites retaliation abroad in the shape of a tariff on British goods in foreign markets, as is reported to have been raised by Portugal, or a commercial treaty with Germany, such as was carried out by Italy some time ago with serious results to the market in British goods in the latter country. It may well be that a tariff which gives protection in the home market is a doubtful benefit if it reacts to our disadvantage in markets overseas. Manufacturers most immediately concerned with German competition are no doubt thankful for the Act to the extent of getting at least some slight protection, and no doubt equally realise its inadequacy as a remedy of the low-level fluctuations of the German exchange.

That the Act is in fact an ineffective instrument in the conditions at present prevailing between this country and Germany is evident from the small notice that is taken of it by advocates of a boycott of ex-enemy goods. It is now recognised that it does not provide the means for keeping out ex-enemy goods, and hence stress is laid on the sentimental objections to dealing in them. Much as we hold in abhorrence the war methods of our late enemies, we cannot put on one side the almost daily observation that such considerations have little weight in commercial dealings, large or small. As a journal which, for the three years since the Armistice which are on the point of being completed, has consistently refused advertisements of ex-enemy goods, we have had perhaps more than the average volume of evidence in justification of that view. There will, undoubtedly, always be people who will not knowingly buy ex-enemy goods at any advantage of price. But unless we are much mistaken, they are few in comparison with those to whom price or, less frequently, the precise fulfilment of their requirements is the sole consideration. Moreover, almost daily experience has shown us the great difficulties of effectively excluding the announcements of ex-enemy goods. There are, for example, at the present time firms handling both British and ex-enemy goods who advertise only the former, but whose advertisements are, nevertheless, largely designed to bring inquiries for the latter. Yet we believe it would be unanimously thought to be contrary to the English spirit to exclude them on that account. Again, apparatus represented as "second-hand" cannot be reasonably objected to. It is plainly impossible for a newspaper to investigate; while it may observe a remarkable number of advertisements of ex-enemy goods for sale "in new condition," the rejection of all and sundry of that kind would obviously inflict inconvenience on many people. These instances are cited for the purpose of drawing attention to what for some time past has been an equivocal position for any journal which rejects, or rather does its utmost to reject, advertisements of ex-enemy goods. It was hoped that the Safeguarding of Industries Act or the success of manufacturers, or both together, would substantially remedy this state of affairs, but these measures unfortunately stand little chance of making their influence felt in the present prevailing international economic conditions; and it thus appears that the efforts of newspapers to exclude ex-enemy products from their pages, while largely successful up to a point, have invited methods of camouflage which actually are more objectionable than a downright undisguised offering of such goods. In the latter event, the public would know where it stands; and it seems that the time has arrived when a discussion of the relation of class newspapers to their readers on the one hand and to manufacturers and dealers on the other would be of benefit in exhibiting the balance of opinion on the subject.

RESTRAINT OF DEVELOPMENT BY BORAX, Etc.

(A communication by the Eastman Research Laboratory to the "Photographic Journal of America.")

It has long been known that the addition of borax, sodium bicarbonate, or ordinary sodium phosphate to a developer produces, under certain circumstances, an apparent restraint of development. The effect is especially pronounced when the developer is one containing an organic developing agent of relatively low reduction potential (such as hydroquinone or pyrogallol), a caustic alkali (soda or potash), and considerable bromide. Luppo-Cramer has dealt with the subject in several papers which appeared in "Photographische Korrespondenz" in 1915; and the greater number of the experiments there described have been repeated by the writer on lantern plates, in connection with the sepia toning of these by direct development. The results obtained confirmed those secured previously by Luppo-Cramer. Luppo-Cramer explained the restraining effect produced by the addition of borax and similar salts to the developer as being due to the low solubility of the silver salts corresponding to the substances in question which influences the amount of free silver in solution. He has pointed out further that sulphates, acetates, and tartrates do not give the effect, the solubility of the corresponding silver salts being too considerable. And an experiment which he made with sodium salicylate (as an example of a salt of an acid whose silver salt is only difficultly soluble) showed that this salt gives typically the borax effect. A study of the various silver salts of low solubility arranged in order of insolubility shows, however, that there are great anomalies in the actions of oxalates and succinates, which do not give the borax effect, and fall between the carbonates and salicylates, which do give it. Moreover, it is difficult to explain how any salt like borax or sodium phosphate, where the supposed corresponding silver salt has a solubility many times greater than that of silver bromide or even silver chloride, can have any detectable restraining action of the same nature as that exerted by an ordinary soluble bromide. There are, indeed, restrainers of the bromide type, those of practical importance being potassium iodide and potassium bromide for silver brom-iodide and silver bromide emulsions, and potassium iodide, potassium bromide, potassium ferrocyanide and sodium chloride for silver chlor-bromide and silver chloride emulsions, and it is usual to restrict the name "restrainer" to such salts as these.

But the velocity of ordinary photographic development is not dependent only on the maximum concentration of silver which is possible in the developer. It is dependent also on the alkalinity; and in regard to the alkalinity of solutions, the actual facts are not always exactly as might be supposed. It might be supposed that a substance which is alkaline when dissolved in pure water will, when dissolved in a solution which is already alkaline, increase the alkalinity of the latter. An example will show, however, that as regards the active alkalinity, this is not invariably the case. Both caustic soda and sodium bicarbonate are alkaline. Caustic soda is very alkaline. Sodium bicarbonate, on the other hand, is only very slightly alkaline. If, however, the caustic soda and the sodium bicarbonate are both dissolved in the water, or if the caustic soda is dissolved in the sodium bicarbonate, or *vice versâ*, the alkalinity of the solution is identical with that of a corresponding sodium carbonate solution and is very much

less alkaline than the caustic soda itself. In other words, a neutralisation of about nine-tenths of the active alkalinity of the caustic soda solution has been brought about by the addition of a substance which itself gives a feebly alkaline solution when dissolved alone in pure water. It is very obvious that the result of an addition of sodium bicarbonate to a developer which has been made up with caustic soda is a reduction in alkalinity, and consequently a restraining action. And a similar explanation is applicable to borax and to each of the other salts which show the borax effect; for in every case the salt added is the potentially acid salt of a somewhat feebly dissociated acid and, while itself alkaline in reaction, nevertheless forms with caustic soda a normal salt the alkalinity of which is very much less than the mean of the respective alkalinities of the original salt and caustic soda. In the case of borax itself we have a potentially acid salt of a weak acid, for the ortho acid of boron containing two atoms of boron in its molecule has the composition $(OH)_2$-B-O-B-$(OH)_2$, or empirically $H_4B_2O_5$, and the equation

$$Na_2B_4O_7 + 6NaOH = 2Na_4B_2O_5 + 3H_2O$$

expresses the formation of its normal sodium salt.

Sodium salicylate, $C_6H_4(OH)(COONa)$, can be considered an acid salt, inasmuch as it still contains replaceable hydrogen and the reaction with caustic soda,

$$C_6H_4(OH)(COONa) + NaOH = C_6H_4(ONa)(COONa) + H_2O$$

takes place to a certain extent.

From the foregoing remarks, it will be gathered that alkalinity is composite in nature. While it is only the active alkalinity (hydroxyl-ion concentration) which counts when the speed of development at any given moment is considered, the other component, which is called the reserve alkalinity, is of some importance as determining the resistance of the developer to diminution of its active alkalinity with use. Without entering into the theory of this effect, it may be simply stated that, if the active alkalinity and other conditions are the same, the greater the reserve alkalinity of a developer the more uniform its action may be expected to be and the longer its useful life. In ordinary photographic practice, indeed, the alkali most commonly used is sodium carbonate, which already possesses considerable reserve alkalinity, and caustic soda or potash (with scarcely any reserve alkalinity) is ordinarily used only when speed is of importance.

Conclusions.

1. The borax effect—the retardation of the speed of development under certain conditions, shown by borax and certain other sodium salts—cannot in any degree be attributed, as has been suggested by Lüppo-Cramer, to the low solubility of the corresponding silver salts.

2. The borax effect is due to the diminution of the active alkalinity of a developing solution which occurs in consequence of a chemical reaction between the borax or similar salt and the alkali already present in the solution.

E. R. Bullock.

INDIVIDUALITY IN PROFESSIONAL PORTRAITURE

In a long and varied experience it has been the writer's privilege to meet with a large number of photographers of extremely divergent capacity both for business and for artistic attainment. In many cases a casual acquaintanceship has developed into a lasting and much-prized friendship. I have visited them in their studios, seen their work and the work of other photographers in their vicinity, and have had the opportunity for comparison and friendly criticism which has often been appreciated. But one has frequently been impressed by the unambitious, commonplace level which characterises so much of this work, and above which it fails to rise. So that one is led to seek for some definite reason why so many professional photographers—good fellows all—seem to be unable to get out of the rut of mediocrity; and, further, to discover, on the other hand, why some of them do succeed in doing so; raising the level of their regular studio work so that it stands conspicuously apart, possessing a character and quality which commands attention, claiming for itself a position in the world of photographic portraiture which is unassailable and from which we could not supplant it even if we had the trepidity to attempt to do so.

But these men would be among the last to claim any superior qualifications over those of their less successful brethren. Ask them the reason why their work possesses that subtle "something" which makes it distinctive. They cannot tell you! They only wonder why other photographers do not produce work of a similar character; and their reply may be in the nature of a question as to your own reason for not doing so. Yet there is a factor which is in a large measure responsible for this "something which is different," and I believe it is a factor which is unconsciously possessed by every one of us. It is the ability, not only to live by our work, but to live in it.

To give to it something of ourselves, something which would make it worth the doing, and impart to it the distinctiveness of our own personality. In other words, to put into it something which is akin to life itself, namely, "Individuality." Undoubtedly we are all—more or less—influenced by the work and mode of thought of other people. We observe this in the influence which the study of mediæval art and the work of modern masters impresses itself upon the work of the younger generation of artists, sculptors, and designers; sometimes leading them in a quest for an ideal upon which to build their own reputation. We have seen the same spirits of the past and the present uniting their efforts in the development of modern photography, and in the artistic evolution of some of our contemporary workers before they have settled down into serious endeavour and eventually given us original conceptions which have lifted their work out of the commonplace and by its individuality compelled appreciative recognition.

We know of more than one man who, after many years of plodding along in the smaller lifeless kind of work, has suddenly burst away from it, and in a comparatively short time built up for himself an artistic reputation, and gained an assured position as an illustrious member of the fraternity. Were it permissible to mention names in this connection the reader would recognise them as men who are to-day among our honoured leaders in professional portraiture. It will therefore be clear that some such factor as I suggest really exists and that it is a personal one.

I further submit that the character of a man's work is influenced by his own attitude toward that work, and that apart from the accident of external influences it is generally to this personal attitude that one must look in order to discover a reason for the success or otherwise of any particular enterprise. In an intimate business like photographic portraiture personality is a factor which has a value, a great commercial value; but a personality, however charming or magnetic, cannot long remain a sole reason why customers are attracted to any particular business establishment. The principal attraction to any photographic studio must necessarily be the work which emanates from it, and unless one's attitude toward that work is one of interested sympathy, it is natural to assume that the character of the work will vary with the ability of the assistants to whom the doing of it will have probably been delegated. There are many small—often

very select—country and suburban studios where the whole of the work is personally carried through by the proprietor; it would be reasonable to expect that in this work one would find a pleasing, not to say exceptional, element of individuality, but, unfortunately, this does not often follow. More frequently it will be found that the running of a single-handed business with little opportunity for recreation or rest becomes burdensome and monotonous, and the good intentions and ambitious ideals with which the business may have been started are soon relaxed; and although great pains may be taken to produce clean, acceptable work, it often possesses nothing which would distinguish it or stamp it indelibly as the work of any particular man. In a business possessing a clientele extensive enough to support a really competent assistant or two, far better work will be done, showing considerably more character, and possessing a greater charm of variety, because the production of such work has the interest of more minds than one, and the consensus of such mentality will tend to produce pictures which are characterised by their technical excellence and beauty and which will avoid the monotony of the egoism which is so observable in the work of a few single-handed producers whose efforts have received much laudation at the hands of their friends. I purposely differentiate between "egoism" and "individuality" because the spirit of "egoism" is particularly distasteful to me, while the man whose ideal is a lofty one will always have my sympathy, for while the imprint of his individuality is undoubtedly impressed upon his work, it does not blatantly shout its author's name into one's ear.

Who can look upon really great portrait work without having the realisation that here we have work which is distinctive and different from the common order. The productions of such men contain factors which are not comparable one with the other. They express the individuality of different men. But why should they do so? We know perfectly well that apart from the actual study of the sitter the productions of our foremost men are not personally executed. It must follow therefore that the whole of their business organisation—the studio, the workrooms, the handicraft of their assistants—are all controlled by the same individualism which reflects the mind of the man whose interests and reputation are bound up in them; and in all the stages through which the work passes his personality is apparent

To discuss his personal work in the studio would interest very few. They would see nothing in it which differs from their own practice; but it is not the things which are done but the manner of the doing which matters. The attention to detail, the personal interest, the inherent love for the work which he has in hand which combines to make it distinctive. It is an education to see some of our leading men at work, and having seen them one is able to realise why their work is distinctive. They put more than time and thought into it. They put into it something of themselves, call it "soul" if you wish, but whatever it is there is no doubt that it carries into the work the hall-mark of an individuality which gives to it the distinction compelling our admiration. He never works at haphazard; he is deliberate and decisive. He doesn't expose plate after plate with little or no variation of arrangement, in doubt as to whether this or that or the other will be the most successful result. He knows what he is aiming at, and gets it—barring accidents—every time. To him the exposure of a plate is a matter of import; and his success must be largely attributed to the faculty which he has for taking pains in every action which he performs in the studio; not solely for the satisfaction of his customer, but also for the satisfaction of the consciousness within him which demands the best of which he is capable and can be content with nothing less. It would appear therefore that in order to emulate the characteristic individuality which we have been considering, it is necessary to study closely our personal attitude toward our own work. It would be sheer waste of time to attempt to advise any one to imitate any particular method or mannerism in order to individualise their own work.

To invite success one must be supremely natural and personal. Originality of thought or action can only be acquired by these means. The world contains too many servile imitators of other people's ideas. The professional photographer who wishes to be recognised in his work must *put himself into it*, fashion it with that regard for the dictates of his own nature, which will make it a part of himself He must love the work for the sake of the work itself, and for the pleasure which it affords him when engaged in it. Though it is his life's vocation, he must never cease to be an amateur in the truest sense of the word, or he will utterly fail to rise to the height of his ambition and achieve the distinctive note of individuality by which he may be recognised in his work.

HENRY J. COMLEY.

SOFT-FOCUS LENSES.

[In the following article in "Camera Craft," Dr. D'Arcy Power reviews the oft-discussed difference between the images formed by the eye and by lenses and bestows his approval on the soft-focus lens as the best means of imitating the effect of natural vision in a photograph. While we do not agree that a uniform even though slight subjugation of sharpness is true to nature—and Dr Power in one place admits as much—we find space for his paper on account of its clear treatment of the subject and particularly for its description of the properties of the quartz soft-focus lenses, the introduction of which followed from Dr. Power's experiments.—EDS. "B.J."]

THE evolution of the popularity of the soft-focus lens is not only an example of the improvement in artistic taste, but a return to the normal way of seeing things. When the lens picture first greeted the public it came as a wonder. The photograph recalled everything the child's dimples and grandmother's wrinkles, the stamens in the flower and the spider's web, nay, with the hand glass you might perchance detect the beetle in the bud Here were pictures such as no artist had ever made, or ever could. No wonder we had an enthusiastic world. "True as a photograph" became an axiom, and yet artists did not like photographs; a few, such as Hill, tried the camera for a while, but soon went back to the pencil and paint brush. All kinds of reasons were given; jealousy said some; false values, a lack of selection, confusing distribution of lights, and other faults replied the artists. Things the laity did not understand.

Presently came the hand camera and everybody made photographs, made them with the ambition of getting them sharp and clear, so that they could see everything that they knew was in sight of the camera. With *f*/64 and ferrotyped Solio, they often did. The greater their success, the less use the artist had for the process. Why? Because the lens picture is one that no eye has ever seen.

A good lens sees everything at once and equally well, the human eye at a given time sees only the object to which its attention is directed: all else is dimly apprehended with increasing blurring as the centre of interest is left. The eye may change its position and retain a memory picture of what it just observed, but the object of interest will always dominate the rest because it is most looked at and best remembered. This fact a good artist unconsciously embodies in his picture, but the lens has no preferences, it gives all, and owing to the

small size of photographs the eye cannot exclude the uninteresting from the field of vision. The artist whose training leads him to seek for the true appearance of things, naturally rejects an image he never sees in nature. With the everyday man it is different; his ideas of what things look like is made up of what he knows they are. He is sure that a tree consists of a trunk, branches and leaves, but he does not reflect that he cannot see a tree and every one of the leaves at the same time. If he obtains a photograph that does this very thing (because the small size of both images can come within the focus of the eye) he accepts it, inasmuch as it fulfils his idea of truth. The everyday man is interested in facts; the more facts he finds the greater his appreciation. So he admires the pictures of Claude Lorrain stuffed with figures and architecture, the photograph, that he can examine with a hand glass and find something otherwise invisible.

Many painters in the early days of art were obsessed with the same idea. That is long past; more and more the aim is to give what is actually seen, leaving it to the beholder to make his own interpretation of the appearance. It took many centuries for the professional artist to reach this point. Now the mass of the public are following the same road; they reach out for pictures that shall give pleasure rather than information. In the case of photography there are many ways to this end, one of which is to avoid an unnatural definition. The ideal desired is to give a picture as the eye sees it. In the nature of things it is an impossibility; consider the eye viewing a landscape: It is apprehended through a lens of short focus and very limited field. With great rapidity its different objects and masses are focussed, examined in turn; attention is evoked by some; others never enter into consciousness; presently a visual concept is formed in which the objects that have stimulated the attention most are dominant. Usually one particular mass or colour makes the greatest impression and holds the optical focus around it, all other things fade away with only a subconscious memory of their existence. As different observers will probably have their attention fixed by different objects in the same field of view, the mental picture will be correspondingly different. An artist using paint will seek to reproduce his impression with such success as his skill permits and within limits he may partially succeed. He does not paint what his eye has not noticed, and he can hardly help giving extra prominence to the things that have mostly impressed him. By enhanced colour contrast, chiaroscuro, or even departure from strict perspective drawing, this is easily attained. How far can the user of the lens follow in his footsteps?

In this article we will confine our attention to one means only, namely, modification of the image in order to secure concentration of attention on the subject of the picture. This means, subordination of the unimportant. Where the conditions permit of it, selection of view point will attain much, but more can be effected by the character of the photographic image. The problem is not easy. It is to see the main object clearly, even sharply, and the rest according to their lesser values. The definition of the main object is easily attained by focussing on it, but most pictures contain many planes, and to get any resemblance to natural appearances they must be shown with reasonable definition, that means stopping down, which in its turn means the excessive sharpness of all objects; the curse of most photographs.

There are three ways by which an approximation to a solution may be obtained. They are—first, coarse focussing; second, the use of a pinhole; third, using a lens that is uncorrected, that is, possesses naturally defective definition.

The first method was much in use some ten or more years ago. To be effective it requires too much blurring of the objects of secondary interest. With a few subjects it gives pleasant results. In a general way it gives not only softening of texture but blurring of outlines, and this is fatal.

The use of a pinhole to form the image is another matter. The definition of a pinhole picture is determined by the size of the hole employed. A No. 12 needle hole gives a circle of confusion of 1/100 of an inch, which is what is demanded of a lens, but the exposure time is prohibitive; a No. 10 needle hole 1/50 of an inch, gives a definition answering all requirements of landscape and portraiture. The picture made in this manner has unique character, all objects are in focus from a few inches to infinity. They are equally in focus. The drawing in absolute perspective. The angle of view is determined by the size of the plate. The definition (with No. 10 hole, No. 3 Power-Watkins System) is clear but soft, much as the eye sees it. These are great advantages, and those who have learned to use a pinhole rarely discard it; but there are grave disadvantages. The exposure time is about 60 times that of an $f/8$ lens, and the equality of the definition through all planes forbids all selective focussing. In landscape this is usually an advantage, but in many cases it is the loss of a means of accent.

The third method, the use of an uncorrected lens, is due to Major Puyo, of Paris, who some fifteen years ago advocated the employment of spectacle lenses, and induced a French firm to make them of dimensions not used by the oculist. A spectacle lens is not corrected for spherical aberration astigmatism, coma, or chromatic aberration; the meaning of which is that besides the main image various secondary images are formed that overlap the former and, according to the amount, soften or blur the image formed on the negative. Now the amount and position of this blurring can be controlled in various ways and can even be relegated to the centre or periphery of the visual field, or, by the use of very small stops, practically eliminated. The success of the French lenses led the well-known lens makers to introduce lenses of this type, until the soft-focus lens is more and more displacing the anastigmat for art as against scientific purposes.

The last lens of this type to enter the field is the Kalosat, the outcome of a communication contributed to "Camera Craft" by the writer of this article, in November, 1919. In the search for a lens of great rapidity to take instantaneous photographs in room lighting, the writer employed a quartz spectacle lens. The reasons for the choice were that as there are only two surfaces as against eight or sixteen in anastigmats, the loss of light by reflection is reduced to a minimum, and as quartz or oxide of silicon passes the highly actinic ultra-violet rays, their action could be counted on to help produce the image. Lastly, as the refractive index of the silica is only one-tenth that of lens glass, a focal correction is not necessary.

The experiments were made with a $1\frac{1}{4}$ in. meniscus lens of 5 in. focus, concave surface towards the field, working aperture being thus about $f/4$. The results were most satisfactory and portraits taken 8 ft. from the window of a living room at one-sixteenth of a second were excellent in definition and permitted of enlargement from $3\frac{1}{4}$ x $4\frac{1}{4}$ to 14 x 17 without loss of quality.

At that time, some seven years ago, a lens competition exhibit was being hung on the walls of the California Camera Club, and the writer hung these enlargements with the caption, "It's all in the lens, price 50 cents," without suffering from the comparison with the product of well-known lens makers. Shortly after, trying it out on landscape, the lens was lost, and the attempt to replace it by another pebble lens, that is quartz lens, resulted in failures owing to imperfections in the natural rock crystal from which they are made.

This led to the discontinuance of pebble lenses, and nothing further was done until the writer learned that rock crystal synthetically made, and therefore flawless, was used for lenses in the transmission of light for medical purposes. A request to make a 5-in. lens from the makers was responded to, and the results obtained by its use were given to the photographic world in the article in "Camera Craft" two years ago. The result was an immediate interest both in the U.S. and abroad that finally caused the manufacture of the Kalosat lens.

It is made in two series, one working at $f/4$, the other at $f/6.5$, but the rapidity of the lens is such that allowance must be made for it in making exposures by meter. Experiments with the $f/6.5$ lens in landscape work yield good marginal definition and an unexpected flatness of field. Single lenses of

the meniscus type show inward or outward distortion of straight lines near the margin of the picture, but this is practically eliminated by the forward position of the diaphragm, and buildings show no distortion.

The writer devised this lens for rapid action, which it has, but the makers especially market it as a soft-focus lens, and it is being judged largely from this standpoint, and this calls for some explanation and warning. The softness in such lenses is due to the overlapping of the central image by marginal images of slight intensity. If the lens is stopped down too much the latter are cut out and the definition becomes proportionately sharp. Furthermore, with such lenses the focussing must be done after the diaphragm has been selected, it varies with the aperture. Failure to observe these rules will result in failures for which the lens is in no way to blame. It has been stated that in the case of crystal lenses the foci of the actinic and visual rays so nearly coincide that no correction by drawing back the lens is needed, but they do not completely come together, and this adds to the softness of the image. If the user rack the lens back 1-400th of its focal length he will lose this diffusion. Therefore, when using the lens for softness be careful that the lens is in front rather than behind its visual focus. Lastly, the distribution of the area of softness in this type of lens depends on the relation of the curvature of the lens to the plate and field. If the convex side of the lens is towards the plate the diffusion is evenly distributed and no area is critically sharp. This is usually the right position for general use. If the lens be reversed we obtain sharp definition in the centre and rapid shading off into blurring at the edge. Such an arrangement may be an advantage in portraiture.

These warnings are necessary, as only recently we received a letter from a gentleman, presumably of experience in photography, stating that "he did not think much of the Kalosat as a soft-focus lens in comparison with the pinhole," oblivious of the complete difference, both in nature and field of usefulness of those instruments. My own experience with crystal lenses enables me to say that they will give excellent results in all fields, except the purely technical and in copying; that pictures taken with them are much closer to what the eye observes than those of the older type; that the Kalosat is the most rapid lens made, *par excellence* a portrait lens, but reliable in landscape work.

H. D'Arcy Power, M.D.

THE IDEAL STUDIO.

I was wandering aimlessly in a strange part of the country; how or why I came there I had no idea, neither did I know, nor could I conjecture my whereabouts, but the names over the shops and even the costumes were British, but then, in the colonies they could be the same. It was while noting the names that my eye was caught by a window in which photographs were displayed and my attention was at once riveted by such specimens of the photographic Art (with a capital A, Mr. Printer) as had never before met my gaze. Having been connected with photography for over fifty years, I have seen many thousands of pictures produced, both in this country and abroad, but never before had I seen perfection. Yes, I speak advisedly, for after carefully inspecting the specimens in question for some minutes with the purpose of searching out any technical or artistic fault I was compelled, *nolens volens*, to admit that they were one and all, without fault or blemish. They were monochrome prints of a pleasing tint, perfect in posing, lighting, exposure, development, printing, even to the slightest detail of mounting, and I gazed upward to see the name of the genius who had so far superseded his fellows. It would seem he was not particularly egotistic, for the facia bore the simple inscription, "The Ideal Studio."

Anxious to know more, I passed through the open door, and found myself in what appeared to be a large drawing room one could hardly call it a studio, for it apparently contained none of what are generally acknowledged studio appliances and accessories. The chairs, tables and furniture in general were such as might be found in any middle-class or fashionable drawing-room. There was no camera stand or camera visible, and there was an entire absence of painted backgrounds, balustrades, etc., etc. There were no glass windows on either side, but in the very centre of the room was what seemed to be an enormous, many-sided lantern, and it was evidently from this, and this alone, that the lighting of the apartment was obtained.

As I entered a suave, elderly gentleman advanced to meet me, and, giving me greeting, asked me if I desired to make an appointment. To this I replied that, although I had not come for that purpose, still I should be very pleased to have a sitting. Then I explained to him that I was a photographer myself, and that, having been attracted by the beauty of his specimens, had entered in the hope of being enlightened as to his methods of production.

"I am pleased, indeed, to meet a brother photographer," he replied, "and certainly have no objection to giving you an insight into the methods in use in what I have called the Ideal Studio, but you will bear in mind that whatever standard of excellence I may have reached so far is as nothing to what I hope to be able to produce in the future. I have an appointment for a group of three children almost directly, so that you will be able to see at once how I work the lantern, which, you see, is my sole source of lighting, and the rays can be thrown on any part of the studio by merely touching one of these switches, indicating, as he spoke, a series of small studs along the wall on the right-hand side of the apartment. Rapidly manipulating the same the light (and what a light!) was made to traverse the whole of the chamber, now up, now down, now on the right, now on the left.

"You will notice," he said, "that the light itself is of a pure white, and I may say that, although it is actinic as the brightest sunlight, it is still as soft as sunset."

Then, taking from a side table what appeared to be a camera of the reflex type, he continued,

"This is my camera with which the main part of my work is done. You will observe that it has two lenses. They are, so to speak, twins, but instead of producing two pictures they are so accurately manufactured and at the same time so accurately set that they produce only one, and as the lenses are practically reproductions of the human eye, the one picture produced is absolutely stereoscopic. The power of the wonderful light in which radium plays a great part, and the rapidity of the special plates I use in addition, obviate any chance of movement showing, either caused by instability on the part of the sitter or by oscillation of the camera; in fact, I can allow the camera to swing, and the rapidity of the exposure is so great that the picture will still be perfectly sharp and clear."

Just then a lady and three children were ushered into the studio, and the proprietor at once commenced to make himself agreeable to the youngsters, passing playful remarks, and asking if they had come to see his toys. Naturally, they looked round for the toys, which, so far, were not in evidence; but with a cheery "come on," he led them across the apartment, and, motioning the eldest, a girl of about ten, into a low basket chair, he indicated to the two younger boys—that they should take up position on the floor at her feet. I could not but notice with what ease they at once seemed to take up natural and easy positions, and that without any attempt

on his part to pose them or control them in any manner. Then, still smiling, he opened a small cupboard close at hand, from which he extracted two or three toys, which he handed to the children. But what toys they were: not the general type of thing, but something quite unusual; toys that, from their very novelty, at once drew the rapt attention of the kiddies. Then, on his touching a switch at the side, a panel behind the group drew up, revealing a recess containing all the appurtenances and appliances of a child's day nursery, and forming a thoroughly realistic background to the children. He then stepped away, still talking to them in a jovial manner, and, taking up the camera, there was a momentary click, after which he suggested that perhaps they would like to see some different toys. They at once followed him to another part of the studio, where a totally different pose was obtained without any attempt at control on the part of the operator, and the panel at the back this time revealed a different type of background.

He did not hand them toys now, but, taking one in his own hands, which appeared to be a doll as large as an ordinary baby, he laid it on a table in front of him, the children meanwhile watching his every action with intense interest.

"You see," he said, "this is a musical doll, a doll that goes to sleep when it lies down, but when I stand it up it at once commences to sing," and, suiting the action to the word, he stood the doll on its feet.

Whether it was a case of ventriloquism, or whether the doll contained something in the nature of a gramaphone, I could not tell, but the strains of a popular melody at once became audible. At once there was another "click," and the picture was taken.

The lady having expressed a desire to be taken also, a couple of exposures were made upon her; the first, with hat and jacket, was posed in front of a recess which represented a conservatory, and the second in an up-to-date boudoir. Again I noticed that all the posing was obtained by suggestion only, and that in each case it was perfect.

An intimation was then given that the sitting was over and that proofs would be sent during the evening, and the proprietor of the "Ideal Studio" and myself were once more left alone.

"Now," he said, "you will see the next part of the procedure." And, so saying, he opened a door close at hand, and we passed into a small lobby, and the door was closed again, while another door in front was opened, and we now passed into a second apartment; but what could it be? It certainly bore no resemblance to any kind of dark-room that I had ever seen. In the first place, it was filled with a radiant light, that appeared equal to ordinary daylight, but its colour was indefinable. It certainly was not ruby, neither was it green or white; then there were no sinks and no water, no developing dishes, and very few bottles on the shelves. Instead of these, there were long benches on either side, and on these benches what appeared at first sight to be one or two gas ovens.

Placing the camera on one of the benches, the operator opened the back and commenced to take out the exposed plates.

"But," I exclaimed, "how about all this light?"

"Oh," replied he, "that is all right; this light is absolutely non-actinic, and will not fog the most sensitive plates yet produced. Here, again, radium plays its part, but in a different combination from the light of the studio."

He then proceeded to place the plates in an open rack, and, opening one of the ovens, placed the rack inside, closed the door, and touched a switch at the side

"There," he remarked, "in ten minutes from now those plates will be developed and fixed and ready for printing."

"But," said I, "you have not put them in any developer yet."

"Well," he replied, "my system of development is an adaptation—in fact, an improvement—on the old Daguerreotype process. These plates are developed by fumes and without wetting. The gentle heat which generates the fumes in that oven is not sufficient to reticulate the softest gelatine film, and, as every exposure is always the same and every plate I use of the same rapidity, ten minutes is always the time occupied, and the fixation going conjointly with development, they will be quite ready in that space of time, especially as no washing is required, for no trace of anything deleterious remains in the film.

"We shall just have time to partake of a glass of wine and a biscuit, and then our negatives will be ready for printing," he continued, "and by then my next appointment will be due."

"But," I queried, "how about retouching?"

"Therein lies one of the best points of my system," said he, "for the exquisite softness of the light obviates all necessity for retouching. Admitted that at times there may be a scar or some similar marking which may require just a touch but even that is of so rare an occurrence as to be almost a negligible quantity."

Having consumed our refreshment, we proceeded to examine the negatives, which were certainly the acme of perfection, both technically and artistically. My host then opened what appeared to be a second oven, but very much longer than that in which the plates were developed.

"This," said he, "is my printing apparatus. The negative is placed in position at this point," suiting the action to the word, "and the bromide paper superimposed. You will observe that the paper is already mounted, there being no moisture during development to cause trouble."

So saying he produced from a box at his side a series of mounts, on each of which the paper was already affixed in position. One of these was placed on the first negative, once again the oven was closed and a switch touched. Almost immediately it re-opened to receive the second negative, and so on through the series.

"Now," he said, "these negatives are printed automatically, each print receiving exactly the same exposure, and they then pass on down the oven at a specially-regulated speed over the fumes of the developing and fixing compound, and in a few minutes will be deposited at the other end the finished production ready for delivery. Such is the process in daily use at the "Ideal Studio."

"In the next room I have installed what I call my publishing machine." And passing through another doorway we entered an apartment, down the centre of which ran a third of the oven-like contrivances, but of a much more massive construction.

"In this," he continued, "are printed, developed, and toned my series of postcard local views. In this end, you observe, is a framework, taking six negatives, each space being accurately bordered and spaced. In this box above I can place up to 500 sheets of the sensitised board, each taking six postcards and making three thousand in all, though I scarcely ever have a run of so large a number of one subject. These sheets drop automatically into place as the machine works, the back comes up and presses them into contact at the same moment that the radiolite is exposed upon them, and they then pass on as in the smaller machine, through the developing, fixing fumes into the fumes of a preparation of sulphurous acid, which yields a fine brown tone, from there through more fumes which eliminate any acid that may be left on the film, which, as you see, is of a high enamel surface, and as that surface is in no way affected during the various processes, there is no glazing required, which is another saving effected. This machine I can start going at any time and leave in action any length of time, knowing that after the exact space of one hour 6,000 cards are being automatically deposited in a receptacle at the other end every hour that passes. And now having demonstrated the methods I will write you out the formulæ." So saying, he took a seat at a desk, drew pens, ink and paper towards him, when some wretched tootler outside started "Bubbles" on a cornet, and I woke to find myself in bed at home without my formulæ, and also without any knowledge of the whereabouts of "my dream studio."

C. Brangwin Barnes.

Assistants' Notes.

Removing Amidol Stains From Finger Nails.

Immerse the hands in a solution of sodium sulphide about double the strength of the usual sepia tone until the deposit on nails can be removed by gentle scraping. This should occur in two or three minutes; after a rinse under the tap the hands are transferred to a weak permanganate bath, followed by a short immersion in metabisulphite to remove any permanganate stain. A final wash with soap and water completes the process. I have used above method repeatedly for the last two years and have noticed no ill-effects either to hands or nails, and in my own case it has been surprisingly successful.—A. Graham Brown.

[We would add a caution against using sulphide without the after-process recommended by our contributor, doing so because sulphide alone will discharge pyro stain, and, therefore, some people may be tempted to use it.—Eds. "B.J."]

Factorial Development.

The prominence of factorial development given by one or two workers during the last twelve months, and Mr. Watkins' repeated appeals to the professional photographers generally for some of their experiences with it, prompts me to send the results of a few tests I made a few months prior to the war.

They were made to find out any differences that varying the quantities of soda carbonate to each grain of pyro might have factorially and with regard to stain.

The required number of quarter-plates were exposed as rapidly as possible on a suitable subject to a tested steady daylight, giving a full exposure and using a roller blind shutter to ensure regularity.

The developer used was as follows:—

A.—Pyro	.....	1 oz.
Potass. metabisulphite	.....	50 grains
Water	.....	9 ozs. 1 dram
B.—Soda sulphite, soda (cryst.)	.....	2 ozs.
Potass. metabisulphite	.....	2 drams.
Water to	.....	10 ozs.
C.—Soda carbonate (cryst.)	.....	2 ozs.
Water to	.....	10 ozs.
D.—Potass. bromide, 10 per cent. solution		1 oz.
Water	.....	5 ozs.

Solution C is best kept apart from the sulphite, and the above keep well for some time.

Solution B is the "B.J." neutral sulphite one, C is made of similar strength for convenience of measuring.

Grains of Each Component per Fluid Ounce of Complete Developer.

	Pyro.	Neutral Sulphite and Soda Carbonate—each.	Bromide.	Factor.	Remarks.
1	1	4½	—	24	Good.
2	1	6	—	18	Fair, slight over-development.
3	1	9	—	16	Good.
4	1	12	—	14(?)	
5	1	18	—	14	Good.
6	1	24	—	12	Good.
A	2	9	—	12	A little too contrasty.
B	2	12	—	8	Good.
C	2	18	—	8	A little too contrasty.
D	2	24	—	6	Good.
E	2	36	—	5½	Good.
F	3½	17½	—	9	Good.
G	1	6	¼	7	Good.
H	2	12	¼	5	Good.
I	2	24	¼	5	Good.

The above factors proved very useful to me, others may need to vary them for their own class of work.

Only one ounce of freshly mixed developer was used for each plate.

The time of appearance was noted, dish covered, and rocked at intervals of 40 seconds till development was complete, rinsed quickly for a few seconds only, and put in fresh hypo.

Measure and dish were wiped out each time after use.

Keeping the carbonate separately makes a lot of difference in the prevention of stain, and there was no stain in any of the above; the printing quality was also good. 5, 6, D and E gave almost similar results and a trifle softer than the rest.—G. J. W. W.

Photo-Mechanical Notes.

Contact Reproductions by Reflected Light.

Considerable interest is being taken in the photo-mechanical journals in the process which has been patented by a German inventor named Max Ullmann, and to which the name of "Manul" has been given. The process provides for the reproduction of printed matter, letterpress, etc., without the use of a camera and even when the "copy" has printing or other matter on both sides. It will be seen that essentially the method has a strong family likeness to the process of the late J. Hort Player, published in this country some fifteen years ago. It has, however, been made the subject of various patents, in particular the German Patent No. 287,214, of August 13, 1913. M. L. P. Clerc, in giving an account of the process in the current issue of "Le Procédé," points out that the method of making copies by contact and by reflected light was indicated by Yvon about 1890, and more recently by M. G. de Fontenay. In the Manni process, however, the dry-plate or bromide paper emulsion employed by those who had previously experimented in this method is replaced by a film of bichromated colloid coated on glass. Although we have not seen any of the results of the Manni process, we are told by those who have that while the lines of a negative are by no means clear glass, the ground has considerable opacity, the contrast of the negative as a whole being fairly satisfactory.

The sensitive plate is placed in a printing frame with its uncoated side in contact with the glass of the latter. The drawing or letterpress to be reproduced is then laid face down on the sensitive surface, and, the back of the printing frame having been inserted, exposure to light is made. In these circumstances the light which passes through the sensitive film is absorbed by the dark parts of the drawing or letterpress to be reproduced, whilst it is reflected back into the sensitive film by the white portions of the original. Roughly, it may thus be said that the light acting upon the bichromated colloid in contact with the white parts of the original is about double that which acts upon those parts in contact with the lines or characters of a black and white original. It will thus be understood that if the exposure is correctly adjusted the bichromated colloid may be rendered insoluble in the parts representing the white portions of the original and left of a sufficient degree of insolubility in the portions in contact with the dark parts of the original.

After development, by removal of the soluble parts of the colloid, a relief is thus obtained, and may be stained with a suitable dye in order to obtain a negative of exactly the same size as the original, but reversed as regards right and left. The patent specification does not give instructions in the preparation of the sensitive film, the inventor reserving to himself the supply of the necessary sensitive plates to licensees under his patents.

Recently, however, Professor August Albert, of the Institute of Graphic Arts in Vienna, has published in "Photographische Korrespondenz" particulars of the formulæ and procedure which he has found to yield satisfactory results. The relatively thick film of bichromated gelatine, such as is employed in carbon printing, is quite unsuitable for the process. It is necessary to employ an extremely thin film, and to render this completely insoluble by prolonged exposure to light, solubility of the exposed portions being at the same time obtained. The two following formulæ have been found to yield excellent results:—

(1) 25 c.cs. of a 14 per cent. solution of albumen or white of egg, previously beaten to a froth and filtered, are mixed with

20 c.c.s. of clarified fish-glue, as employed in the enamelene process, and 10 c.c.s. of 20 per cent. ammonium bichromate solution added.

(2) A mixture is made of 60 c.c.s. of water, 30 c.c.s. of liquid fish-glue, 24 c.c.s. of 10 per cent. ammonium bichromate solution, and 2.5 gms. of sugar candy, previously dissolved in 20 c.c.s. of water. A few drops of glycerine may be added.

One or other of these preparations is coated on glass by means of a whirler, the film being extremely thin, and almost colourless.

The time of exposure requires to be very carefully determined. In first trials of the process it is well to use a perfectly constant source of light, placing the printing frame at a given distance therefrom alongside an actinometer. During the exposure a card is placed step by step against the printing frame at noted intervals of time, and the reading of the actinometer made each time that the card is shifted into a fresh position. In this way the plate is given a series of step known exposures corresponding with the readings of the actinometer.

Development is done in cold or luke-warm water, and the plate is then immersed in a solution of a red-dye, such as fuchsine, and afterwards into one of orange colour such as chrysoidine, so as to obtain intense and completely non-actinic dyeing of the colloid relief. After a brief rinse the negative is dried, and is then used for printing on metal by one or other of the customary processes.

The following patent has been applied for :—

PRINTING PROCESSES.—No. 26,926. Photo-mechanical printing processes. A. R. Trist.

FORTHCOMING EXHIBITIONS.

September 19 to October 29.—Royal Photographic Society. Secretary, Royal Photographic Society, 36, Russell Square, London, W.C.1.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

November 23 to 26.—Rotherham Photographic Society. Latest date for entries, November 9. Particulars and entry forms from the Hon. Exhibition Secretary, Sydney G. Liversidge. "Orissa," Gerard Road, Rotherham.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Latest date for entries, January 30. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick Glasgow.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

February 11 to 25.—Scottish Photographic Salon. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

SCOTTISH PROFESSIONAL PHOTOGRAPHERS' INTER-CITY GOLF MATCH.—An interesting golf match, between the Glasgow and District Professional Photographers and the Edinburgh Society of Professional Photographers, took place at Turnhouse on Friday, October 21, 1921. The members were fortunate to have fixed on an ideal autumn day for their outing. The course and the greens were in excellent order. The match between the clubs was played in foursomes, and, after some good play, resulted in a draw. The members in the afternoon engaged in friendly matches, which were much enjoyed by all. The visitors were in the evening entertained to dinner by the Edinburgh Society, under the chairmanship of Mr. J. R. Coltart, who, in proposing the toast of "The Glasgow and District Professional Photographers' Golf Club," said that of all the golf matches played between the Societies, this one was, without question, by far the most enjoyable he had attended. This was no doubt accounted for by the ideal autumn day and the fact that the match had ended in a drawn game.

Patent News.

Process patents applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, October 10 to 15 :—

FILMS.—No. 26,771. Manufacture of photographic films. P. A. Barron.

SHUTTERS.—No. 27,451. Photographic camera shutters. A. E. Bettles.

APPARATUS.—No. 28,352. Apparatus for use with photographic processes. C. Callebaut.

PRINTING-APPARATUS.—No. 27,198. Photographic printing apparatus. H. R. Eason.

PRINTING-FRAMES.—No 27,363. Photographic printing-frame, etc. H. McClean and W. H. U. Morley.

CAMERA DEVICE.—No. 27,101. Means for positioning sensitised cards, etc., in photographic cameras. E. F. Stratton.

LENS-HOLDER.—No. 27,111. Combined lens-holder and shutter for photographic cameras. E. F. Stratton

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COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

FOCUSSING MECHANISM.—No. 169,249.—(June 19, 1920.) The invention relates to improved means for coarse or fine adjustment of focus.

In a mechanical focussing device especially adapted for photographic work it has been proposed to mount the movable member upon three rollers, two of which are V-grooved peripherally to run on a rail, whilst the third is plain.

According to this invention the means for coarse adjustment comprise a sliding member of the instrument, adapted to carry the lens or object to be focussed, and having a three-point bearing on a supporting member of the instrument, the bearing

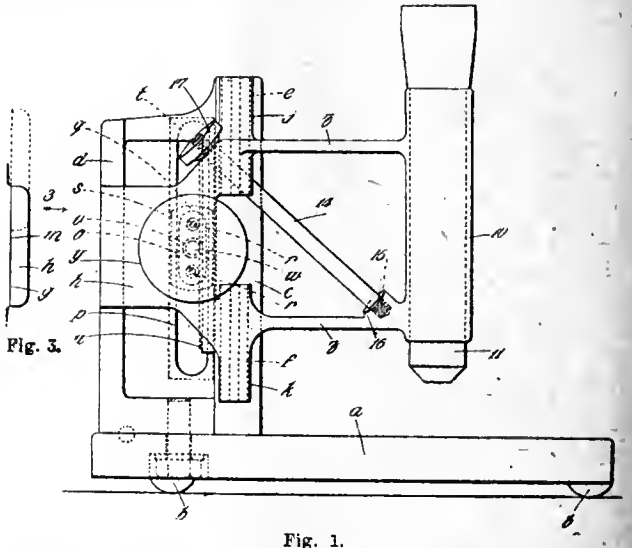

Fig. 3.

Fig. 1.

surfaces of the sliding member and the supporting member being rigidly attached thereto respectively, two of the pairs of the coacting bearing surfaces being of V-type, whilst the other pair is of flat type.

Preferably the two bearing surfaces of V-type are in alignment, the one with the other. Preferably also the coacting bearing surfaces of each pair are of equal length, and so arranged that when in use they normally travel so as to overlap equally at each end in order that the surfaces may remain straight in spite of wear.

The means for fine adjustment of focus comprise two resilient bars, adapted to support the lens or object to be focussed, and set normally parallel with one another and at right angles to the direction of motion required in combination with means for springing them in this direction from their normal positions.

In the drawings, on a base *a* supported by three feet *b* is an upright member *c* integral with a frame *d* substantially semi-circular in horizontal cross-section. On the side of the member *c* and frame *d* are V-grooved and flat bearing surfaces respectively, the V-groove bearing surface being divided into the two open-ended parts *e* and *f* of equal length towards the top and bottom of the member *c*, whilst the flat bearing surface *g* is arranged at a height midway between those of the parts *e* and *f*. Coacting with these bearing surfaces *e*, *f* and *g* are corresponding bearing surfaces on the sliding member *h* of the instrument. The V-bearing surface on the sliding member *h* is divided into two parts *j* and *k* of the same length and separation as the grooves *e* and *f*, whilst the flat bearing surface *m* on the member *h* is of the same length as the surface *g* on the frame *d* (see fig. 3). In this manner a three point bearing is provided, whilst the equality of length of the coacting surfaces at each point, and the fact that they normally travel so as to overlap equally at each end ensure that, when in use, the surfaces may remain straight in spite of wear.

The member *h* is held to the frame *d* by a boss *n* integral with the member *h* and having a flatted portion *o* which passes

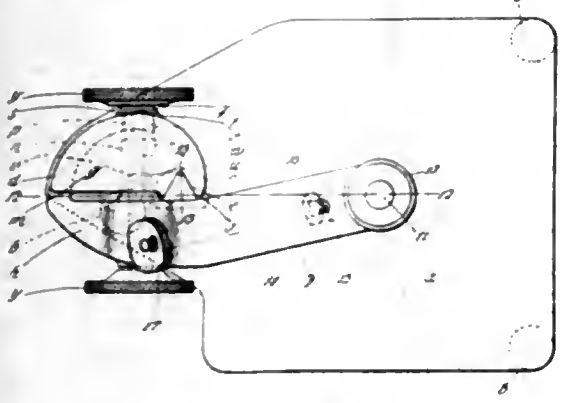

Fig. 2.

through a slot *p* in the frame *d* and carries a guard *q* secured to the boss *n* by screws *r*, *r*, a spring *s* being disposed between the guard *q* and a bearing surface *t* at the edges of the slot *p*, so as to exert constant pressure on the parts and to prevent their coacting surfaces being separated under ordinary circumstances, and to take up wear automatically. The guard *q* serves to prevent the surfaces being separated to any harmful extent under force greater than that of the spring *s*.

On the member *c* is a rack *u* with which meshes a pinion *v* on a spindle *w* which passes through the member *h*, the boss *n*, the flattened portion *o*, spring *s* and guard *q*, the boss *n* being cut away at one side as at *x* (fig. 2), to enable the pinion *v* to engage the rack *u*, whilst knurled heads *y*, *y* are mounted at the ends of the spindle *w* to enable the pinion *v* to be turned to cause the member *h* to travel up and down for coarse adjustment.

Extending from the member *h* at right angles to the direction of its motion, and normally parallel with one another, are two resilient arms *z*, *z*, at the ends of which is carried a holder 10 for the optical element 11 to be focussed. The arms *z*, *z* are thin in the direction of motion of the member *h* and wide at right angles thereto so as to be deformed in one direction only. As will be seen from fig. 2, these arms *z*, *z* are so arranged that the bearing surfaces *e*, *f*, *g*, and the optical element 11 lie in or near to one plane 12—12 at right angles to the plane 13—13, intersecting the V bearing surface longitudinally, so that any force acting eccentrically and vertically near to the optical element 11 shall have a minimum tendency to displace either part *j*, *k* of the V bearing surface from its seating.

In order to effect a fine adjustment of the optical element 11 a rod 14 is mounted diagonally between the arms *z*, *z* being fixed at one end by screwing rigidly at 15 into the boss 16, is free to slide at its other end through a bearing in the member *h*, and is provided with a screw and knurled nut 17 which bears against the end of the bearing in the member *h*. By turning the nut 17 in the appropriate direction the arms *z*, *z* are sprung and the optical element 11 is thus moved slowly but rigidly in the required direction, i.e., upwards, and by turning the nut 17 in the opposite direction, the arms *z*, *z* are released to permit the optical element 11 to return to its former position relatively to the member *h*.

In this manner means free from shake or backlash are provided for fine adjustment of the focus.

The supporting and sliding members of the instrument may be held together by gravity, by a spring as shown, or by other constant pressure means, as may be most convenient, and it is preferable that, as shown, the V-bearing surfaces should be nearer to the optical element 11 than the flat bearing surfaces, since in this position they exercise greater control on the element 11.

Any convenient means other than the rack *u* and pinion *v* may be provided for effecting the coarse adjustment of the member *h*, for example a screw, and for springing the arms *z*, *z*, instead of the screwed rod 14 an eccentric or a differential screw may be used, or a diagonal strut itself adapted to be bent laterally may be substituted, or any equivalent means employed. William Taylor, Stoughton Street Works, Leicester.

SILHOUETTE PHOTOGRAPHS.—No. 169,233 (June 16, 1920). The object, *o*, intended for silhouetting is first photographed in front of a pure black background, *b*, the background appearing as a blank on the glass or whatever it may be, in accordance with the optical inversion of lights and shades.

The negative thus obtained is here called Nb_o, the lower letter representing the object and the upper the colour of the background.

Without changing the position of the object *o* nor that of the photographic apparatus, the black background is replaced by a pure white one, *w*, and another photograph taken. The new negative, Nw_o, accordingly shows a black background, while the figure appears negatively in the same way as on Nb_o. Of this second negative a diapositive is made, Dw_o, the object, *o*, appearing on the same as positive and the background as transparent.

By placing the diapositive, Dw_o, upon the first obtained negative, Nb_o, an altogether transparent background is obtained, but the object *o* is positive in one picture and negative in the other, and accordingly, by this superposition, a uniformly covered silhouette is obtained.

Instead of placing the negative on the diapositive, the two pictures may be photographically superimposed one upon the other. This may be done by first developing the negative Nw_o, leaving for the present the negative Nb_o undeveloped. Then the diapositive Dw_o, instead of being printed upon a new plate, is printed from the developed negative Nw_o direct upon the film or coating of the undeveloped negative Nb_o, so that after the development of the latter a complete silhouette will be obtained.

The taking of successive pictures before a black and a white background, as described, is, however, not generally practicable with objects which are in motion. In this case it is preferred to use one background of an intense colour, as, for instance, red. Avoiding as much as possible stereoscopic parallax, the object is simultaneously taken upon two plates, placing, however, before one of the lenses a plate of transparent material (i.e., a filter of the colour of the background, say, red), and before the other lens a filter of a complementary colour, for instance, green. Through the red filter the red background is photographically equivalent to white, and through the green filter to black. In this way the required partial pictures may, accordingly, be obtained by the simultaneous taking of two photographs, this last-mentioned way being specially adapted for cinematographic combination prints.

If the silhouettes, as described, are to be employed for combination printing, they should preferably be made on films as thin as practicable. Whenever, for instance, the object *o* is to be inserted into another picture, *a*, the negative of which may be called Na, we place a silhouette made as already set forth ($Nb_o + Dw_o$) between Na and the sensitive printing film and obtain in this way a print of *a*, in which the space for *o* is left blank. By means of the negative Nw_o, the ground of which is black and, therefore, requires no special covering, the object *o* may afterwards be inserted into this space.

Accordingly, in taking the first print there will be a superposition of the picture films $Na + Nb_o + Dw_o$.

Whenever circumstances permit, also in this case, as in the one described with reference to Nb_o and Dw_o, a photographic superposition

may be substituted in part, or even entirely, for the three mechanical superpositions between taking the three pictures, for instance, by taking the picture Nb_0 not upon a new film, but directly upon the undeveloped coating of Na, or both views upon one film.—Hans Goetz, 1 Sendlinger, Torplatz, Munich.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

EKUALITE.—No. 415,813. Cinematograph screens, specially prepared and framed. The Ekualite Screen and Accessories, Ltd., 5, Denmark Street, Charing Cross Road, London, W.C.2, manufacturers. June 1, 1921.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

KEROTYPE HONEYCOMB BRAND (DESIGN.)—No. 407,251. Photographic paper. Kerotype, Ltd., 2, The Pavement, Clapham Common, London, S.W.4, manufacturers of transfer papers.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, OCTOBER 31.

Bradford P.S. "Pictorial Principles." H. A. Crawford.
Dewsbury Phot. Soc. "My Rambles in Upper Wharfedale." Thos. Ryder.
Glasgow and W. of Scot. Amateur P.A. "The 'Black and White' Men." T. C. F. Brotchie.
Kidderminster and Dist. P.S. Midland Photographic Federation Slides.
Leeds Camera Club. "Enlarging and Reducing."
Southampton C.C. "Spirit Photography." Dr. McDougall.
South London Phot. Soc. "A Talk on London Landscape." A. E. Farrants.
Wallasey Amateur Phot. Soc. "Passe Partout Mounting." F. H. Lancaster.

TUESDAY, NOVEMBER 1.

Royal Photographic Society. Presidential Address. Dr. G. H. Rodman.
Birmingham P.S. "The Use of Colour Sensitive Plates." Kodak, Ltd.
Cambridge and Dist. Phot. Club. "Antarctic Exploration, with Notes on Polar Photography." Major F. Debenham.
Exeter Camera Club. "Ilford Lantern Plates and How to Use Them." Algernon Brooker.
Hackney Photographic Society. "Picture Making in Northern Italy." G. H. Dannatt.
Leeds Phot. Soc. Exhibition of Colour Transparencies.
Morley Photographic Society. Whist Drive.
South Glasgow Camera Club. "The Rocky Mountains of Scotland." John Martin.
Tyneside Photographic Society. Gaslight Printing.

WEDNESDAY, NOVEMBER 2.

Accrington Camera Club. "Carbro." A. Dordan Pyke.
Croydon C.C. "Necol Collodion Products." H. W. G. Bidgood.
Dennistoun Amateur Phot. Assoc. "Colour Lantern Slides." Paget Prize Plate Co.
Edinburgh P.S. "The Camera in Research Work." A. Eddington.
Halifax Scientific Society. "Bromide Enlargements: Chemical Modification." C. Thomas.
Ilford Phot. Soc. "Composition." M. O. Dell.
Partick Camera Club. Whist Drive.
Rochdale Amateur Phot. Soc. "How a Reflex Camera is Made." Messrs. Butchers.
South Suburban P.S. "Birds and their Nests." T. B. Bayne.
Tunbridge Wells Amateur P.A. "A Dive into Belgium." W. L. F. Wastell.

THURSDAY, NOVEMBER 3.

Camera Club, The. "Modern Magic." C. P. Crowther.
Hammersmith Hampshire House P.S. "Idle Thoughts of an Old Hand." P. R. Salmon.
North Middlesex P.S. Competitions—Prints and Slides, general.
Wimbledon and Dist. C.C. "A Loon in London." W. L. F. Wastell.

FRIDAY, NOVEMBER 4.

Wombwell and Dist. P.S. Beginners' Night.

SATURDAY, NOVEMBER 5.

Borough Polytechnic P.S. Dance, Edric Hall.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, October 25. Mr. F. F. Renwick, F.I.C., in the chair.

Papers arranged by the Scientific and Technical Group were read.

Mr. F. C. Toy, of the Photographic Research Association, described experiments on silver bromide grains (of the same size and shape) made with the object of testing the hypothesis that the sensitiveness of such grains is equal. Triangular flat-plate grains were selected by visual examination at a magnification in the microscope of 4,000 diameters. Five were selected of approximate identity, their size differing from the mean by about 2 per cent. The thickness was estimated by observation of the focussing movement required to bring opposite faces into focus, the mean variation in volume being about 5 per cent., and the greatest variation in volume between two grains, about 25 per cent. The variation in size of the grains was thus about 1/30th of that in a process plate emulsion. It was found from sensitometric exposures that the characteristic curve obtained with the grains approximated to the typical H. and D. form, having a straight line mid-portion. The conclusion therefore appeared to be that uniformity of volume does not determine equal sensitivity. Mr. Toy dealt briefly with the theories co-relating the characteristics of the sensitive grains and the shape of the curve.

Mr. G. Brooksbank, of the Ilford Laboratories, followed with a paper on a cognate subject, viz., the visible change in silver bromide grains on exposure to light. He first showed an ingenious wedge-shaped vessel for coating glass with a 1-grain layer of diluted bromide emulsion. Photo-micrographs showed that the change in the grains from transparency to more or less complete opacity was independent of their size or shape. On treating the darkened grains with weak solution of hypo many of them were partly dissolved, triangular grains yielding skeletons of star form.

The two papers were discussed by Messrs. F. W. T. Krohn, R. E. Crowther K. C. D. Hickman, and the chairman.

In a third paper, Mr. Olaf Bloch briefly described a method of obtaining greater uniformity in the development of plates, in particular X-ray emulsions. The method consisted in the use of a roller made by removing the rubber from an ordinary roller squeegee and winding the wooden core spirally with thick-pile velvet. The plate was first covered with some developer, and the velvet-covered roller caused to travel constantly to and fro over the surface by its own weight. Mr. Bloch exhibited charts of the lines of equal density obtained in a plate by this method and showing an improvement over those produced by rocking the developer.

Mr. R. E. Crowther referred to the advantage, as regards uniformity of development, of pouring the developer constantly off and on.

The concluding paper, by Mr. Milts Cartwright, of the L.C.C. School of Photo-Engraving, dealt with provisional experiments on accuracy of reproduction in rotary photogravure and showed the very close approximation to facsimile rendering obtainable in the process.

Mr. H. M. Lomas, Mr. A. J. Bull, and Mr. E. L. Turner briefly discussed the paper.

CROYDON CAMERA CLUB.

Mr. K. C. D. Hickman lectured on "Some Aspects of Screen-Plate Photography," dealing in a highly interesting and fresh manner with a somewhat worn subject. By means of blackboard diagrams and coloured chalks he clearly explained the principles of the additive system of screen-plate photography, and emphasised the necessity of correct exposure, otherwise the ratios of the three primaries will be incorrectly rendered with material falsification of colour reproduction.

This was followed by practical instruction on working the Paget process, the whole lecture being delivered in the happiest of ways with flashes of genuine humour. Although a great admirer of the process he departs from the official instructions largely, even to employing Wellingtons S.C.P. plates for the positive transparency, a course which, it is assumed, Messrs. Paget do not recommend. It does not seem necessary to record these alternative procedures, apparently purely due to personal idiosyncrasies, for exquisite Paget

slides, secured in orthodox manner [illegible] Paget materials throughout, have often been shown in the club, notably by Mr. S. Rose.

An awkward cross-country journey compelled Mr. Hickman to leave comparatively early. It is intimated to him that after he had gone all sorts of complimentary things were said about the lecture and lecturer, more modified opinions being expressed about his slides. On the other hand, Mr Harpur felt hurt at a statement made that a plate became electrified and attracted the enemy when dusted with a brush. It was not necessary to use so much friction as to convert the plate into a high-tension electrical machine. To attempt to remove dust by knocking one end of the plate simply made holes in the table, and effected little beyond

Mr. Hibbert passed round an interesting novelty shortly to be placed on the market, a variant of placing tulle close to the lens, first suggested by Mr. Harpur many years ago. It consists of two cemented discs of glass enclosing a fine cross-screen of black lines, photographically produced, placed immediately in front of, or behind, the lens. He had tried such on a portrait lens, and the plastic quality of the softened definition was comparable with that furnished by the best soft-focus lenses. Discs giving three different degrees of diffusion will be supplied Obviously exposure will be somewhat increased; doubtless the makers will state the multiplying factors.

News and Notes.

Return of a "Quest" Photographer.—Two invalided members of the Shackleton Expedition, Mr J. C. B. Mason and Scout Mooney, arrived at Southampton on Saturday last from Madeira. The former who was one of the official photographers, became very ill during the voyage, but has now practically recovered.

The Malayan Camera Club.—We are interested in receiving the rules of the Malayan Camera Club recently established at Kuala Lumpur, Federated Malay States, the secretary of which, Mr. L. Arfeer, is an old reader of the "British Journal." We believe the society is the only one in the country, which includes in its white population large numbers of Europeans engaged in the rubber and tin industries

Photographs Wanted.—Mr F. W. Tassell, 39, Lowther Street, Carlisle, writes:—May I ask through the medium of your valuable paper if any firm of photographers who photographed the Australian cricket team, either in their private dress or cricketing flannels, would please communicate with me at once I wish to secure a photograph of the whole team that came over, or a separate photograph of Mr Armstrong and Mr. Gregory.

Lantern Slides in Schools.—A new catalogue of photographic and other lantern slides for the use of L.C.C. schools was issued last Friday. These slides, and the special viewing apparatus for the use of teachers, are housed in rooms adjacent to the Teachers' Reference Library, at the new County Hall, Westminster. There are 80,000 to 100,000 slides available for illustrating school lessons, and they are classified under 30,000 title subjects. The slides most in demand are, we are told those illustrating geography and history lessons.

A Much-photographed Bride.—When Mrs. Rosita Forbes, the famous woman explorer, and Colonel A. T. McGrath left the Chapel Royal, Savoy, last Saturday, after they had been married, they had to face 25 photographers As she was about to enter the chapel she halted to speak to the crowd of waiting photographers She remarked that she had said beforehand there were to be no photographs. Nevertheless, she smilingly agreed to let them take some at the conclusion of the ceremony. The majority of the guests departed before the photographic operations were over.

The Late Charles W. Hastings.—Late intelligence reaches us of the death on September 28 of Mr. Charles W. Hastings at the age of 71. It is so long since Mr Hastings was connected with photographic journalism as editor of the "Amateur Photographer" in the early days of that periodical that his kindly personality is probably a memory of only very few. For many years past he had been associated with the technical editorship of engineering and gas publications. He was a prominent Churchman and Freemason, and his death is sincerely lamented in circles more immediately familiar to him in recent years.

Smuggled German Cameras.—A fine of £174 was imposed on Henry French, Cedars Road, Clapham, yesterday at Dover, for smuggling 2,000 cigars, 1,000 cigarettes, cameras, binoculars, motor lamps and horns, etc., all of German manufacture. Most of the goods were in registered baggage that the defendant had marked "Armée Britannique," which the prosecution alleged was done to mislead the Customs. Invoices found on the defendant were stated by the Customs official to show that French did a considerable business with Germany. At the same Court, Sidney Dickenson, of Acton, was fined £5 10s. for smuggling a German camera.

Photographing a Petrified Forest.—The camera played a very important part in a geological discovery which has been made known by Dr. Venerosi, representing the Italian Government, by whom he was sent to the little village of Martis, in the north-west corner of the Island of Sardinia, to report on the rumoured existence of a petrified forest, said to be the most wonderful in the world The large collection of photographs which has been made show not only trunks of trees, but the foliage and even some fruit preserved through millions of years, and now lying exposed to view because the water which once filled the basin has disappeared.

A Too Early Photograph.—When sending photographs to a paper for publication it is advisable to write details on the backs of them or attach a letter to them. Messrs. Raphael Tuck & Sons, Ltd., have called attention to the fact that the reproduction of the Queen's Christmas Card which appeared in some editions of the "Evening News" last Friday should not have been printed till November 26. The editor states that the photographs were received by hand, and the letter naming the date of publication as November 26 was received by another department by post. As soon as the error was perceived the photograph was taken out of the paper.

Guilleminot Folio-Brom.—Mr. Jules de Gottal, 17, Cecil Mansions, London, S.W., writes drawing our attention to the Guilleminot product, for which he is the agent in this country, namely, the stripping "Folio-Brom" negative paper, which is coated with a rapid orthochromatic emulsion, and, owing to its paper support, is non halative. Moreover, the negatives are characterised by absence of grain, and the film can be retouched and printed on both sides, is not liable to be scratched, and is non-inflammable. Mr de Gottal is confident that photographers will find Folio-Brom to combine in itself the advantages of plates and films as regards both the quality of the negatives and the conveniences of manipulation for the purposes of portrait photography.

Lecture Courses in Optics.—The lecture courses to be delivered in the Department of Optical Engineering and Applied Optics of the Imperial College of Science and Technology, South Kensington, S.W.7, during the autumn session, include a general series on advanced optics and polarised light by Professor F. J. Cheshire. Professor Conrady will lecture on elementary and advanced optical designing and computing and workshop and testing room methods. Mr L. C. Martin will deliver a course on advanced optics and construction theory and use of optical measuring instruments. Further particulars are obtainable on application to the Registrar at the College The Director of the Department intimates that applications may be received from students and others desirous of carrying out research work in the laboratories.

Royal Society of Arts.—The winter programme of lectures at the Royal Society of Arts contains announcements of several series of great interest to photographers. Mr. F. F. Renwick, F.I.C., will deliver the Cobb lectures in May next, taking for his subject, "Modern Aspects of Photography." In February and March, Professor A. F. C. Pollard, formerly Professor of Optical Engineering in the Imperial College of Science, is to deliver three Cantor lectures on "The Mechanical Design of Optical Instruments." A lecture, which promises to be of photo-mechanical interest, is that by Mr. Arthur Wilcock on "Surface Printing by Rollers in the Cotton Industry." And in November-December Mr. Arthur M. Hind, assistant keeper of prints and drawings in the British Museum, is to deliver three lectures on "Processes of Engraving and Etching."

WINDOW ANTI-STEAMING COMPOSITION.—A correspondent writes:—In reply to a reader last week you stated (on page 636) that you did not know a certain window-cleaning composition, and gave some methods of preventing the steaming of windows. I know the product your correspondent inquires about, but do not know how it is made. I do know, however, that the following formula (advocated by a chemist on the staff of "Work") gives a paste similar to that your correspondent asks about:—Dissolve 100 parts by weight of finest coconut oil soap in water, boil to a clear jelly, and add, with constant stirring, 10 parts of tripoli, 5 parts of alum, 5 parts of cream of tartar, and 5 parts of white-lead, all previously pulverised finely and intimately mixed. Pour the mixture, whilst still hot, into shallow tin moulds, when it will quickly solidify on cooling. For cleansing, moisten the glasses with lukewarm water, apply the soap with a rag, and polish with a dry, soft cloth.

KODAK STAFF PHOTOGRAPHIC SOCIETY.—Although this society, which has been formed among the Kodak Company's staff, has been in existence for only a few months, it already has 170 members. On Thursday, in last week, it held its first exhibition for one evening only in the Oak Room, Kingsway Hall, Kingsway, London, W.C., when 328 prints were hung, catalogued and duly judged by Mr. W. L. F. Wastell. It might be thought that the exhibition of so many examples of work provided sufficient interest for the 3½ hours during which the room was open to members and their friends, but, on the contrary, the intensive programme which was squeezed into the time must surely fill the American Kodak staff at Rochester with doubts of their ability to "hustle" at as fast a rate. For, apart from an hour for refreshments, there was a formal presentation of awards, a lecture on fixing by Mr. Raymond E. Crowther, a demonstration of photo-micrography, and, incredible as it may seem, a lecture on radiography by Mr. Luboshez. We hope that visitors got an opportunity to look at the prints, many of which were of most meritorious quality.

HYPO-ALUM-GOLD TONING.—Mr. S. Zanoff, of the Towles Studio, of Washington, D.C., writes to "Abel's Weekly" that he has been experimenting for a long time trying to get away from the "sick-looking sepias that so many photographers produce," and that he has finally succeeded. He sends to our contemporary some Artura prints from negatives made by the Towles Studio. These, it is stated, bear out all he says about the process, which, by the way, can be worked on any paper. Mr. Zanoff's formulæ are as follows:—

TONING BATH.

No. 1 (A).—Boiling water (rain or distilled)	...	128 ozs.
Hypo	...	20 ozs.
Alum	...	2 ozs.
Boil for two minutes, allow to cool and then add		
Sodium phosphate	...	2 ozs.
No. 1 (B).—Nitrate of silver	...	60 grs.
Water	...	1 oz.
Potass bromide	...	180 grs.
Water	...	1 oz.

Pour the bromide solution into the silver solution and add precipitate and all to the cool hypo-alum bath. If silver and bromide are added to bath while hot, the latter will turn black.

Next add A to B.

No. 1 (C).—Chloride of gold	...	15 grs.
Water	...	2 ozs.

Finally add C to the mixture of A and B. This is Bath No. 1.

No. 2.—Water	...	128 ozs.
Hypo	...	1 lb.
Alum	...	4 ozs.

Boil 10 minutes and when cool add:

Water	...	1 oz.
Silver nitrate	...	30 grs.
Potass bromide	...	30 grs.

Have No. 1 lukewarm. Put prints in No. 1 for about seven minutes. Then rinse prints in clear water and then place in No. 2 bath until they turn sepia. Prints will tone evenly all over.

The prints should be printed the depth desired, a rich black and white, as they will not bleach by this process. The warmer the tone desired the less time the prints should be kept in bath No. 1 and the colder the tone desired the longer they should be kept in No. 1.

Commercial & Legal Intelligence.

LEGAL NOTICES.—A first and final dividend of 6¾d. in the £ has been made in the case of Charles Rose, picture frame maker (trading as Universal Framing Works), carrying on business and residing at 21, Chesterfield Road, Sheffield, Yorks. The dividend is obtainable at the Official Receiver's office, 14, Figtree-Lane, Sheffield.

NEW COMPANIES.

CONVEX ENLARGING AND METAL FRAME CO., LTD.—This private company was registered in Edinburgh on October 14, with a capital of £700 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in embossed or convexed photographic enlargements and metal photograph frames, etc. The directors (each subscribing for the number of shares indicated) are:—J. B. Kellock, 141, Onslow Drive, Dennistoun, Glasgow, secretary, 200 shares; L. Mair, 17, Ross Avenue, Cardonald, Glasgow, picture frame maker, 300 shares; H. Hill, 60, Dunerium Street, Maryhill, Glasgow, manager of company, 200 shares. Secretary: J. B. Kellock. Registered office: 29, Oxford Street, Glasgow.

AMISOL, LTD.—This private company was registered on October 11, with a capital of £2,000 in £1 shares (all preference). Objects: To carry on the business of manufacturing photographers, etc. The subscribers (each with one share) are: T. Thomas, 1, Woodthorpe Terrace, Huddersfield, chemical engineer; S. Wilman, Norfolk Villa, Dewsbury, chemical engineer; W. Sowden, Fernleigh, 48, High Street, Cleckheaton, chemical engineer; T. C. Hammond, "Hopewell," Lightcliffe, chemical engineer; E. V. Chambers, The Manse, Lightcliffe, chemical engineer. The subscribers are to appoint the first directors. Qualification £100. Remuneration as fixed by the company.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

DESENSITISING WITH POTASSIUM IODIDE: FREUND'S METHOD.

To the Editors.

Gentlemen,—The communication of Mr. O. F. Bloch and Mr. F. F. Renwick in yours of the 21 inst., interests me much, but putting aside the "invitations" to do certain things, as outside the amenities of technical discussion, I may perhaps be allowed to make a few discursive remarks.

My recent paper on Freund's method is not intended to be exhaustive as regards the literature or in any other aspect, the papers which I mentioned being those which I regard as serviceable in calling more general attention to the method.

The communication of the above-named gentlemen in the "British Journal" (October 21, 1921) gives an addition to the experimental statements now available, and so is a gain; the conclusions arrived at are for a more matured study than that of a day, but the interest of the moment centres chiefly on the details which require amplification.

If I correctly read the particulars as to the iodising solution of Freund's strength, it is not quite as I described. In my view white potassium iodide cannot in the nature of things be pure, but alone it often is satisfactory. If, however, the final addition of two grains of soda crystals is made to a solution showing no tinge, we have an addition to existing alkalinity instead of an addition from which alkalinity is subtracted. There also appears to have been some confusion as to my suggestion of a possible (but not recommended) addition of one-tenth of potassium bromide solution to the developer, but in the experiments now described

this addition seems to have been made to the iodising solution. Further, a slow acting developer like the quinol sulphite developer should not be gauged by an equal-time action with the others, but by inspection in the manner which I pointed out. Sodium sulphate, if present, hinders or delays much, but accelerators other than the bromide in its reversed aspect may be used in accordance with established usages for hydroquinone, although I deprecate such additions. Most important of all, the gentleman mentioned gives no chemical notion whatever as to the nature of the sensitive plate which he used. Freund's original publication had definite reference to gelatino-bromide. I refer to a somewhat less satisfactory use of bromo-iodide, and I hope to return to this subject towards the end of this letter, or later.

Mr. Bloch and Mr. Renwick record their failure to find the word "gelatino-bromide" in connection with the reversing action of photographic plates as mentioned by Meldola in Watts's "Dictionary of Chemistry." That such skilled dialecticians should both fail in so easy a task appears to me remarkable, but I should not mention it were not the non-finding made the basis of an argument, which, if accepted, might materially affect the position. I suggest another glance at the place (Watts's "Dictionary of Chemistry," vol. iv., 1894, page 158); this time at the foot-note to the sentence ending " —— and in this case the potassium iodide is the photo-sensitive compound." Here Meldola calls attention to the strictly parallel but less pronounced case with potassium bromide.

Certainly I did not expect that any reader of the "British Journal" would require enlightenment as to so well understood a matter as the general distinction between the behaviour of a colourless and a coloured photolyte. Black-ness and white-ness are extremes and degrees of the same condition (see tabulation of Albedos, p. 3 of Vogel's "Das Licht im Dienste der Photographie," Berlin, 1894), and it is generally believed, and perhaps proved, that every truly ortho-chromatic photolyte must come in the range "Black to white." This general truth is subject to many apparent exceptions, owing sometimes to "colours" which happen to be outside our octave or so of vision, often owing to the embedding medium. Silver chloride, which appears to be itself totally insensitive to light but becomes a photolyte if a minute trace of moisture is present, is a remarkable instance. Also one may mention the apparent and perhaps real sensitising by weak iodine solution noticed by Andresen on p. 34 of his "Das Latente Lichtbild," Halle, 1913. There is much bearing on this subject in the writings of Abney about 1882, Watson's book, "Colour in Relation to Chemical Constitution," and Luppo-Cramer's "Photographische Probleme," Halle, 1907, and his subsequent works.

What surprises me most in connection with the communication of Mr. Bloch and Mr. Renwick is the apparent supposition that the change of silver bromide into silver iodide can by any possibility be complete.

In Field's method for estimating mixed chlorine, bromine, and iodine, the transformation may be, and indeed is, complete enough for ordinary analytical purposes. Gladstone's No. 3 law, however, holds good, and reverse transformations can be effected to a certain extent by taking advantage of the action of mass. Indeed, the action of mass is a factor of importance in many (perhaps all) interchange reactions between binary compounds, unless one product passes out of the field of action, as by precipitation or volatilisation. Such a transformation can never be complete, the case being analogous to that of a hyperbolic curve and the asymptote, as these may approach to infinity but can never meet.

To return to the concrete case of Mr. Bloch and Mr. Renwick. Personally I should not expect the solvents they mention to differentiate appreciably between the associated or combined silver halides, as in association they often lose some of their individual solubilities. Thus, for example, the easily soluble silver fluoride may be held rather firmly by silver iodide, and doubtless Mr. Bloch and Mr. Renwick remember the iodo-bromo-chlorides of Rodwell and their interesting properties.

If any chemical worker is interested in knowing how I recognised, or think I recognised, the stage by stage action of Freund's iodising solution, I will try and do the best I can for him if he will send me a reply postcard.

To revert to my efforts to secure gelatino-bromide plates as distinguished from plates containing iodine. The bromine was liberated in fractions from commercial sodium bromide (the safest, cheapest, and most convenient form in which to purchase bromine) by a modification of a method sufficiently indicated on p. 535 of Vol. I. of the Watts's "Dictionary" already referred to, and there associated with my name. The fractions (generally 11) are controlled by calculated amounts of sulphuric acid introduced through the thistle funnel. Ordinarily the freedom of the middle fraction from chlorine and iodine comes near to bromine purified from iodine by the method of Stas: a method described in the same column. Iodine-free bromine having been obtained no further details need be given, but any reader who would like a few words on any detail can send me a reply postcard, and I will do the best that leisure allows.

THOMAS BOLAS.

60, Grove Park Terrace,
Chiswick, London, W.4,
October 22

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply, 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

E. JONES.—Prices paid for view postcard negatives are small, and range from 5s. to £1 1s. and upwards.

G. A. S.—The British patent specification for Rodinal developer is No. 1,736, of 1891, in the name of O. Imray, for the Actien Gesellschaft für Anilinfabrikation.

C. A. S.—We can think of nothing which would obstruct the action of the hypo except two or three coats of paint. We are quite sure that such a protective coating would not be penetrated by splashes of hypo.

E. C.—About the best book for quite a beginner is the latest one by Mr. R. Child Bayley, namely, "Photography made Easy," price 3s., through any dealer, or plus postage, from 20, Tudor Street, London, E.C.4.

W. H. REED.—Tables for the use of a tank formula for the "B.J." pyro soda developer were published by P. H. Dawson in "B.J.", July 9, 1915, pp. 445-446. You can see the volume in the library of the Patent Office, 25, Southampton Buildings.

G. LADE.—(1) Not positively harmful, but we would prefer to use an earthenware tap. (2) Yes, quite satisfactorily. (3) It could, but the usual formulæ keep very well, and are more energetic. (4) Not as a rule: prints from flat negatives might be benefited.

C. J.—The fault lies in not using a colour-sensitive plate. We advise you to use a good anti-screen plate, or, perhaps better, a panchromatic plate with a K2 or K3 filter for these subjects. So far as we can judge from the negatives you cannot improve matters by using a different printing paper.

G. H. H.—We are sorry that your letter has been overlooked. It is impossible to ascertain the maker's firm from the particulars you give. Apparently the lens is an ordinary rapid rectilinear of about 9 inches focal length and maximum aperture *f*/8, the diaphragm markings being evidently on the Uniform System. We should think the present value is not more than about £1.

S. N.—As your studio is so narrow you will require a good deal of glass if you want to secure any variety in lighting. We should recommend the two ends to be boarded over for three feet, the roof to be glass up to the ridge on one side, and the side light to come within three feet of the floor. This will give you 14 ft. run of glass. If you only want to work at one end, you can have 5 ft. boarded over at the camera end. This, of course, would still allow you to take heads-and half-lengths at either end.

S. D.—Judging from the specimens we should say the print is by the carbon process, much used for reproductions of paintings.

No doubt this particular tone and surface could be matched on one or other of the print-out silver papers, or, with greater difficulty, by sulphide toning bromide or gaslight paper, but we think that if you write to the Autotype Co., 74, New Oxford Street, London, W.C.1, they could indicate the tissue of theirs which would be a match of your print. You could, if you desired, make a print by the Carbro method.

W. E. J.—It is not very easy to account for the white markings from the particulars you give, but we think the most probable cause of the markings is actual eating of the gelatine film by insects. Such damage frequently occurs in this country, and is probably more likely to happen in the warmer climate of the Mediterranean. The remedy is to enclose the prints in a muslin chamber whilst drying, or, if you cannot do this, you might try giving them a final bath of weak carbolic acid, which perhaps may be enough to put the insects (if they are the cause) off their diet.

M. W.—It is difficult to make a studio roof remain watertight with ordinary putty, and we do not think red lead will be any better. A mixture of putty and Stockholm tar in equal parts makes a good joint, which never sets quite hard, and therefore does not shrink away from the wood. The putty must be good honest linseed oil and whiting. You will find particulars of various systems of metallic glazing in the advertisement pages of "The Builder." The sash bars are made of iron, and the lead strips are screwed upon them and turned down upon the glass, the edges of which are surrounded by the lead.

B. E.—The arrangement you suggest will answer very well, but you will have to place the sitter fairly close to the lamps if you wish to get exposures down to half a second. You will require reflectors behind the lamps and thin diffusers in front. The reflectors sold by the General Electric Company are very effective, and are fitted with oiled paper diffusers. We prefer thin calico diffusers, but are afraid that with 3,000 c.p. they would stop too much light. If you write to the General Electric Company (Magnet House, Kingsway, London, W.C.2) they will send you a catalogue with illustrations of these fittings.

W. T. S.—(1) If you wish to use flashlight you cannot do better than to get one of Charles's flash-lamps from Messrs. Griffin, but unless this is enclosed in a cabinet you will find the smoke troublesome for continuous work. We should recommend you to use half-watt lamps in preference to flash. We believe Messrs. Marion & Co. supply a fitting for adapting half-watt lamps to the Northlight umbrella. The same firm will also supply a small "point light" with stand. This can also be used for lamplight effects. (2) The postcard is undoubtedly liable to surcharge: nothing is allowed for a penny beyond five words of *greeting*.

W. W.—As a rule these old stains will not yield to the somewhat mild methods of soaking in acid, or other of the regular clearing solutions. We think you had better make a good P.O.P. print, or positive transparency on glass, so that if the worst happens you can make a copy negative. You might then try the effect of intensifying to a slight degree with chromium, using the C formula, page 439 of the current "Almanac." If the stains do not disappear under this treatment we are afraid you will have to give the negatives up as a bad job. Usually these yellow patchy stains are due to incomplete fixing, and there is no means of removing them if from this cause.

J. O. P.—(1) We do not know that naphthalene or camphor has a fogging or desensitising effect on plates, but, nevertheless, we should prefer not to put either of these substances in the camera case. If the case is kept regularly well brushed out, and the same applies to the bellows, there should be no reasonable chance of damage from vermin. (2) The only process of making colour prints on paper is by means of three negatives respectively exposed through red, green and blue-violet screens. These negatives are separately printed in blue, yellow and pink colours, and the prints superimposed on each other. The Raydex Company, 71, Lavender Hill, London, S.W.11, supply materials for a process of this kind, and issue a very complete instruction booklet.

Copyright in Portrait.—A little problem has presented itself on which I should be glad to have your opinion. A girl in charge of a pretty child goes into a photographer's studio to see a girl friend who is an assistant. The photographer, seeing the child, induces the nurse to allow him to photograph it there and then. The first intimation the parents have is seeing an enlargement in the photographer's window. (1) Have they any redress? (2) In the circumstances of the parents having an arrangement with a rival photographer that the child should be used exclusively as his model, would that affect the situation?—Press Operator.

(1) None under copyright law, nor, we think, under common law. (2) So far as the photographer mentioned in the first question is concerned, it makes no difference.

C.C.—(1) The efficiency of the focal-plane shutter varies according to the F. No. of the lens with which it is used and the distance of the blind from the plate, also with the width of the slit. For example, with an *f*/4.5 lens, 1½ inch slit ⅛ inch from the plate, the efficiency is 98 per cent. With the same lens and with a slit ⅛ of an inch and ¾ an inch from the plate, the efficiency is 50 per cent. Diaphragm shutters likewise vary considerably in efficiency, but never get to the 90 per cent. or so of the focal plane when used with a not too narrow slit, say one inch, and fairly close to the plate, say ¼ inch. We think you may say that the efficiency of a good average between-lens shutter is about 70 to 80 per cent., so that an exposure of 1-50th would be equal to about 1-60th or 1-70th with the focal plane at its best. There was an article on this subject in the "B.J." of March 14, 1919, page 123. (2) Chiefly by the very elaborate make-up of the cinema performers. (3) The print is a fair example of the degree of sharpness which it is possible to get in a pinhole negative. (4) Yes, it is about the correct separation of the centre of the lenses.

Halation.—I find that when photographing woodland scenery the sky and lights showing through the trees produce a halo, very pronounced, which entirely obliterates all detail where it occurs. The same thing, of course, when photographing a window in an interior. (I use films, not plates.) Are there any known means of obviating this, by the use of coloured screens or something of that kind? I find the same thing in a lesser degree in the case of pictures in sunlight where the light falls sharply and brilliantly upon an object. In such case the charm and perfection of the picture is, of course, destroyed. I have seen photographs taken by other people which do not seem to have this defect, from which fact I imagine there must be some remedy.—W. M. Belassie.

The halo (halation) is very liable to occur with subjects of the kind you mention. The use of a light-filter does a little towards obviating it, but nothing considerable. You require to apply a non-actinic backing, which can be bought from any dealer in photographic supplies, or you can purchase plates already backed. In using a backing yourself you can apply it to cut films, but the manipulation is not very convenient, and it would be best to use plates. Full exposure and unforced development has a good deal to do with obviating halation, which usually occurs in its worst form when plates are underexposed and kept for a long time in the developer.

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Contents.

SUMMARY

In a leading article we refer to the methods of intensification which are of chief everyday usefulness, in particular those with chromium and mercuric iodide, and the plan of sulphide toning the silver image. (P. 654.)

Dr. J. M. Eder sends us a contribution giving an account of a process which has been worked out in Germany for the making of dye prints from photographic negatives by the use of a sensitive coating containing benzidine hydrochloride in conjunction with a dye appropriate to the colour of print required. (P. 658.)

Dr. J. Weir French has published a valuable paper recording his experience of the various processes for silvering glass as regards the brilliance and durability of the metallic coating, and the facility for carrying out the process under ordinary conditions. (P. 656.)

In a contributed article, Thermit outlines a possible method which might be adopted for the rating of gaslight, bromide, and other development papers as regards contrast. (P. 655.)

A recent patent specification describes a method of single-solution selenium toning for red and purplish tones with development papers. (P. 659.)

An American correspondent, Mr. R. W. Harrison, of Miami, relates his experience in the successful use of hypo solution as an addition to the ordinary developer for the prevention of stress markings on development papers. (P. 663.)

A method of making studio roofs watertight, a suggestion for the two-negative method of soft-focus portraits, and the case of a visible image appearing on the plate before development are the subjects of letters from other correspondents. P. 663.)

Mr. Elwin Neame lectured and demonstrated at the Croydon Camera Club last week, when he made a strong case for the use of photography in advertising. (P. 661.)

At the Royal Photographic Society on Tuesday evening last Dr. Rodman was warmly welcomed on his appearance after his recent illness. He delivered his presidential address, in which he dealt at length with the work of Fox Talbot. P. 661.)

Fitments for extra security of dark slides and their shutters from accidental openings are described in a paragraph on page 653.

For short exposures, particularly under winter conditions of light, the small camera has very great advantages. (P. 654.)

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

Particulars are contained in a recent patent specification of the device of Mr. G. Sydney Whitfield for colour registration in the Paget process when using a key screen for the making of a set of three-colour negatives from the Paget mosaic negative. (P. 41.)

Commander H. E. Rendall, in a contributed article, reviews the difficulties in the construction of a three-colour one-exposure camera, and suggests a modification of the camera patented by Walter White in 1896. (P. 43.)

EX CATHEDRA.

Overhauling Apparatus. It does not seem to occur to many photographers that the dull season, when apparatus can be spared for a day or two without inconvenience, is a suitable time for doing any repairs, adjustments or alterations which may be necessary. Moreover, the camera makers are also having their quiet time, and are able to accomplish such work more promptly than in the summer and at Christmas time, when the procrastinators are crowding them with jobs. Faulty apparatus often means a serious loss, not only in spoiled plates, but also in time and, often, in disappointing a customer. It is not possible to give a list of what points may need attention, but such things as the re-velveting of camera backs and dark slides, the repair of the flexible part of slide shutters, the adjustment of studio and hand camera shutters, and the repair of stands are frequently necessary, as the best of apparatus will not keep in condition for ever. The appearance of many studios would be improved if the camera was not only kept in working order but also in what the builders call "decorative repair." A little French polish, lacquer, and leather varnish will often make a good old camera equal in appearance to a new one at a very small outlay.

* * *

Dark-Slide Fastenings. Many photographers do not take as much trouble as they might in ensuring that the catches of their double dark slides really fulfil their purpose. Nothing is more annoying than the accidental opening of a slide or the slipping open of the shutter. The recessed turnover catches used upon the modern dark slide are quite effective as long as the slide is new, but after some wear there is a tendency for this fitting to work too easily, with the result that plates may be spoiled. If this happens, due to shrinkage of the wood or to wear, the end of the catch may be bent gently downwards with a small pair of pincers, ensuring a better grip on the woodwork. The brass only needs to be bent very slightly, and a considerable amount of care should be exercised when doing the job, or the brass may twist off where it is turned at right angles. We know one photographer who has learnt by costly experience what the accidental opening of a dark slide may mean, and now always fits his slides with a double set of catches, also fixing at the top of each slide a couple of the older pattern fasteners for additional security. The kind employed is that in the form of a brass turn button, having a recessed opening screwed to one half of the slide; when the latter is closed, this recess engages with a pin upon the other half. This precaution is of special importance to those who cycle or motor-cycle. Only a short time ago we were told by a photographer who cycled over very rough roads with a heavy field camera attached to the carrier of the machine, that the vibration was enough to unfasten two of the catches on his slides.

Small Cameras in Winter. The great depth of field which is obtained by using a very small lens at a large aperture may be turned to good account when the light is too weak for rapid exposures with a larger apparatus. Those who are unused to the vest pocket or "Blocknote" size of camera can hardly comprehend the capabilities of these little instruments with their two and a half or three inch lenses at apertures of $f/4.5$ and even larger. Some time ago in an American contemporary it was demonstrated that the depth of field at practically the same degree of sharpness was obtained by using a 6 x 4.5 cm. camera at $f/4.5$ and an ordinary 8-inch anastigmat at $f/11$ upon a 7 x 5 plate, the small negative being enlarged so that the images were identical in size. We have only to square the two f numbers to realise the decrease in exposure, which is possible by using the smaller lens. Roughly speaking, the ratio is 1 to 6. When using these small sizes it is desirable that for a given plate speed the plate having the finest grain should be selected.

THE INTENSIFICATION OF NEGATIVES.

Although the process of intensification is so frequently required, there are still many photographers who approach it with some misgiving, fearing that stains will occur and completely ruin the image. This is quite a wrong idea, since staining is not in any way inherent in any method of intensification, but is only an indication that the processes which precede it have been improperly carried out. The commonest fault is imperfect fixation, either from too short an immersion in a fresh fixing bath or from the use of an exhausted solution which leaves traces of silver in the film. The remedy is clear; if the fixing bath is in good condition the negative should be allowed to remain in it at least twice as long as it has taken to cause the visible unaltered bromide of silver to disappear. This course should be adopted with all negatives which are intended to be kept for more than a month or two, but it is essential to stainless intensification. It must not be forgotten that the ultra rapid plates now commonly used require much longer fixation than those of ordinary rapidity, and this tends to rushing the fixing process in order to make room for another batch in the dish or tank. It is advisable to keep a second fixing dish, into which plates which need intensification are transferred after they have received the usual period in the ordinary bath. As it is quite easy to see, as soon as the plate is cleared, whether it needs intensification, this extra fixation can be done before the plate is washed and dried. The next cause of stains is imperfect washing; if hypo be left in the film it will precipitate the mercury in an insoluble form, and no amount of washing will remove it. If the chromium solution be used, hypo in the film appears to reduce the image irregularly, and this is made evident upon re-development.

The most usual method of intensification is by bleaching the negative in a solution of mercuric chloride, and after well washing, blackening in a weak solution of ammonia. A considerable addition of density is obtained by this method, and if the precautions we have mentioned are taken the results should be clear and satisfactory. It is not, however, a good process for portrait negatives, as not only does it tend to the loss of detail in the highlights, but the images will certainly fade to a sickly yellow colour, it may be in a few months or in two or three years. This is a serious matter when the negative is wanted for re-orders. Fortunately, besides ammonia there are many other reagents which may be used for blackening the bleached image, and will form a more stable compound of the mercury and silver. Of these, the ferrous oxalate developer is undoubtedly the best, the results being practically permanent. Ferrous oxalate is now rarely used by the professional photographer, and recourse may be had to amidol, which we have found to answer practically as well.

Probably the most convenient intensifier for professional use is mercuric iodide; with the exception of Wellington's silver intensifier, which is too elaborate for everyday use, it is the only one which allows the degree of intensity to be controlled; moreover, it does not require very thorough removal of hypo from the film before treatment. With this the negative is immersed in a solution of mercuric iodide in iodide of potassium until the required depth is obtained, a short wash under the tap until the clear portions turn yellow, and a short immersion in a very weak, plain hypo bath until the yellowness disappears. The advantages of this method are the short time necessary and the permanence of the intensified image. In the case of a portrait sitting of four or six negatives, one or two of which require intensification, it is possible to get them into the final washing tank with the others so that the order goes through complete.

Those who distrust mercurial intensification in any form will find a perfect substitute in the chromium formula of Mr. Welborne Piper. In this the mercury solution is replaced by one containing bichromate of potash and hydrochloric acid, the bleached image being blackened by an amidol developer. This gives exceptionally clean results, and by varying the proportions of the components of the bleacher, considerable control over the ensuing density is obtained; if more density be required the process may be repeated, and the results are permanent. The chromium intensifier can be used to improve the colour and contrast of weak or bad coloured bromide prints.

Where only a small increase of density is required, it may be obtained by using the sulphide method of toning bromide prints. By this means the image is changed from black or grey to a yellowish-brown, which greatly adds to its printing power. Somewhat similar is the action of the uranium intensifier, which is, perhaps, the most effective of all for very thin negatives. With this, the increased deposit is of a deep orange-red colour, which is very non-actinic. Intensified negatives, especially those upon which mercury has been used, are very liable to show drying marks, if "tears" are allowed to remain upon the film. It is necessary to wipe the surface as dry as possible with a pad of cotton wool or soft washleather before placing them in the drying rack.

It is a common error to intensify under-exposed negatives in the hope of strengthening faint detail as the tendency of intensification is to increase contrast, it is obvious that printing must be carried on to penetrate the dense high-lights with the result of burying the shadow detail.

Flat over-exposed negatives are sometimes better for being slightly reduced with ferricyanide and hypo before intensification, but this often leaves the whole image too thin for effective treatment. If such negatives are intensified without reduction they may appear thick or muddy looking, but they will, as a rule, yield satisfactory prints with sufficient exposure.

Local intensification is sometimes desirable, and for this there is nothing better than the mercuric iodide solution, which may be applied with a swab of cotton wool where needed, washing and clearing in hypo following as usual.

We have refrained from printing formulæ, for the various solutions as these are given in the B.J. Almanac.

TESTING THE VIGOUR OF DEVELOPMENT PAPERS.

THERE is a movement afoot to induce manufacturers of development papers to express in numerals on the packets the degree of vigour possessed by the particular grade and batch of paper enclosed.

That such an innovation would be beneficial is agreed by technical workers and printers of experience. Manufacturers, however, are not unanimous as to the need for numbers, some of them arguing that the descriptions "Soft" and "Vigorous" fully cover all requirements. But printers know that confusion can exist among the numerous "Softs," Normals," "Portraits," Contrasties," etc., of which there must be over a dozen grades on the market at present, each of which is capable of giving the best from some particular type of negative, but is not the exact thing for any other type. And so we look forward to the time when all papers will be marked as having 5, 50, or 100 degrees of vigour, as the case may be. It may be admitted here that a number which correctly represented the vigour of a paper when the paper was packed would be a trifle low twelve months after, but this could be allowed for when using old stock.

With things as they are at present, it is very useful to be able to measure roughly the vigour of a paper for oneself. This can be done, of course, by printing it along with another paper that is known on a selection of negatives, but a quicker, more certain and satisfactory method is to use some kind of definite scale or wedge. I have suggested for manufacturers' use a "Vigrometer," on which a five-foot strip of paper is exposed to the rays of a 4-volt lamp, one end of the strip receiving only 1/100 of the light received by the other, the intensity of the light gradually decreasing along the whole length of the strip. A grid divides the light into 100 divisions, the records of which, on the resulting printed scale, are calculated into units of vigour. But for testing paper roughly in the printing room I employ a simpler method which I have found to be of great value at times. For example, I have known paper labelled "Soft" that appeared in use to be anything but soft. But negatives are often very deceptive, and it is not wise to blame a paper rashly. Reference to a precise method of testing puts all doubts on to a sure footing.

The simple way is to use a wedge, and the kind of wedge that I have found so serviceable is nothing more than a cleaned-off half-plate covered in layers with tissue paper. Negative envelopes opened out supplied the paper, which is clear and free from any suggestion of yellowishness. The first layer covers the glass completely, the second leaves a strip of ¼ inch in width at one end of the glass, the third leaves another similar strip at the same end, and so on. Twenty layers at the thick end will prove more than sufficient for all practical purposes.

More often than not it is convenient to test a paper by comparing it with one that is known. With the wedge in position on the printing cabinet with paper side up, a strip of each paper is laid on it, the strips reaching along the wedge so as to cover as many steps as possible. The exposure aimed at is such that, upon correct development, the first two steps of the wedge are recorded as one dead black bar on the known paper. By correct development I mean development in strict accordance with the instructions issued by the paper makers, if these agree for both papers, or by the system in use in the particular workshop, if such system is reliable and definite, or by the factorial method.

Developing out of exactly two steps is not absolutely essential, but with papers of a long exposure range—soft papers—printing out more steps may leave insufficient of the scale to fully measure the range. Printing out of the first step only is not such a definite guide to full and correct exposure, as one step alone may appear to be fully black when it is not quite so. When two steps merge it is proof that the light has penetrated the denser or more opaque to the point of full exposure.

Having fully developed the strips, if the two papers vary in vigour their relative difference will be easily seen, but first we must take into consideration their speed, which may be different. The desired result is that both scales shall be recorded somewhere between two ends of the wedge, when one end of the scale will be dead black and the other one pure white in each case. If the thin end has not been recorded fully black, the exposure has been too little, and another test must be made for that paper. If the most opaque strip of the wedge has been recorded as a decided grey, the exposure has been too great. Having found the relative parts of the wedge which print out black with the same exposure, or the different exposures which are necessary to print out the same strip of the wedge, we cannot fail to have a good idea of the relative speeds of the two papers, but that is not the object here.

The steps on the home-made wedge are not supposed to represent any recognised or previously mentioned steps in the exposure range of emulsions. Dr. Glover has stated that the deposit of a fully developed photographic image may consist of as many as 100 visible shades, and this number is a very convenient maximum for a scale of measurement. It is quite unnecessary for a scale designed for a printer's private use to be so finely divided, however, and we must not lose sight of the fact that the 100—or any other number—of steps or shades is not a limit of softness or exposure range. A scale of 100 steps or gradations could be printed on the most vigorous paper or the most soft if we had a wedge of sufficiently delicate gradation. In fact, a much longer scale might be possible with any paper if we had keen enough sight to detect all the differences.

The exposure range of a paper does not refer to the number of shades or gradations which a paper will render, but to the amount of difference between the light necessary to fully expose it, and the minimum light necessary to effect it at all. A longer range here means really a steeper range, not a range containing more gradations. Simply explained, the range might be described as a staircase, and taking the gradations of the photographic image as 100, the staircase has 100 steps. If the range is long, the steps are steep, while being equal they are high; if the range is short, the stairs are shallow or low.

The amount of light stopped by a thickness of clear white tissue such as negative envelopes are made, providing the paper is not yellowish, is about 1.5 of that which reaches it; therefore, each step in the wedge reduces the light which reaches it by that fraction, the first step passing 4/5 of the original light, the second 4/5 of 4/5, and so on. Twenty such steps will cover most papers met with in professional and commercial use.

In conclusion, I have found that an average soft bromide will record about 16 steps, a very soft one 20, while ordinary and vigorous bromides range between 14 and 5 steps respectively. An average vigorous gaslight records 5 steps, and an exceptionally vigorous one 3 to 4. Unfortunately, users' ideas of vigorous and soft papers cannot always agree with the terms as printed on the packets, where they are often misleading.

THERMIT.

WORKSHOP NOTES ON SILVERING.

[While formulæ and recipes for the silvering of glass have been freely published, there is a special value in the following paper in which Dr. James Weir French, of Messrs. Barr and Stroud, describes the result of his experience of the various silvering processes as regards the physical and optical properties of the metal coating. The paper is among those included in the volume, "The Making of Reflecting Surfaces," recently published by the Optical Society, and containing, as is pointed out on another page of this issue, a very great deal of practical information on silvering methods and also a key to the most important literature of the subject.—EDS. "B.J."]

MANY processes for the silvering of optical parts have been introduced from time to time, but the number in practical use is small. The best known processes are:—

(1) The old Mercury Tin Amalgam process.
(2) The Formaline process.
(3) The Rochelle Salt process.
(4) The Tartaric Acid process.
(5) The Brashear process.

Numerous attempts to project under vacuum fine deposits of silver upon glass surfaces have been made, and I understand that the latest information on this subject is to be placed before the meeting. There appears to be little difficulty in producing small reflectors of 1 cm. or more in diameter. Hitherto it has been very difficult to produce large, uniformly reflecting surfaces by this method.

(1) *Mercury Tin Amalgam Process.*—This process, the details of which are well known, has not been used regularly in commerce for many years, and it is now rarely used by opticians, although there are still some sea-going officers who favour it from the point of view of durability. The process has been abandoned in the industry in favour of the Rochelle salt process, because of the long time—several weeks—required for the removal of the excess mercury, and principally because of the danger to health. As the final surface contains about 20 per cent. of mercury, it is to be expected that the light-reflecting power is not good from the point of view of the optician.

There is a characteristic difference between the mercury tin amalgam and the precipitated silver in that the former cannot be used like the latter for surface silvering. The uniformity of the amalgam surface is dependent upon the polished surface of the glass with which it is in contact. The surface in contact with the glass appears highly reflecting, whereas the other side in contact with the air has a dull matt appearance. When, on the other hand, a thin layer of silver is deposited upon the polished surface of glass, both sides can be made highly reflecting.

(2) *Formaline Process.*—This process has the sole merit of being very simple and rapid, and therefore suitable for experimental work, but in the present stage of its development it is rarely used in optical manufacturing. Compared with the Brashear and Rochelle salt surfaces, the formaline surface is dark. The process has the additional disadvantage that one deposit cannot be laid upon another, and the surface cannot be electrically plated with copper.

(3) *Rochelle Salt Process.*—This process is very generally used in commerce and by opticians. It gives a brilliant reflecting surface, which, however, is about 5 per cent. or 6 per cent. less brilliant than that of the Brashear process. The difference can be detected at a single reflection. It is easily detected after three or four reflections. The process has the advantage that the silver is deposited at a normal temperature, which does not require very careful regulation.

(4) *The Tartaric Acid Process.*—So far as brilliancy is concerned, the surfaces produced by this process are nearly comparable with those of the Rochelle salt process. From the point of view of the optician, the process has the disadvantage that the best results can be obtained only when the bath is heated to about 40 deg. C. To subject finished optical parts to this temperature is undesirable. This objection is not applicable to such work as large flat mirrors, in which case steam-heated tables are used. A single deposit only is necessary.

(5) *Brashear Process.*—This process is probably the one that is most extensively used for the silvering of optical parts. It is a cold process, which gives good results at a temperature between 10 deg. C. and 20 deg. C. It is not unusually complicated, and the resulting coating is brilliant, comparatively hard, and adheres well to the surface of the glass. Coats of any thickness can be obtained by successive deposition. The layer can also be burnished for surface reflection.

Details of all the above-mentioned processes are well known. They may be obtained from any of the books of recipes, such as Spon's "Workshop Receipts." But there is one detail that cannot be too strongly emphasised, namely, thorough cleanliness, which, if neglected, will result in failure, however perfect the appliances and the methods may be.

Imperfections.

When the reflector is not near the focal plane small imperfections result only in a loss of light at the emergent pupil, and, although such a reflector may be slightly tarnished or spotted, the optical instrument may still be capable of performing its designed function.

When the silvered surface is in or near the focal plane, minute imperfections that ordinarily would be quite imperceptible may provide sufficient cause for the rejection of the instrument, especially when the power of the eye-piece is high.

Brown stains are usually attributable to impurity of the chemicals and want of cleanliness in conducting the operations and particularly the cleaning of the surface.

Pinholes in the silver which may be due to the evolution of gas bells or to the presence of dust, give rise in the course of time to systems of concentric rings which gradually broaden out. These tarnish rings have but little reflecting power, and are consequently very visible.

An unprotected silver layer on the surface of glass has very little durability. It rapidly tarnishes over the whole surface, and also is extremely liable to become spotted. It is essential that there should be as little time as possible between the silvering and protecting processes. The trouble may be due to atmospheric moisture containing acids associated with particles of dust in the air, which deposit themselves upon the silver surface. But the principal cause appears to be minute particles of saliva. From tests that have been carried out, it would appear that this substance reacts upon silver more quickly than dilute acids and alkalies. Perspiration also acts extremely rapidly on the silver, but a skilled operator exercises care in handling the silver surfaces, and is unlikely to suffer from such a source of trouble. If much time elapses between the silvering and the protecting processes, it is very difficult to prevent minute particles of saliva from landing on the surface. In one instance the number of rejections was greatly reduced by cutting out intermediate operations between the silvering and protecting operations, and thus reducing the time of exposure and the amount of handling. It will be understood that this applies to minute imperfections which under ordinary circumstances would be regarded as negligible.

Pinholes, when well defined, can be readily detected, but there is an intermediate type in which there is a local sponginess or possibly thinness of the layer. Pinholes or sponginess of this type cannot readily be protected by the electro-deposition of copper, as the pinhole in the silver will be reproduced

in the copper as a spongy or thin area. It is not sufficient, therefore, to protect the surface by means of deposited copper without an additional protection of shellac or other varnish, because the coppered surface, if left exposed to the atmosphere, will probably become affected at this point of weakness.

Cleansing of the Glass Surface.

A system that has been found satisfactory in practice when using the Brashear process is as follows:—

The surface is first cleansed with naphtha, then with nitric acid. It is fortunate that the majority of the glasses in ordinary use are unaffected by strong nitric acid. The naphtha, like most solvents, leaves a fine residual film of oil on the surface, which is not removed by the nitric acid. The surface is, therefore, again cleansed with ammonia, followed by nitric acid, and finally by distilled water. It will be understood that the cleansing process should be carried out immediately before immersing the parts in the silvering bath

When working the Rochelle salt process, after cleansing in the manner described above, the surface is immersed in a bath of stannous chloride, and then well washed in distilled water before insertion in the silvering bath. If there is delay between the stannous chloride treatment and the silvering process, the resultant coat will be unduly brown. The stannous chloride treatment appears to affect the brilliancy of the Brashear coat more than that of the Rochelle salt coat, and it is for this reason that it is not used in the Brashear process. Even in the Rochelle salt process the stannous chloride appears to have an effect upon the brilliancy of the coating. But it has the distinct advantage of producing a more adherent layer.

The action of the stannous chloride is somewhat obscure, and it would be interesting to have the opinions of the members of the Societies. I would suggest that the function of the stannous chloride is to provide a greater concentration of reducing agent directly on the surface of the glass where the deposit is desired than is obtainable from the ordinary liquids of the bath alone. It might be thought that the washing with distilled water would remove all the stannous chloride, but there is reason to believe that is not the case. After washing there appears to be an extremely thin surface film of stannous chloride, which can only be removed with some difficulty with nitric acid, but which is readily removed with hydrochloric acid.

Surface Silvering.

There are many cases in which surface silvering, either on glass or metals, would prove of great advantage, but at the present time it is hardly possible to make such surfaces sufficiently durable. It is well known that thin layers of varnish can be applied to such surfaces, the thickness of the layer when thin being so uniform as not to affect the definition under the highest magnifying powers that are customary. For example, if a drop of varnish composed of celluloid dissolved in amyl acetate and acetone is dropped centrally upon the reflector mounted upon a quickly rotating table, the varnish under centrifugal action will spread itself in a layer that is sufficiently uniform, provided it is very thin. A varnished surface of this type may appear uniformly coloured when viewed obliquely.

Experiments which the writer carried out some time ago seemed to indicate that, although the layer could be thickened without at first affecting the definition, it tended to become granular or uneven, which is intelligible in view of the enormous contraction of varnishes of this type. Surface-silvered reflectors covered with various varnishes were exposed to the atmosphere, but not directly to the weather. As the atmosphere was that of Glasgow, the test was drastic. After three months the specimens showed signs of tarnishing and spotting. It was observed, however, that in the majority of cases the bulk of the tarnishing was near the periphery, from which it appeared to spread. In a new series which was prepared, the edges were sealed with a thick layer of gum dammar varnish. After three months there was slight spotting; when examined after nine months' interval there appeared to be a progressive increase in the tarnishing and the spots had grown, but it was estimated that the total amount of tarnishing would not have reduced the illumination by more than about 10 per cent. Some time later the specimens were stolen by someone who estimated the material value more highly than the scientific.

The results of the experiments seem to show that, even when the edges are sealed, surface silvering cannot be protected sufficiently well for practical commercial use.

Reflective Power.

I had hoped to be able to give the results of a series of tests, but experiments which are in hand for the purpose of testing the absolute and relative reflecting powers of various surfaces are unfortunately not yet complete, and I can only give a few general results.

The test specimens are in the form of slips of glass about 100 mm. long and 3 mm. thick. The ends of the slip are worked to an angle of 45 deg., and the arrangement is such that the entering and exit beams are at 45 deg. to the plane of the slips. Under these circumstances the light is multiply reflected before reaching the eye, the number of reflections being the length divided by the thickness. A small imperceptible loss at a single surface becomes quite apparent after multiple reflection in this way. The amount of the loss is measured by means of a special photometer.

A mercury tin amalgam surface is generally considered to reflect at a single surface about 70 per cent. of the incident light. In this respect the mercury surface appears to be slightly better than a speculum metal surface.

Specimens silvered by the Brashear process were compared with a specimen which was photometrically tested by the German Reichsanstalt, and was certified to reflect at a single surface 98 per cent. of the incident light. The Brashear specimen was slightly superior to this German standard, and, if the German figure is accepted, it may be assumed that the Brashear surface reflects 98 per cent.

One half of a slip was silvered by the Brashear process, and the other half by the Rochelle salt process. There appears to be a difference of 6 per cent.—*i.e.*, the Rochelle salt surface reflects about 92 per cent. Another slip was similarly silvered, one half by the Brashear and the other by the tartaric acid process. The difference was 8 per cent.—*i.e.*, assuming the above value for the Brashear reflection, the tartaric acid surface reflects about 90 per cent. of the incident light.

JAMES WEIR FRENCH

STOLEN CAMERA.—Messrs. Newman and Guardia, 17-18, Bathbone Place, Oxford Street, London, W.1, ask us to mention that a new vest-pocket Baby roll film "Sibyl" camera, No. B. 1010, has been stolen from their premises. It was fitted with *f*/4.5 3-inch Cooke lens No. 102,573.

AERIAL PHOTOGRAPHY FOR ARCHÆOLOGY.—Mr. A. P. Trotter writes to "Nature," of October 28, pointing out that photographs from an aeroplane taken on a clear afternoon a little before sunset would give good records of ancient British and Roman camps, "castles," villages, rings, pack tracks, barrows, ditches, and other earthworks, and, as in such photographs taken in Mesopotamia, would probably reveal details that cannot be distinguished by inspection on the ground. Photographs might yield almost as much information as the models in the Pitt Rivers Museum at Farnham, which were made from laborious contour surveying. There are hundreds of such earthworks on Salisbury Plain, and many of them are, no doubt, related to Stonehenge and to Avebury. The stereoscopic combination of two successive photographs might disclose those parts of the banks and ditches which are nearly obliterated by the village of Avebury. General modelling is wanted rather fine detail. Perhaps such work might be done by learners.

A NEW DYE-PRINTING PROCESS.

Hitherto there have been several photographic printing processes which have been based upon the light-sensitive properties of certain dyes, in particular diazo colouring matters, which have yielded prints of generally bright colours. In diazotype process of Feer (1889), use was made of diazo sulphonate compounds which, on exposure to light, were so altered that by the action of alkaline phenols or phenylene-diamine highly-coloured compounds were obtained. In 1895 Andressen introduced a similar process in which a diazo compound of naphthylamine was employed. Both processes yield positive prints from ordinary negatives.

In the primuline process of Green, Cross and Bevan (1890) the sensitive compound was a diazo derivative of primuline, which, on exposure to light, lost its property of forming coloured compounds. In this process, therefore, a negative print is produced from an ordinary negative, a positive transparency being required for the production of positive prints. These processes have, however, not found practical application.

A process which is completely different from these earlier methods has recently been worked out by the Badische and Anilin Sodafabrik of Ludwigshafen, and has been patented in the German patent No. 337,173, of December 21, 1919. The process employs diamino benzidine bases in combination with acid dyes. The patent specification was published during the present year and good examples of the process shown.

According to the specification, the novel feature which is claimed for the process is the production of light-sensitive coatings, characterised by containing compounds of aromatic para-diamino bases with acid dyes, preferably in the presence of oxidising agents. The process is, therefore, one of photo-oxidation—assisted by the addition of salts containing oxygen, such as nitrates, chlorates, etc. The time of exposure is long, about four hours, and the process allows of making prints in a wide range of bright colours, red, purple, green, bluish-black, browns, etc.

The process for the preparation of the light-sensitive diamine coating is divided into two operations: (1) Benzidine hydrochloride or other diamine compound is precipitated with an acid dye, such as eosine, cyananthrol, Neptune green or quinoline yellow. (2) This precipitate, which must contain the free benzidine base.

$$NH_2\text{-}C_6H_4\text{-}C_6H_4\text{-}NH_2$$

is decomposed with manganese nitrate, calcium, nickel or magnesium nitrate, picric acid or similar oxidising agent and coated on glass or other support by means of a colloid medium, such as gelatine or albumen.

Fixing is done by treatment in a weak alkaline solution, such as borax or sodium phosphate.

Modification of the bright colours may be made by after-treatment of the prints in a very dilute solution of sodium hypochlorite, or with a 1 per cent. bichromate solution.

A number of prints sent to the writer by the Badische Anilin und Sodafabrik consist of exceedingly bright red, green, blue and brown paper prints (of landscape and architectural subjects), which exhibit good gradation of light and shade, and possess satisfactory permanence. Up to the present, however, it has not been possible to obtain pure high-lights.

The following are formulæ for the preparation of the sensitive coatings:—

A.—Bright Purplish-Red Prints.

Blanc fixe paste (30 per cent.)	100 parts.
Anhydrous soda carbonate	10 ,,
Fish glue (20 per cent. solution)...	15 ,,
Eosine A.	20 ,,
Benzidine hydrochloride (2 per cent. solution)	800 ,,

By treatment of the finished prints with a weak solution of hypochlorite the colour is rendered a brighter red.

B.—Dark Violet Prints.

The formula is the same as A, except that 20 parts of cyananthrol R.B.X. are used instead of the eosine and 850 instead of 800 parts of the benzidine hydrochloride. By treatment of these prints with weak hypochlorite solution the colour is converted into a good sepia brown with a slight reddish shade.

C.—Bright Green Prints.

The formula is the same as A, but is compounded with 20 parts of Neptune green S.G.X. in place of the eosine. The bright green colour is converted into a much more pleasing dark green by a weak solution of hypochlorite.

D—Brown Prints.

By the use of 20 parts of quinoline yellow L extra and 700 parts benzidine hydrochloride solution, prints of brownish colour are obtained. In other respects the formula is the same as A, the quinoline yellow taking the place of the eosine.

The preparations A to D mentioned above are mixed with 40 parts manganese nitrate and 40 parts of water, and are coated on paper, dried, exposed under the negatives and fixed in a solution of borax or sodium phosphate in water.

The process is of considerable scientific interest, although its practical value is discounted by the fact that so far prints having pure whites cannot be obtained. The great brilliance and variety of the colours and the gradation and vigour of the prints are very marked in the specimens, so that it may be considered that the process is worthy of attention.

J. M. Eder.

Art of Studio Lighting.—Under the auspices of Messrs. Kodak, Ltd., a most instructive and interesting lecture and demonstration in "The Art of Lighting in the Studio," was given by Mr. Luboshez to the professional photographers in Edinburgh and district, on Tuesday evening in last week. Messrs. W. and E. Drummond Young, 12a, Frederick Street, Edinburgh, kindly placed their studio at the disposal of the lecturer for the evening. There was a large attendance of professional photographers from Edinburgh and provincial towns.

Mr. Luboshez illustrated the methods of lighting used by the old masters, especially Van Dyck and Rembrandt. He carefully demonstrated how to light the model first on the front top light, as generally used by these masters, and showed the safety of using such lighting. He pointed out how the high-lights on brow, nose, cheeks and chin were correctly shown, the ear and back of the head falling into shadow without screening or help from the operator. In demonstrating the top side light Mr. Luboshez pointed out the defects of side light when uncontrolled. The ear being nearest the light became too prominent, and the necessary screening was done to correct this and fully explained by Mr. Luboshez in a delightful and entertaining manner. The so-called Rembrandt, top, double, cinema and stage lighting were demonstrated, and films exposed and developed.

Mr. Luboshez explained the use and qualities of various electric lighting systems, and spoke in laudatory terms of Messrs. Drummond Young's system.

Mr. Campbell Harper, the President of the Edinburgh Society of Professional Photographers, in moving a vote of thanks to Mr. Luboshez, expressed the gratitude of the company present to Messrs. Kodak, Ltd., for sending Mr. Luboshez to Edinburgh to deliver the lecture. He also moved that a hearty vote of thanks be given to Messrs. W. and E. Drummond Young and their staff for the use of their studio and electric light for the lecture. Mr. Luboshez and Mr. E. Drummond Young suitably replied.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, October 17 to 22 :—

CAMERAS.—No. 27,641. Photographic cameras. W. Atterton and W. Loveless.

FOCUSSING-DEVICE.—No. 27,530. Focussing-means for photographic cameras. E. F. Stratton.

CAMERAS.—No. 27,796. Photographic cameras. A. Veacock.

COLOUR CINEMATOGRAPHY.—No. 27,686. Apparatus for production of projected pictures in natural colours. E. H. Tarlton.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

PAGET COLOUR PROCESS.—No. 167,793 (February 20, 1920). The invention consists in an addition to the taking screen used in the Paget process, namely, of two strips of different colours, each of which is transparent to the light passed by two different pairs of the colour elements in the screen. For example, one strip may be greenish-blue, transmitting light which is passed by the green and blue-violet units of the screen, whilst the other is yellow, transmitting light which is passed by the red and green elements of the taking screen. This device provides a colour indication of the correct registration of a stop-out or key screen with the negative made through the taking screen, when preparing negatives which shall be records of a single colour sensation.—G. Sydney Whitfield, The Paget Prize Plate Co., St. Albans Road, Watford, Herts. (Further particulars of the principle and use of this device will be found upon another page in the "Colour Photography" Supplement.

CINEMATOGRAPH LANTERN SCREENS.—No. 159,851 (March 1, 1920). The invention consists in a screen which may be employed for projection in daylight, and for that purpose has a coating

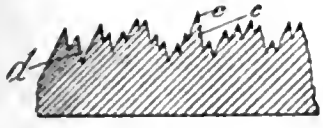

Fig. 1

Fig. 2.

Fig. 3

which absorbs the diffused general illumination, while reflecting that from the projection lantern.

The coating may be applied in a mechanical or in a chemical way. In many cases it will be advisable to effect the coating

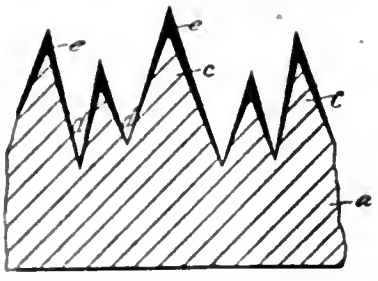

Fig. 4.

of that surface of the screen which is directed towards the spectator by providing the surface with a dark-coloured layer of glass, gelatine, glue, or some other suitable material or substance, and to perforate this layer in a great many places by means of a sand blast or by etching, so that in the deeper portions of the perforations the transparent surface is laid bare in a great number of places.

In the drawings, *a* is a portion of a projection screen in which the surface on the side facing the spectator is roughened in known manner so as to form projections *c* and recesses *d*. According to the constructions shown in figs. 1—3 only the tips of the projections are coloured with a dark colouring *e* capable of absorbing the light and covering the sides and the edges of the projection points.

If desired, the coating *e* may be continued in decreasing magnitude right into the recesses *d*, as shown in fig. 4.

A special way of applying the coating is shown in fig. 5, in which the surface of the projection screen *a* is provided with a layer *b*. The latter is irregularly perforated, as by means of a sand blast, etching, or the like, so that in the deeper portions *f* of these perforations *g* the transparent surface *a* of the projection screen is laid bare in a great number of places.

The mode of operation of the invention is that the daylight falling on to the screen will not be reflected by the darkened

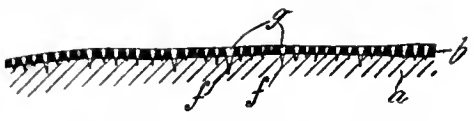

Fig. 5.

tips, but will be absorbed, whilst the image produced by the projection apparatus passes unaffected through the uncovered, or only lightly covered, recesses in the roughened or net-like surface.—John Emlington-Darling, 5, Culmbacher Strasse, Wilmersdorf, Berlin, assignee of Carl Oskar Roehrich, 4, Augsburger Strasse, Charlottenburg, Berlin.

SELENIUM TONING.—No. 169,378 (September 7, 1920). Baths which contain selenium in an alkaline solution for toning photographic papers are well known. These baths have the disadvantage that they have a corrosive effect on the fingers of the operator, and that they affect the gelatine on the paper, which causes the colouration of the emulsion side, or even of the rear side, of the paper.

Means have now been found to obviate these disadvantages. It has been discovered that these alkaline baths can be diluted with boric acid without precipitating the selenium. The baths thus treated will no longer have a corrosive effect on the human skin, and will no longer affect the gelatine on the paper. Reddish tones are obtained with facility, as is usual with selenium toning.

Completely fixed and washed images made on developing paper, which may be placed in the bath whilst damp or after drying, receive within a short time the pronounced reddish-brown tone.

Images made on printing-out paper are preferably treated with a solution which is 20-30 times as dilute as that for prints made on developing paper. Within a short time purple tones are also obtained similar to those obtained with gold toning baths.

The whites are frequently easily coloured with such baths. This can be avoided if ammonia or sodium sulphate is added to the bath.

The following baths are recommended for prints on dovelopment papers :—

(1) Solution 100 gms. soda sulphide and 10 gms. selenium in 500 c.c.s. water ...	20	c.c.s.
Water	220	c.c.s.
Ammonia, 25% solution	40	c.c.s.
Boric acid, 1 : 29 solution	20	c.c.s.

Prints should be cleared after toning in a 10% solution of potassium metabisulphite.

(2) Solution of 100 gms. sodium sulphide and 10 gms. selenium in 500 c.c.s. of water...	20	c.c.s.
Sodium sulphate, 1 : 6 solution	220	c.c.s.
Boric acid, 1 : 29 solution	20	c.c.s.

With this bath it is not absolutely necessary to employ the metabisulphite clearing bath. Both baths tone in about two minutes.—Mimosa Aktiengesellschaft and Dr. Felix Formstecher, both of 31, Bärensteiner Strasse, Dresden.

The following complete specifications are open to public inspection before acceptance :—

PROCESS SCREEN.—No. 170,270. Photo-process screen and method of preparing the same. J. A. H. Hatt.

COLOUR CINEMATOGRAPHY.—No. 170,267. Optical system for a three-colour exposure cinematograph. Firm of C. Zeiss.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

KOTINIC.—No. 418,037. Flashlight powders and other preparations for flashlight purposes, all being for use in photography. Kodak, Ltd., Kodak House, Kingsway, London, W.C.2, dealers in photographic materials. August 27, 1921.

SALEX.—No. 417,493. Photographic apparatus included in Class 8. Richard Green, trading as The City Sale and Exchange, 81, Aldersgate Street, London, E.C.1, merchant. August 6, 1921.

OMEGA.—No. 418,011. Cinema projection lenses. L. Le Personne & Co., 99, Cannon Street, London, E.C.4, merchants. August 26, 1921.

KALO.—No. 418,129. Photographic paper, photographic albums, and photographic mounts included in Class 39. Ilford, Ltd., Britannia Works, Roden Street, Ilford, Essex, manufacturers of photographic plates, papers and films. August 31, 1921.

IKO.—No. 418,228. Photographic paper, photographic albums, and photographic mounts, included in Class 39. Ilford, Ltd., Britannia Works, Roden Street, Ilford, Essex, manufacturers of photographic plates, papers and films. September 2, 1921.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

DUPLI-TIZED.—No. 416,805. Photographic films. Kodak, Ltd., Kodak House, Kingsway, London, W.C.2, dealers in photographic materials.

FORTHCOMING EXHIBITIONS.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

November 23 to 26.—Rotherham Photographic Society. Latest date for entries, November 9. Particulars and entry forms from the Hon. Exhibition Secretary, Sydney G. Liversidge, "Orissa," Gerard Road, Rotherham.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Latest date for entries, January 30. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick Glasgow.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

February 11 to 25.—Scottish Photographic Salon. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

A REMINDER OF CHRISTMAS TRADE.—Those photographers who make a special bid for the photographic Christmas card trade would do well to bear in mind the following dates, which are the latest for the despatch of Christmas letters and parcels to soldiers serving abroad:—Rhine, letters, December 20, parcels, December 15; Black Sea, letters, December 10, parcels, middle November; Egypt and Palestine, letters, December 8, parcels, November 29; Mesopotamia, letters, November 17 or 24, parcels, November 8; India, letters, December 1, parcels, November 15.

PORTRAITS AS ADVERTISEMENTS.—The death last week of Mr. J. B. Dunlop, of pneumatic tyre fame, recalls the famous action concerning the use of his photograph for the purposes of advertisement. It may be remembered that in 1891 he presented a signed portrait bust of himself to the tyre company to be used as a trade mark. This was later developed into a figure which became familiar in advertisements. But last year he brought an action for libel against the Dunlop Company, complaining that he had been misrepresented as "a very tall man dressed in an exaggerated foppish manner, wearing tall white hat, a white waistcoat, and carrying a cane and eyeglass, none of which it was his custom to wear or carry." He said this had caused him very great annoyance in Dublin, where he lived, and eventually the company consented to discontinue the publication of the picture in Ireland.

New Books.

The Making of Reflecting Surfaces. Papers read at a Joint Meeting of the Physical and Optical Societies. 5s.

A CONSIDERABLE service has been rendered to those having occasion to undertake the silvering and platinizing of glass in the publication, in separate form, of the series of papers read at a joint-meeting of the Physical Society of London and the Optical Society, in November of last year. The present volume is a symposium, from the current standpoint, of the practice and literature relating to the coating of glass and other substances with a reflecting metal surface, and, moreover, includes within its scope the making and use of metal mirrors. There are thirteen papers in the volume, including the survey of the bibliography of metallic deposition on glass, by Mr. R. Kanthack and the chronological list, by the same writer, of the chief papers and publications dealing with the technics of the subject. It is interesting to note that the photographic journals of the second half of the last century were the places of first publication of a considerable number of the processes of silvering glass, and the "British Journal" and the "British Journal Almanac" figure prominently among them. Mr. Kanthack's list of evidently an exceedingly valuable guide to the scattered literature of silvering and platinizing. The communications include a paper on workshop experience with silvering processes by Dr. J. W. French, which we reprint on another page. Messrs. F. Ellerman and H. D. Babcock, of the Mount Wilson University, give practical details of silvering large glass reflectors, and Mr. C. R. Davidson, of the Royal Observatory, Greenwich, in like manner contributes his experience. A very full account is also given by Mr. Julius Rheinberg of the process of platinizing by the burning-in process devised by him. Some further brief contributions deal with the use of mirrors in optical instruments under industrial conditions, and with a method of measuring the aggegate reflecting power of mirrors. In the former it is mentioned that a mirror of stainless steel was found to reflect 68 per cent. of light, an efficiency which is pretty good in comparison with a silver surface, and suggests the practicability of employing such mirrors in reflex cameras and for other photographic instruments. It will be remembered that many years ago Abney employed steel mirrors in three-colour cameras. The great amount of information brought together in the present monograph will, we are sure, be appreciated by opticians and others. The volume may be obtained from the Optical Society, Imperial College of Science and Technology, South Kensington, London, S.W.7, price 5s. 3d., post free.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, NOVEMBER 7.

Bowes Park and Dist. P.S. Lantern Slide Competition.
Bradford P.S. "The Craven Highlands." F. Whitaker.
Dewsbury P.S. "A Tour Round an old Garden." Alex. Keighley.
Glasgow and W. of Scot. Amateur P.A. "Bromoil." Wm. Ferguson.
Leeds Camera Club. "Norway." J. C. North.
Southampton Camera Club. "Some Visits to Foreign Cathedrals." Rev. J. R. Husband.
South London P.S. "Further Eastern Reminiscences." T. A. Moates.
Wallasey Amateur P.S. "Seltona." Leto Co., Ltd.

TUESDAY, NOVEMBER 8.

R.P.S. "Sepia Toning with Colloidal Sulphur." S. O. Rawling, B.Sc. "Scott Archer's and Hardwick's Wet Collodion Formula Revised." W. T. Wilkinson. "The Optical and Photographic Properties of some Isomeric Isocyanines." Miss F. M. Hamer, B.Sc.
Belfast C.P.A. Camera Club. "How to Make your Camera Pay." F. Harrison.
Birmingham P.S. "With the 23rd Division in France, Belgium and Italy." G. E. Pearson.
Cambridge and Dist. Phot. Club. "Old Processes and New Methods." W. F. Slater.
Dennistoun Amateur Phot. Assoc. Whist Drive.

Exeter Camera Club. "The Taj Mahal." E. Molony.
Hackney Phot. Soc. "Oxford." A. H. Verstage.
Leeds P.S. "Winter in the Bernese Oberland." S. E. Bottomley.
Morley P.S. "Advance of Modern Camera." R. Spence.
South Shields P.S. "Enlarging for Beginners." Harbit Heal.
Tynside P.S. "Pictorial Work in Great Cities."
Welfare C.C. "Lantern Slide Making." Thos. Carlyle, S.P.F.

WEDNESDAY, NOVEMBER 9.

Accrington C.C. "Dye-Impression Printing." Tom Woods.
Belfast C.P.A. Camera Club. "X-Ray Photography as Applied to Modern Surgery." R. M. Leaman.
Borough Polytechnic P.S. "The South of Ireland." J. Nixon.
Croydon Camera Club. Members' Print Display.
Dennistoun Amat. P.A. "Development." W. S. Crocket.
Edinburgh Phot Soc. "How to Make the Best of a Bad Negative." R. S. Galloway. Also Lantern Slide Competition.
Ilford P.P. "Making Autochrome Slides." W. E. Lambert.
Partick C.C. "Retouching Negatives and Prints." John Baird.
Photo-micrographic Society. "Some Studies in Marine Biology." F. Martin Duncan, F.R.M.S.
Rochdale Amateur Phot. Soc. "Gaslight Printing."
South Glasgow C.C. "Printing, Gaslight and Bromide."
South Suburban Phot. Soc. "Old Processes and New Methods." Kodak, Ltd.

THURSDAY, NOVEMBER 10.

Camera Club, The. "Further Adventures in the Tree-tops." Capt. C. W. R. Knight.
Gateshead Camera Club. Lantern Slide Exhibition.
North Middlesex P.S. "Slide Making." J. F. Nisbett.
Optical Society. "The Theory of the Periscope." Dr. Alexander Gleichen. "Interocular Distances." Dr. J. W. French. "Note on the Thin Astigmatic Lens." T. Chaundy.
Wimbledon and Dist. C.C. "Making Lantern Slides." H. Pickwell.

FRIDAY, NOVEMBER 11.

Wombwell and Dist. P.S. "Elementary Principles of Art applied to Photography." Alex. Keighley.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 1, Mr. F. F. Renwick in the chair.

The President, Dr. G. H. Rodman, who was present against his doctor's orders, was cordially received on rising to deliver his presidential address. He referred at the outset to evidences of the continued activities of the Society during the past year, particularly in the progressive increase of membership and on the support accorded to other societies, such as those interested in radiography and photo-micrography.

He touched upon pictorial photography, and while commending the objects of the Pictorial Group, expressed the belief that the future of pictorial work with the camera lay with the fuller utilisation of the capabilities of present-day lenses and colour-sensitive plates. He pointed to works of J. M. Whitehead and Fredk. H. Evans in pure photography as examples of artistic achievement which had a permanent value. He was unable to do as much for much of the highly "controlled" photography which was produced by methods such as Bromoil.

He then turned to pass in review the discoveries which might be said to be included in "the invention of photography." On the optical side, the formation of a lens image of an object, the foundation was laid in the cameras of Barbaro and Porta in the sixteenth century. On the chemical side, the fixation of the optical image by the action of light, the work of many investigators had led up to practicable photographic processes. Dr. Rodman rapidly traced the successive labours of Schulze, Scheele, Wedgwood, Niépce, Reade, Bayard, Herschel and Daguerre, and, in greater detail, of Fox Talbot. Alluding to the bequest to the Society of apparatus of Fox Talbot and examples of his earliest results, by his granddaughter, he showed early and later portraits and many interesting ancient and modern photographs illustrating Fox Talbot's work and home at Lacock. A collection of the apparatus and other relics was on view. Dr. Rodman also referred to the fund now being raised to establish a memorial to Fox Talbot, and showed a photograph of the interior of Lacock Church, where it was possible that a window might be placed in commemoration of the experimenter. He urged that contributions to the fund should be forthcoming in order that long-delayed public recognition of Talbot's investigations might be adequately made.

Tracing the later development of photography through the wet-collodion and dry-plate eras, the President referred to the immense popularity conferred by the introduction of daylight-loading film and cameras by the Eastman Company, and concluded by contrasting examples of a vest-pocket Kodak and a Sibyl camera with the primitive and cumbrous apparatus of the early days.

On the proposition of Mr. E. W. Mellor, seconded by Mr. T. H. B. Scott, the hearty thanks of the meeting were accorded to the President for his address.

CROYDON CAMERA CLUB.

A fixture which proved one of the "very best" was provided last week by Mr. Elwin Neame, who lectured on "Photography in Advertising." The walls were covered with photographs illustrating the subject, most of the highest technical excellence and alluring charm, even if they did not bow to the canons of Fine Art, but undeniably clever nevertheless.

A stately and very attractive young lady accompanied the lecturer, and adopted various elegant poses when requested. In the long intervals of rest, a member (who had celebrated a silver wedding) having crossed the room and secured the next chair for the purpose, chatted paternally, amiably, and continuously with the fair visitor, resisting with great skill all attempts at dislodgment. Even the president, gifted on similar lines, hardly had a look in, and the rest were absolutely nowhere. The gay young Lothario is gently reminded that men have been killed in cold blood for less than this.

Mr. Neame first narrated his early experiences in photography, which began with a guinea hand-camera fitted with a "rebound" shutter of a highly energetic description. Next came a 70s. field outfit with real leather bellows, R.R. lens, and one D.D. slide complete. An art school followed, which in itself was all right, but art money appeared to languish, so he plunged for photography, and after operating for two years started on his own. Things went well following much hard work, but down in the bottom of his unconscious soul lay a latent ambition, unidentified and therefore incapable of realisation. Only when he remembered quite recently that he had never visited the Croydon Club did the inconcrete become concrete, and he immediately called on Mr. Geo. E. Brown who, after pointing out the peril of the adventure, put him into communication with Mr. Sellors.

He was out for propaganda, for photography is the best of all mediums for advertising, and Neame, he said, is undoubtedly the man for the job. (This modest statement was certainly made good during the evening.) In America photography is far more widely used for advertising than in this country, but an ever-increasing and remunerative business is now being done here. The general public usually suspects a line drawing, but knowing "the camera cannot lie" accept its evidence unquestioningly. Also, many buyers for commercial houses will not look at a sketch which is apt to let them down, but will transact business on the strength of a photograph.

The great difficulty is to know what is required, and the first thing to do is to ask the customer "What is your kink?" for the special characteristics, whether of a corset or motor-car, must be emphasised, and first-rate technique and quick delivery are compulsory adjuncts to success.

Unfortunately, some customers have but hazy ideas what they do want, and this frequently adds greatly to the difficulties of advertisement work. As regards costumes worn by models, the conditions necessitated a fairly quick exposure, and the necessity of securing fine detail a medium stop. In such cases screened orthochromatic or panchromatic plates are not easy to work, but by judicious arrangement with the makers, characteristic costumes presenting suitable colour-contrasts for a fast "ordinary" brand may be found. As a general rule the print must be vigorous, with a bold note of outline, lighting, and gradation.

The foregoing gives the salient points mentioned by Mr. Neame. What he did not allude to, but what was very evident, is that he is possessed of a fertile and inventive brain which devises photographs which admirably advertise goods of all descriptions. This ingenious method of introducing "natural" backgrounds (published some time ago) is undoubtedly a powerful aid to success in many cases, as it forms a rather theatrical setting in harmony with a scheme which has to be assertive. Back lighting is another powerful factor towards the same end in studio work.

He often employs 24,000 candle-power behind the sitter, and only 4,000 c.p. in front. Half-watt lamps are used, and the lens, of course, is carefully shielded from direct rays.

The rest of the lecture was devoted to some really valuable hints on posing, and to the consideration of art maxims. For instance, Δ = stability: the "S-curve" = beauty, and so forth, the maxims being fascinatingly humanised by the young lady, the Δ excepted. In the discussion, Mr. Catharine, who is an engineer familiar with heavy pressures, chatted pleasantly on corsets, and was followed by a long string of questions from other members. In reply to one query, the lecturer said the best print for reproduction was one on P.O.P. toned to a purple-blue without suspicion of double-toning. A most hearty vote of thanks was accorded Mr. Neame, and the young lady assisting, with much acclamation. Societies that can prevail upon him to name an evening will ensure a fixture of outstanding interest.

News and Notes.

Mr. George J. Hughes, Waterford, Ireland, sends us a reply envelope to a recent advertisement of his in the "B.J." which has reached him without contents. His correspondent, who, it is thought, wrote from Bolton, is asked to address him again.

Death of Mr. S. G. Downing.—We much regret to announce the death, which took place at Highgate last week, of Mr. S. G. Downing, who for some years past has been manager of Messrs. Wellington & Ward's branch at Bombay. He only returned from India about three weeks ago and succumbed after a very short illness.

Focussing Screens.—A correspondent of the "Club Photographer" points out that the Barnet matt-emulsion plate, when fixed out and washed, makes a superb focussing screen. Although Messrs. Elliott term their product a "self-screen" and not "focussing screen" plate, it cannot be denied that an article that lends itself to uses other than those for which it was designed is a decided acquisition.

Houghtons' "Professional Bulletin" for October contains an article by Mr. Marcus Adams in appreciation of Mr. Pirie Macdonald and in advocacy of a matter of which we have often urged the desirability, namely, the making and entering of prints for exhibitions. The issue contains descriptions of Messrs. Houghtons' latest items for professionals, among them embossed mottoes for sticking on Christmas photographs and a new Father Christmas studio accessory.

Sheffield and District Professional Photographers' Association.—A well-attended meeting of the Society was held on Wednesday, October 26, at Miss Eadon's Studio, when Mr. G. Henderson, of the Imperial Dry Plate Company, showed the working of their new Eclipse Plate, 600 H. and D., its characteristics and its use for short exposures and electric light portraits. A vote of thanks to the demonstrator, to Miss Eadon for the use of her studio, and to Mrs. Hinkin for her service as model brought a very interesting evening to a close.

Smiling Poses Unfashionable.—A writer of Society gossip paragraphs in one of the evening papers (the "Star") states that "The day of the smiling beauty anxious to display a fine row of teeth is done. Society girls and stage celebrities have all adopted the more than serious expression; indeed, it seems quite the thing to look a trifle sulky. But, of course, when a whim of this kind is sponsored by such an undisputed beauty as Gladys Cooper, lesser fry are bound to take it up both in stage and Society circles. Only the result is not always so artistic. Apparently the idea is to look as though you are being 'taken' against your will."

The Scientific American.—The first issue of our contemporary in its new monthly form, incorporating the "Scientific American Supplement," is a handsome magazine covering a wide field of technics and science. The present issue contains illustrated contributions on such varied subjects as bridge building, the evolution of the Dreadnought, safety of aeroplanes, wireless telephony, super-range artillery, mountain tunnelling, to name only a few of the headings of its many pages. There are also some notes on the desensitising of photographic plates, and a series of drawings illustrating the 16 stages in the making of the offset plate by which the coloured cover is printed. In its new form the magazine is published at 35 cents a copy, 4 dollars per annum, in the United States. Foreign subscriptions, 5 dollars per annum.

Society Programmes.—The lists of fixtures arranged by photographic societies in this country look poor things beside those of some which we receive; for example, of the California Camera Club, kindly sent to us by the secretary, Mr. W. Mackintosh, of San Francisco. Among the fixtures for last month is a whole-day water excursion to Paradise Park in San Francisco Bay, where there is a beach and a dancing pavilion. Members are entreated to bring their bathing suits and a big lunch. But even this fixture appears tame beside the arrangements for a Halloween costume party on October 28, when "witches and owls, pumpkins and jack-o-lanterns will be much in evidence."

Manchester Amateur Photographic Society.—The annual exhibition is being held at 5, Carr Street, Blackfriars, from to-morrow, Saturday, November 5 to November 12, from 5.30 to 10 p.m. During the period of the exhibition the following lectures will be given:—November 5, "Charm of the Hills," W. W. F. Pullen; November 7, "Derbyshire Dales," J. B. Berwick; November 8, "In and Around St. Paul's," E. W. Harvey Piper; November 9, "Glimpses into Nature's Secrets," Fred Taylor; November 10, "Some Dravidian Landmarks of Southern India," E. W. Mellor; November 11, "In the Shires of the Sea Kings," Rev. S. R. Laundy; November 12, "Burgos and a Bull Fight," James Shaw.

Diplomas in Radiography.—The establishment of a diploma in medical radiology and electrology by the University of Cambridge (writes "Nature") was made at the instigation of the British Association for the Advancement of Radiology and Physiotherapy (B.A.R.P.). This association has also been instrumental in forming a Society of Radiographers, having as its object the consolidation of the position and improvement of the status of the lay assistant who carries out the routine work at hospitals under the direction of the medical head of the department. The Council of the Society of Radiographers has arranged for an examination to be held yearly, and instruction for this examination is being greatly facilitated by the co-operation of the Institution of Electrical Engineers. Successful candidates will be entitled to use the letters M.S.R. These dual activities of the B.A.R.P. are a good augury of the desire among radiologists to improve the status of medical work involving the use of the various forms of electricity and radiation.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

STRESS MARKS ON DEVELOPMENT PAPERS.

To the Editors.

Gentlemen,—I am often inclined to write on subjects mentioned in the "B.J.", but my "frame of observation" being so different to yours, and my means of communication so slow, I fear a difference in my dimensions, especially the fourth. (With apologies to Einstein.) But there is a point on which I think I can make a suggestion of real value, even if it is a month behind time.

On page 592 in the "Answers" I take it that a correspondent is troubled with stress marks on glossy paper. We call them abrasion marks on this side of the herring pond, because we find that the marks can be made by any rubbing which abrades the surface. About two years ago some of my Velvet Velox paper showed these marks, so that I was obliged to give it up and use another make. My foreman is a dyed-in-the-wool Velox man, and often complained of the inferiority of this latter paper. About a year ago he asked me to send in a small order for Velox, and see if it was any better. So I ordered a few thousand sheets, and we found it worse than ever. We knew that iodide of potassium in the developer would prevent the marks, but we also knew that it

would shorten the efficiency of the developer to about one-half and degrade the quality of the work. So it was ruled out; better use a slightly inferior paper than a much inferior developer. At last he suggested that I try to find something better than iodide. I tried a number of things which I thought might work, mainly at first with the purpose of modifying the iodide and preventing its deleterious action, but all were failures.

In working out photo-chemical problems in late years, if they do not solve by probable methods I reverse my tactics and begin with what I consider the most improbable.

It has been a lifelong habit, religiously observed for nearly a half-century, when I use hypo to wash my hands before touching even a towel. When I was asked why, among other reasons given was "you might get some in your developer." So I defied my bugaboo of forty-seven years' standing, and *put* hypo in my developer, cautiously at first, but with increasing temerity as results encouraged. The idea was to prevent the iodide from doing harm, but I soon found that with hypo I did not need as much iodide. This led to leaving out the iodide and using hypo alone. So I handed the foreman a solution, and asked him to try it out in the printing room, and see how it affected the prints and the effectiveness of the developer. He reported that he could see no difference in the prints, except that there were no abrasion marks, and the developer stood as well as any he had ever used. Under-exposed prints would be slightly yellow, but a print that was much under-exposed would in any case be unfit to pass according to our standards.

It has been my experience that a fragmentary suggestion like this rarely works out under different circumstances than those in which it was first successful; so I think it best to give my whole practice in this matter.

A few years ago I told in the "B.J." my objections to stock solutions of developer, so I will now re-state the method of procedure in my printing room. On the mixing shelf there is a tin which holds about two quarts. In this is Elon and hydroquinone 1 to 4 by weight dry. A small tin cover stays with this tin, and measures the amount of the dry crystals needed for a quart (32 ounces) of developer. Beside that is a larger tin containing anhydrous sulphite and carbonate of soda, equal parts by weight, and a measure required for the amount used in a quart.

The printer takes a quart of distilled water, adds the proper measure of dry elon-hydro, and stirs a little, then adds the proper measure of sodas and stirs vigorously, adds 7 drams of a 10 per cent. solution of potass bromide, and 4 drams of a 10 per cent. solution of sodium thiosulphate (hypo), and in the time it takes to read it absolutely fresh developer is ready for use. We use our developer at or near 65 Fah., which means with us ice about 300 days in the year, and we never use a solution kept over night.

So with the addition of hypo to the developer we began again to use Velox, and never had a stress or abrasion mark all winter, although our output was from 4,000 to 6,000 per day. The hypo solution was known in the printing room as "non-abrasion dope," and recently I asked the foreman if any of the printers had tried to find out what it was, and he said that not one had shown the slightest curiosity. Men are queer cattle.

R. W. HARRISON.

Studio of Photographic Art, Miami, Fla.

WATERTIGHT STUDIO ROOFS.

To the Editors.

Gentlemen,—I see your correspondent, "M. W.," is, like a large majority of fellow-photographers, troubled with a leaky roof. If he cares to try the following experiment I think he will find his trouble at an end:—

Procure a quantity of the purest linen and some of the best oil paint (colour is of no consequence), cut the linen into strips of 3 ins. wide and the length of the sash bars, now give the bar and glass around it a good coat of the paint, and lay the strip of linen on to it, and rub well down with a cloth, and apply another good coat of paint on the top. When this is thoroughly dry I think it will withstand anything.—Yours faithfully, V. L. WYBALL.

Gipsy Hill, London, S.E.19.
October 28.

DESENSITIZING WITH POTASS IODIDE: FREUND'S PROCESS.

To the Editors.

Gentlemen,—In reply to the letter in your columns from Mr. Bolas dealing with our recent article on "Freund's Method of Desensitizing Dry Plates," we beg to assure him that we have no desire to appear as "skilled dialecticians," but simply as students of photographic science willing to learn from anyone who has something new to bring forward.

We are reluctantly driven to the conclusion, from a careful reading of his letter, that Mr. Bolas has no new facts to offer on the subject, and we do not, therefore, propose to send him even the reply postcards he suggests.—Yours faithfully,

Ilford, E. November 1. O. F. BLOCK.
F. F. RENWICK.

VISIBLE IMAGE ON DRY-PLATE BEFORE DEVELOPING.

To the Editors.

Gentlemen,—While washing backing off a 12 x 10 plate of a flash-light group, prior to developing, I was surprised to find that the figures in the group had already appeared on the film and were quite distinct. The negative was a little under-exposed, quite clear and free from fog. The plate was a Wellington studio anti-screen. People I have spoken to consider this a very unusual occurrence.—Yours truly, H. W. LEVERTON.

112, Peckham Rye, S.E.15. October 31.

CAMPHOR IN THE CAMERA CASE.

To the Editors.

Gentlemen,—With reference to the inquiry regarding the effects of keeping camphor, etc., in the camera case, I may say that for over 30 years I have kept a piece of camphor in my case, and, though plates in many instances have remained in the slides for many months, no ill effects have resulted from it. Camphor has also always been kept in the print drawers. I would not care to recommend naphthalene, however, for similar use.—Yours faithfully,

W. J. BARKER.

14, Victoria Mount, Woodsley Road, Leeds. October 29.

ARTIGUE'S TWO-NEGATIVES METHOD FOR SOFT FOCUS PORTRAITS.

To the Editors.

Gentlemen,—As the front plate has to be over-exposed in order to sufficiently expose the rear plate, I suggest the slower flat film should be used in front instead of a plate which cannot be backed. I intended trying this, and should have written last week but have not had opportunity to do so.

I fancy with light drapery and light backgrounds there would otherwise be more halation on the front plate than desirable, although a slow plate in front should mitigate it. The film could, if necessary, be slightly separated from rear plate by another plain film.—Yours truly, WILLIAM COLES.

16, Queens Road, Watford. November 1.

Commercial & Legal Intelligence.

NEW COMPANIES.

FILM FACE FOTOS, LTD.—This private company was registered on October 20. Capital £2,000 in £1 shares. Objects: To take over the business of Williams & Da Silva, and to carry on the business of photographers, artists, colourmen, dealers in works of art, managers, and proprietors of studios, etc. The permanent directors are: E. T. Williams, Lawrence House, St. Margaret's, Middlesex; L. D. Da Silva, 5, Effingham Street, S.W.1; J. Wright, 149, Brixton Hill, S.W.2. The two first-named are joint-managing directors. Qualification of ordinary directors: £250. Secretary: J. Wright. Registered office: 32, Shaftesbury Avenue, W.1.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

N. U. R. (London).—Conditions are none too good at the present time, but they show signs of improving, and there is always business to be had by retouchers who can do really first-class work.

Caterham.—The article by Mr. John H. Gear on the D.50 developer appeared in our issue of May 27 last. The developer is manufactured and sold by the Cooper Research Laboratory, Watford, Herts.

K.B.—The mixture referred to is probably that of Stockholm tar and linseed oil putty in equal proportions. There are several preparations now sold for stopping leaks in ordinary roofs which might be useful in this case. One is called Matex, and another Farotex. These are very adhesive and do not set hard.

Axiom.—(1) We do not know of any method of dry development that is an improvement on the Douglasgraph method, published in the "B.J." of August 27, September 3, 1920. The bichromate gum film, when dry, is very sensitive to direct daylight, and—even indirect rays of the enclosed arc lamp. Should those rays strike the film it is impossible to develop a clean stencil, the result being that the ink will not adhere to the metal. (2) 4 to 5 per cent. for enclosed arc lamp. (3) We do not know of any.

F. A.—(1) About the best particulars are given in an article by Dr. König in the "B.J." of November 6, 1908, pages 848-9. This number is out of print, but you can see the volume in the Library of the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C. (2) In making up M-Q developer, dissolve the metol first, then the sulphite, then the hydroquinone and bromide, and finally the carbonate. In single solution this developer will keep for a month or two; much longer if the carbonate alone is dissolved in one-half of the water and the other chemicals in the other half. (3) According to the year, there are 52 or 53 issues of the "B.J." in a volume. The volume runs according to the calendar year, the present volume ending at the end of December next. We do not supply binding cases.

C. N. E.—(1) Two rows of curtains will do, but we should prefer three, little more material will be necessary and only two extra wires. (2) We do not consider two complete sets of curtains are needed; have enough black curtains to cover the entire run of glass, and in the middle, on the same wires, enough white ones to cover half the glass. (3) This depends upon the width of your material, about a yard is convenient. Allow about half as much again as the length of the glass to allow for fullness. (4) You could not very well carry out Robinson's idea with festoons. The arrangement we suggest would give equally good results; in fact, greater control can be obtained. (5) Good black casement cloth, or Bolton sheeting for the dark blinds, and nainsook or mandapolam for the white ones. (6) Any upholsterer will make the blinds for you. Most photographers find someone who can sew. A builder would fit the wires.

J. A.—There seems to be some confusion in the particulars. You say you give half-a-second exposure at *f*/16, and in the next line you say the shutter is set at 1-15th of a second. We think it is unlikely that the vibration of the shutter is the cause of the fuzziness, but it is possible that it is if the camera or the tripod is ricketty in any part. Also it may be that the plate does not come into the same position as the focussing screen. You should test this by first focussing on the focussing screen in the usual way with the largest aperture in the lens, and then, without moving anything else whatever, throw back the focussing screen and focus again on a piece of ground glass placed in one of the dark-slides, pulling out, of course, both of the shutters for this purpose. If the image in the latter case is out of focus, it is a sign that there is something the matter with the dark-slides. If you persistently find the difficulty in all the pictures you make, we think your best plan would be to send a batch of negatives and prints to the makers of the camera for their remarks.

W. A.—(1) You cannot very well get both of the things you want, namely, silence and moderately short exposures, with the same shutter. We think the Packard is a very suitable shutter for indoor use, and is almost silent. For outdoor use there is nothing better than a good roller-blind shutter on the lens hood, which will give exposures from about 1-5th of a second up to 1-50th, and can be made to give longer automatic exposures by means of one of the time-exposure valves. (2) We do not think it is possible to make a good job of retouching the uncovered corners of the negative. Your best plan would be to block out the sky part of the negative, so that it prints white, and then, if necessary, print in a tint by sunning down for a second or so; or you could make a new negative by copying a positive transparency or a good clear print from the negative after blocking out. (3) Magnesium ribbon is too slow in burning for providing the light for photographing groups of any size. You would almost certainly spoil each exposure owing to movement of one figure or another.

E. L. W.—As regards the irregular toning of the prints in the hypo-alum bath, your letter does not say anything about the one thing which very likely is the cause, and that is the mode of heating the toning bath. If the bath is heated over a flame, such as a gas-burner or other naked source of heat, we think that the irregular degrees of temperature in the toning solution are sufficient to account for the patchy toning of the prints. We advise that you should keep the toning bath hot by placing it in a vessel of ample size containing water, which in turn is kept hot by a small gas-ring several inches below it. The outside water vessel should be of such size that you can keep the water stirred, both underneath and at the sides of the dish containing the toner, keeping some form of paddle in the outside vessel for this purpose. Also, a certain measure of care should be taken that the water in the outside vessel does not become hotter than is necessary. By means of a thermometer you should be able to ascertain with sufficient closeness how much hotter the water in the outside vessel must be in order to keep the toning bath at the required temperature. If it so happens that you have been heating the toning bath in this way, then we must look for the cause of the patchy toning in another direction. We do not think that your method of development need give you any uneasiness. For toning by the bleach and sulphide method it is certainly better to have minimum exposure and maximum development, but, on the whole —that is to say, with most papers—that does not apply to the same degree with hypo-alum toning. We think the sugar makes no material difference to the process.

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Henry Greenwood & Co., Ltd., Proprietors and Publishers, 24, Wellington Street, London, W.C.2.

THE BRITISH

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Contents.

SUMMARY.

Photographic assistants whose employment brings them within the provisions of the Shops Act, have occasion to be grateful to the King's Bench Division of the High Court for a judgment (reversing that of a magistrate), which has made it plain that it it a breach of the Act for an assistant to be employed at another shop under the same proprietorship on the weekly half-holiday. We give the report of the judgment on page 672, and comment upon it on page 665.

At a recent meeting of the Council of the Professional Photographers' Association, it was decided to proceed with the formalities for the incorporation of the Association. (P. 677.)

A safety method of packing large photographs for postal transmission is described in a paragraph on page 666.

Two correspondents give their experience of means found effective for keeping studio roofs watertight. (P. 679.)

We refer to a recent notable example of the use of photographs by an educational body in its appeal to the public for funds. (P. 665.)

In the first part of a chapter on the elementary optics of the size of image produced under various circumstances, an explanation will be found of the Gauss planes and nodes of a lens and some particulars of their positions in a number of compound lenses of modern type by British makers. (P. 667.)

Colonel R. J. S. Simpson contributes a formula for the calculation of the nodal space of a lens alternative to that recently published by Mr. Lockett. (P. 679.)

The first portion of the Traill-Taylor lecture delivered by M. L. P. Clerc on aerial photography, dealt with practical considerations such as the use of light filters, design of shutters, sensitive material and build of camera. (P. 669.)

The causes of veiled or degraded negatives connected with the reflection of stray light upon the plate from the interior of the camera or from the lens surfaces are the subject of a leading article on page 666.

We greatly regret to announce the death on Tuesday last of Mr John Spiller, at the great age of 83 years. (P. 673.)

At the Royal Photographic Society, on Tuesday evening last, papers arranged by the Scientific and Technical Group dealt with sulphide toning, isocyanine colour-sensitisers and a revised wet-collodion process. (P. 676.)

A bromide printing machine worked by a self-contained electric battery is the subject of a recent patent specification. (P. 673.)

Looseness of plates in their holders is an occasional cause of unsharp definition in the use of a large aperture lens. (P. 666.)

EX CATHEDRA.

University Customers. Photographers who live in towns where there is a University or other large educational institution should take the opportunity of seeing a booklet which has just been issued by the University of Bristol. It is an appeal for funds, of which the University of the West stands greatly in need. But it is significant that in addressing itself to the public the committee intrusted with the appeal for financial help should employ almost exclusively a photographic method of showing the public what is being done. The booklet is actually a 18 page album of 172 photographs, representing every educative and social phase of the University life and reproduced in rotogravure. The fact that an important educational body should rely exclusively upon a pictorial method for making an appeal to the public for funds is a striking example which, without doubt, will be followed by other bodies. The photographer on the spot should obtain business of this kind, which requires a good deal of stage management and can be more satisfactorily carried out by a photographer in touch with local affairs. Moreover, as we have many times emphasised in similar cases, the photographer who undertakes such work should be sufficiently enterprising and familiar with photo-mechanical reproduction to undertake the contract for the entire printing job.

* * *

The Business of a Shop. The deferred judgment delivered in the King's Bench Division last week gives a legal precision to an important provision of the Shops Act which has hitherto been lacking. We quote the report of the case on another page, where it will be seen that the appeal related to the case of an assistant employed by the proprietor of two shops. On the weekly half holiday of the shop where she was regularly employed she was engaged in the other establishment of the proprietor. The magistrate, to whom this alleged breach of the Shops Act was laid by the London County Council, held that the employment in the second shop was not a breach of the Act. The judges of the King's Bench Division, however, have held otherwise, and, in reversing the magistrate's decision, have given an exposition of clause 1 of Sect. 1 of the Shops Act which is clearly in accordance both with common sense and the deliberate wording of the Act. The judges point out that the words of the Act are carefully chosen. It is provided that on one weekday in each week a shop assistant shall not be employed "about the business of a shop" after half-past one. The deliberate use of the words "a business of a shop" instead of simply "a shop" is evidence of the intention of the Act to provide for the protection of assistants employed by a proprietor having several shops; and the judgment usefully serves to give legal weight to this wider interpretation. In view of the many photographic businesses having several shops

under a single proprietorship the judgment should receive the attention of photographic assistants.

* * *

Packing Large Photographs. It is a matter of some difficulty to ensure that portraits upon large mounts, say, 14 x 11 and over, reach their destination without injury. Usually a large quantity of corrugated paper and string is used, and even then the risk of bending is considerable. A little dodge which we saw recently appeared to solve the problem. A piece of stout strawboard about two inches larger each way than the prints had four strips of wood about ¾ inch in section fastened round the edge with ordinary tin tacks, so as to make a shallow tray in which the prints wrapped in brown paper were laid, a second piece of strawboard was tacked on, and the whole wrapped in an outer cover. The wooden strips can be obtained from any timber dealer and need not be planed. If a number of one size were required they could be ordered cut to the necessary lengths, otherwise a small saw is needed. As such packages are almost invariably sent by parcel post, it is not necessary for them to be open for inspection. It would, perhaps, be an improvement to fasten the lid with glued or gummed strips as being easier for the customer to open, but most people are able to open a box in these days of postal trading.

* * *

Bellows. Sag of the camera bellows, due to the softening action of the damp atmosphere on leather, cloth or glue, is particularly liable to occur at the present time of year, but unless the bellows are very much the worse for wear may be prevented by suitable renovation. For stiffening, the bellows should be extended to the full and a coat of thin glue applied to the inside and one of good varnish to the outside. If the bellows are in a very bad condition two coats of glue may be required. Both coatings should, of course, be allowed to get thoroughly dry before the camera is returned to use. It will, however, be found that this means is insufficient to give the required stiffness to leather which has lost its substance through age, but usually it is enough in conjunction with the employment of a pair of elastic bands for hitching the bellows forward and upward to the lens front. Two elastic supports of this kind are a good deal better than the one which is commonly provided on cameras.

* * *

A Cause of Unsharp Negatives. Those photographers who use the ordinary book-form dark-slides should be on their guard against a possible source of unsharp negatives, sometimes met with, though the exact cause of the defect is not so readily apparent. We refer to the gradual weakening of the springs upon the metal division, so that there comes a time when these fail to press the plate into correct register. Recently, we were asked the reason why certain negatives taken with a well-known anastigmat lens, and focussed with the aid of a magnifier to the finest point of sharpness, were unsharp when the lens was used at full aperture, while, when smaller stops were employed, the definition upon the screen and upon the resulting negative showed no difference. Suspecting that the cause of the trouble was some defect in the lens, the photographer sent the instrument to the makers who returned it, saying that it was in perfect working condition. The fact that the negatives were sharp with the smaller stops and unsharp when the lens was used at full aperture, pointed to inaccurate register, and the trouble was eventually traced to the cause mentioned above. Another point not often realised by many workers is that the double book-form slide should never be loaded with only *one* plate, especially if the springs upon the division are inclined to be weak, as in this case the plate may not be kept in correct register. If, for any reason, only one plate is wanted in the slide, the other half should be loaded with an old negative, thus avoiding a likely cause of trouble.

HARMFUL REFLECTIONS.

When we consider the delicate gradations which should exist in good portrait negatives, and to a lesser degree in those of landscape subjects, it is difficult to imagine why so little care is taken to prevent the access to the plate of every ray of light, except that needed to reproduce the lights and shades of the original. It is true that the old axiom that a perfect negative should show a few points of clear glass no longer holds good, because this assumes that there are in every subject some portions which are absolutely non-reflective, and in practice this is rarely the case. There is, however, no reason why the smallest amount of light which is not reflected by the original should be allowed to reach the plate and degrade the scale of tones, if it can possibly be prevented.

The commonest cause of such degradation is reflections from the interior of the camera, the tube of the lens, and in some cases from the lens-surfaces. Practically all cameras are now provided with bellows bodies, and the danger of reflection from these is small, if the fabric is perfectly black and dull. But this condition cannot be long maintained without occasional attention, since the black coating has a tendency to become grey partly by a kind of bleaching process and partly by dust which adheres more or less firmly to the surface. This defect is easily removed by applying a coat of dead black colour or varnish to the fabric. A very good idea of the state of the bellows may be got by laying a piece of black velvet upon the bottom folds, opening the lens and looking through the camera back, the head being well covered with the focussing cloth. The increasing use of anastigmatic portrait lens which illuminate the interior of the camera to a much greater degree than did the old portrait lenses, emphasises the necessity for attention to this point.

Local fogging is frequently caused by reflections from the wooden framing of the camera, and this is often difficult to detect, since the eye may not be placed in a position in which the reflected light can be seen. It is a good plan to cover all edges which may be the cause of trouble with black velvet or black flock paper, thus safeguarding them against the strongest light which may fall upon them. In hand cameras which have wooden bodies, *e.g.*, the French model stereoscopic instruments, there is great danger of a bright object outside the limits of the plate causing a patch of light to appear on the side or bottom of the body, which, when reflected on to the plate, gives rise to a general or local fog. In one case of this kind a great improvement was effected by lining the whole body with velvet. The woodwork inside reflex cameras should be carefully examined and treated where necessary, the mirror support being frequently far from safe in this respect. It is, of course, necessary that the lens should face a bright light while the camera body is being inspected, or a false idea of safety may be obtained.

Lens reflections are more difficult to deal with, especially if they arise from the glass surfaces and not from the inside of the tube. In both cases they may be minimised by effectually shading the front lens by means of a hood or curtain, and in the case of lenses with long tubes a velvet or flock paper lining should be fitted.

There are some excellent matt black varnishes on the market, but the best of them fall short of the surface of velvet or other dead fabric. They may, however, be applied with advantage to the rims of the lens cells and to the edges of the rings which hold the iris in position.

An excellent aid to brilliancy will be found in the outside diaphragm recommended by Mr. Chapman Jones. This consists of an opaque non-reflecting card with an opening approximately of the proportions of the plates in use. It is adjusted at such a distance from the front of the lens as will intercept all light from reaching beyond the edges of the plate. For studio work, such a mask may be fitted to the ordinary vignetting rod of the camera, and manipulated as in vignetting. The value of this appliance when working against the light for "Rembrandt" or "edge light" effects can hardly be appreciated without trial. It is also of great value when using electric light, where it is sometimes difficult to shade the lens effectively. Almost equally efficacious, but not so convenient in application, is a similar mask or diaphragm interposed between the lens and the plate. Such a contrivance was recommended more than forty years ago by the late J. H. Dallmeyer, and it may be safely assumed that if it was necessary with the slow collodion plates of that period, it is still more so in these days of 500 H. and D.

On the principle that prevention is better than cure it is advisable to see that, when working in the studio, very light objects, such as white backgrounds and reflectors (not to mention mirrors), do not occupy positions in which their surfaces, although not included in the field of view, will cast their images upon the interior of the camera. Even a brightly-lighted floor may degrade the shadows, as may easily be proved by taking a negative with and without a dark rug upon the ground.

Those who have the good fortune to work in a well-screened north-lighted studio do not experience nearly the same amount of trouble as those who have to endure a certain amount of sunlight upon the glass, but in any case it is obvious that light that is not necessary cannot be other than injurious, the only question being one of degree. It is certain that more brilliant images would be obtained upon ultra rapid plates if every precaution were taken that no light, except that actually forming the image, reached the plate. It goes without saying that the lens should be absolutely bright and clean, or all efforts to obtain unveiled negatives will prove fruitless.

SCALE OF OPTICAL REPRODUCTION.

[The arithmetical calculations relating to the size of the image formed by a lens are among those which have frequently to be made in such diverse branches of photographic work as, for example, copying and enlarging, aerial photography, and lantern and cinematograph projection. The following article deals with this subject. The present chapter adopts the Gauss conception of the action of a lens as a simple method for derivation of the rules of optical image formation. It considers in particular the case of objects at a distance which is great relatively to the focal length of the lens, thereby emphasising the disturbing effect of depth of focus on certain scale calculations. It also presents the rule determining the relative exposures for different scales of reduction or enlargement. In Part II., to appear in a subsequent issue, the formulæ and rules contained in the present chapter are arranged in a form corresponding with the various conditions occurring in practice, with examples of their use.—Eds. "B.J."]

PART I.

The calculations relating to distance of object and extension of camera when photographing objects on various scales of reproduction with lenses of different focal length are based on a very simple optical law which follows from the construction of a lens and can be readily verified by experiment.

This law can be most easily explained by making use of the elegant method introduced by C. F. Gauss (1777—1855) for the graphic construction of the image of an object formed by a lens. We owe to Gauss the conception of the *nodes* and *nodal planes* of a lens, also called *principal* or *Gauss points* and *planes*. If the positions of these are known, and also the focal length of the lens, such problems as those involved in making calculations of the size and position of the image are made extraordinarily simple. Gauss replaced the cumbrous and complicated plan of tracing the course of rays through a lens according to the curvatures and refractive powers of its component glasses by one which requires no knowledge of these optical values. He showed that every lens possesses two nodes (usually but not necessarily within the space of the lens), and that in a well corrected lens these nodes provide the means of constructing the image from the object without knowing anything about the actual course traversed by the rays in their passage through the glasses.

The Nodes of a Lens.

In fig. 1 the disposition of the nodes N_2, N_1 in a single lens is shown. A ray of light entering the lens obliquely so that it reaches the node N_2 (called the *node of admission*) behaves as though, so to speak, it were jumped parallel with itself to N_1 (the *node of emergence*), continuing a straight course after this lateral shift. In other words, its behaviour is as though, on reaching N_2, this node instantaneously carried it straight forward to N_1, whence it proceeds parallel to its original path.

If we imagine planes P_2 P_2 and P_1 P_1, passing respectively through the nodes N_2 and N_1 perpendicularly to the axis of the lens, we shall come upon the property of the nodes which

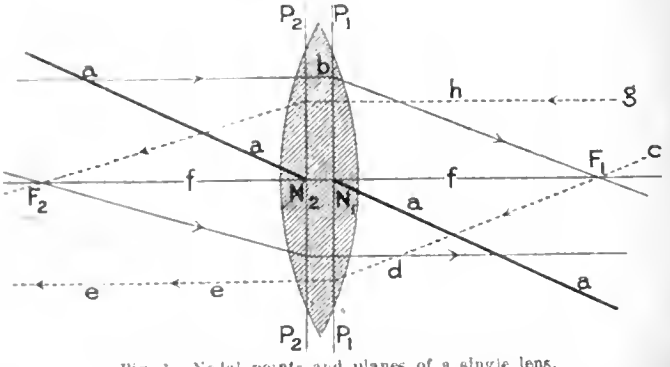

Fig. 1.—Nodal points and planes of a single lens.
P_2 P_2 and P_1 P_1 are the nodal or principal planes having the nodes N_2 and N_1 respectively on the lens axis.

is of chief importance in tracing the formation of the image. It is that a ray of light *ab* parallel to the axis, on reaching the lens, behaves as though it passed undeviated to the *plane of emergence* P, and was there bent so that it passes through

the focus F_1 of the lens. The distance on the lens axis from the plane of emergence, that is from the node of emergonce, to the focus F_1 is the focal length of the lens, which we will call *f*.

Inversely, a ray of light *cd* which reaches the lens after having passed through the focus F_1 behaves as though it continued its course undeviated to the plane P_1, and thence, undeviated, parallel to the lens axis, as at *ee*.

If rays of light are allowed to fall upon the lens from the opposite side (as would actually be done by turning the lens back to front), what was previously the node of emergence becomes that of admission, and *vice versâ*. In fig. 1, a ray *gh* parallel to the axis behaves as though it proceeded undeviated to *its* plane of emergence P_2, and thence in a straight line to the focus F_2 of the lens. Again, the distance on the lens axis from F_2 to N_2 is the focal length *f* of the lens; and in like manner a ray of light which has passed through F_2 behaves as though it continued undeviated to its plane of admission P_2 and thence parallel with the axis.

It will be seen from this very simple imagery that we may look upon every lens as having a rear focus, say F_1, and a front focus F_2, respectively situated from the nodes N_1 and N_2 at a distance *f* (the focal length) on the lens axis.

The Nodes in Practice.

Although imaginary features, the nodes occupy in every lens fixed positions relatively to the lens mount and to each other. In a single symmetrical bi-convex lens their positions are as shown in fig. I, that is, about one-third the maximum thickness of the lens from each surface. In symmetrical doublet lenses both are usually close together and near to the diaphragm. In the case of many lenses, however, particularly those of modern construction, the nodes are irregularly placed. A lens, therefore, requires to be placed nearer to or further from the plate according as its node of emergence lies towards the front or the back. In the telephoto lens, to choose an extreme example, both nodes are a considerable distance in front of the lens, so that a length of camera extension equal to the distance from the node of emergence to, say, the lens flange is dispensed with. In most lenses, however, the nodes occur in or near the lens mount, and their positions can be noted as such-and-such a distance in front of or behind the diaphragm.

In the rules and formulæ which follow relating to scale of reproduction, the distance of the object from the lens is presumed to be that from the admission node of the lens; the distance from lens to image (*i.e.*, to the sensitive surface) is that from the node of emergence of the lens. (For convenience in writing, this latter distance is referred to as "camera extension.") Only by this means can the rules connecting object and image distances, focal length of lens and scale of reproduction be made precise. Depending on the construction of a compound lens, it may be sufficiently accurate to regard both nodes as situated very close to the diaphragm.

There is no reason why any user of a lens should not find the position of its nodes. If the focal length *f* of the lens is known and a distant object be focussed on the ground glass, the node of admission is obviously at the distance *f* from the image of the sharply focussed distant object. By directing the front of the lens towards the screen and again focussing a distant object, the position of the second node is found in like manner.

A prettier method of finding the positions of the nodes is based on the fact that if the lens is supported on a vertical axis which passes through the node of emergence the sharp image of a distant object remains stationary on the focussing screen when the lens is turned through an angle. This method can be carried out by supporting the lens on any convenient holder (such as that shown in fig. 2), mounted on a rotating table. The table is rotated on a pin *A* (driven into a supporting base), which passes through one or other of a series of holes drilled in the table perpendicularly below the lens axis. If the holder is accurately made of the V pattern shown in the drawing, the holes will be directly below the axis of any lens which the V's will support; that is, if they are made in the line connecting the points of the two V's. A distant object is focussed on a piece of ground glass placed squarely behind the lens. The table is then turned on its pin, which,

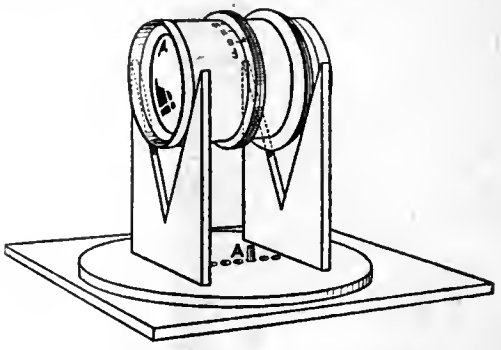

Fig. 2.—Rotating lens holder for measurement of position of nodes.

almost always, will have the effect of moving the image on the screen. By pivoting the table successively through other holes, and also by shifting the lens backwards or forwards a little on the V's, a point of rotation is found at which the image remains stationary when the table is turned. The node of emergence of the lens is then perpendicular over the axis *A*. The position of the other node is found by repeating the test after turning the lens back to front in its holder.

Positions of the Nodes in Some Lenses.

The following table gives the distances of the nodes from the diaphragm in a few of the lenses by British opticians. It will be seen that in most cases the nodes are near to the diaphragm; in some lenses both on one side; in others, one on each side. The distance between the nodes is the *nodal space* entered in the last column.

TABLE OF POSITIONS OF NODES.

(*Measurements by the respective makers.*)

Lens-maker and lens.	Entrance node.	Exit node.	Nodal space.
	Distance from diaphragm.		
ALDIS:	Inches.	Inches.	Inches.
8 in. *f*/4.5 anastigmat ..	.26 in front	.22 in front	.04
8½ in. *f*/6 anastigmat ..	1.52 in front	1.07 in front	.45
9 in. *f*/7.7 anastigmat ..	.75 in front	.67 in front	.08
BECK:			
9½ in. *f*/6 Bystigmar ..	.18 in front	.09 behind	.27
8½ in. *f*/5.8 Isostigmar ..	.04 behind	.21 behind	.17
8¼ in. *f*/6 Neostigmar ..	.17 behind	.32 behind	.15
COOKE:			
8¼ in. *f*/4.5 Aviar	.2 in front	.3 behind	.5
8½ in. *f*/6.5 Ser. III. ..	.73 in front	73 in front	nil
9½ in. *f*/3.5 Portrait ..	.19 in front	.15 behind	.34
DALLMEYER:			
3 B Portrait	.726 in front	Coincident.	.726
9 in. *f*/6 Stigmatic ..	.3 in front	.5 in front	.2
11 in. *f*/6.5 Dallon	3.45 in front	5.55 in front	−2.10
ROSS:			
8½ in. *f*/4.5 Xpres	.20 in front	.08 in front	.12
8½ in. (No. 15) Combinable	.09 in front	.09 behind	.18
8½ in. *f*/6.8 Homocentric ..	.084 in front	.084 behind	.18
WATSON:			
8¾ in. *f*/4.5 Holostigmat ..	.019 in front	.019 behind	.038
8½ in. *f*/6.1 Holostigmat	.030 in front	.030 behind	.060
WRAY:			
9 in. *f*/6.8 Universal ..	.31 in front	.31 behind	.62
9½ in. *f*/6.3 Lustrar ..	.51 in front	.43 in front	.08
9 in. *f*/4.5 Lustrar ..	.31 in front	.24 in front	.07
10 in. Portrait	.24 in front	.31 in front	−.07

Lenses are occasionally met with in which the nodes are "crossed," that is, the entrance node is nearer to the image than is the exit node. The nodal space is then a minus distance. The Dallon (telephoto) lens and the Wray portrait lens in the table are examples.

We can now turn to see how the properties of the nodes provide the means of constructing the image, and shall see the fundamental relation between the quantities concerned in calculations relating to scale of reproduction.

The Geometry of Image Formation.

In fig. 3 let N_1 and N_2 be the nodes of a lens. P_1P_1 and P_2P_2 the corresponding nodal planes. Let F_1 and F_2 be the rear and front foci, so that $F_1N_1 = F_2N_2 = f$ (the focal length of the lens).

Let ab be an object having its lowest point on the lens axis bb_1. The position of the point a in the image may be found by drawing two rays, one AP_1, parallel to the axis and thence

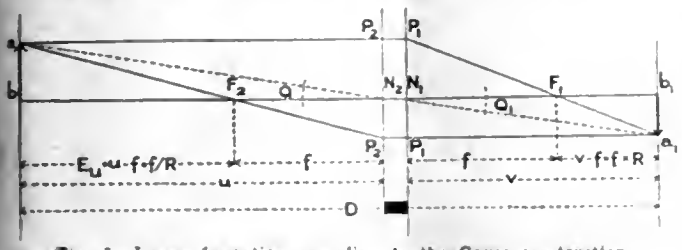

Fig. 3.—Image formation according to the Gauss construction. In the diagram f is the focal length of the lens; u, the distance of the object, or object conjugate distance; v, the distance of the image, or image conjugate distance. D is the image-to-object distance less the nodal space shown as ■.

through the rear focus F_1; the other, through the front focus F_2, to the plane of admission P_2, and thence parallel to the axis. The meeting point a_1 of these two rays is the image of a.

In like manner the position of any other point can be found. The image of b obviously lies on the axis in the same plane as a_1, viz., at b_1. Hence a_1b_1 is the image of ab.

A very little geometry will now serve to show the relation of object and image to their respective distances from the nodes N_2 and N_1. From a draw a ray to N_2 and from N_1 draw a ray to a_1. aN_2 is therefore parallel to N_1a_1, and the angles Q and Q_1 are therefore equal. The triangles abN_2 and $a_1b_1N_1$ are therefore similar, and hence

$$\frac{a_1b_1}{ab} = \frac{b_1N_1}{bN_2}$$

Calling the distance of the image v and the distance of the object u (as shown in the lower part of the diagram)

$$\frac{\text{image}}{\text{object}} = \frac{v}{u}$$

This linear ratio of image to object is usually denoted by R, *i.e.*,

$$R = \frac{v}{u} \quad . \quad . \quad . \quad . \quad . \quad . \quad (a)$$

Note that the distances u and v are interdependent. They are the so-called *conjugate focal distances*. For every value of u there is a corresponding value of v; that is to say, the scale of reproduction is not proportional to v by itself nor inversely proportional to u by itself, but is strictly equal to the ratio of these distances when an object at a given distance is in focus. We shall see, however, that in certain circumstances u may be so great compared with v (very distant objects), that v becomes practically equal to f (see fig. 3), in which case since f and u are not interdependent distances, the scale of reproduction is separately proportional to the focal lengths of different lenses used at the same distance or inversely proportional to the distances of the object when using a lens of given focal length. This relation, however, holds good, even approximately, only under certain conditions. See "Scale Calculations and Admissible Error in Size of Image" below.

For purposes of calculation it is convenient to express the value of R in terms u and f or v and f.

In fig. 3 the triangles abF_2 and $F_2N_2P_2$ are similar, whence

$$\frac{N_2P_2}{ab} = \frac{F_2N_2}{bF_2}$$

By the construction, $N_2P_2 = a_1b_1$ (the image), $F_2N_2 = f$ and $bF_2 = u-f$.

Therefore

$$\frac{\text{image}}{\text{object}} = R = \frac{f}{u-f} \quad . \quad . \quad . \quad (b)$$

Similarly from the triangles $a_1b_1F_1$ and $P_1N_1F_1$

$$\frac{\text{image}}{\text{object}} = R = \frac{v-f}{f} \quad . \quad . \quad . \quad (c)$$

Obviously these formulæ hold good rigidly on the assumption that there is no "depth of focus" when photographing objects at different distances.

These three formulæ (*a*), (*b*), and (*c*) are the fundamental relations determining reproduction to scale, and hold good in all circumstances (excluding depth) always on the assumption that the lens forms an image (free from aberration) in a flat field perpendicular to its axis. The exception relates to the formation of images of different sizes, of an object at different distances, without alteration of the camera extension owing to depth of focus. See below under "Scale, Focal Length and Depth of Focus."

The formulæ may be given other forms to fit particular conditions or for facilitating calculation.

G. E. B.

(To be continued.)

AERIAL PHOTOGRAPHY AND PHOTO-TOPOGRAPHY.

The Twenty-fourth Traill-Taylor Memorial Lecture. Delivered by M. L. P. Clerc at the Royal Photographic Society.

SINCE I received, last year, the invitation of the Traill-Taylor Memorial Committee to deliver the twenty-fourth Traill-Taylor Memorial Lecture, I have always been convinced that such an honour was a tribute to my native land and to the photographic work of my compatriots, more qualified than I am as representatives of French photographic science, but I am very pleased to have been so chosen.

The hazards of the war took me from the trenches, where I served as a non-commissioned officer, to be appointed as a draughtsman in the first Section of Aerial Photography, established in December, 1914, where I had to second a very young officer totally unacquainted with photography in general and more specially with photo-surveying, and to devise in the field, without any means of scientific experimentation, a photographic technique adapted to this very special branch of photography. Later, I was appointed as an instructor in photography, and I was able to spend my leisure time in some theoretical and experimental work. Being not sufficiently enthusiastic in some official orders, I was dismissed and sent in a squadron to have the command of the photographic section, where I had the opportunity to verify the good application of the rules I had taught during eighteen months. I left aerial photography in March, 1918, to serve as a military chemist attached to the control of the benzine found on captured German aeroplanes.

The subject of aerial photography and photo-topography has become so large and important that it is impossible to do justice to it in a single lecture; the most that I can hope to do this evening is to describe briefly some apparatus, and some principles used in this comparatively new branch of photography, avoiding all duplication with so valuable papers as those already published by Messrs. Chas. W. Gamble, C. M. Williamson, P. R. Burchall, M. N. McLeod, and others, of which a list will be appended to the text of this lecture.

Apparatus and Materials.

Lenses.—While the British and American opticians have succeeded in producing special lenses of fine quality, with a larger

relative aperture than French ones, insufficiently supplied in optical glass of requisite qualification, it seems that no sufficient attention has been paid to the variation of the focal length and of the location of nodal points when the temperature is lowered, as it is at a height of 15,000 to 20,000 feet, frequently attained in war-time, and a very convenient one for precise topographic work. A Berthiot's Olor lens of 21 inches focus, cooled from about 75 deg. to zero Fahrenheit, has its focal length increased by one-half per cent. Such a variation, which frequently is aggravated by a contraction of the body of the camera, is detrimental to the sharpness of the image and introduces an appreciable error in the use of aerial photographs in surveying. A French patent granted to the "Société d'Optique et de Mécanique de Précision" provides against this variation by a compensation between the thermic effects on the glasses by the thermic effects on the mount, made of concentric tubes of brass and of "invar" metal. Minor variations of the focal length are a consequence of varying the aperture of a lens containing some residues of spherical aberration, but an easy remedy is the use of a fixed diaphragm. It would be very desirable that some marks be engraved, as in Cooke lenses, on all parts of the mount, to show the correct screwing and avoid variations of the focal length and of the quality of the image by insufficient or by excessive screwing. I will add that some lenses have been disabled by an interversion of their respective parts due to the fact that the number of the lens was engraved on one part only of the mount.

Light-Filters.—The optical equipment of an aerial camera is not complete without a set of light-filters, the importance of which was fully realised in the German army since the beginning of the war; a number of German cameras were fitted, inside or outside, with movable filters easily controlled by the operator, who had only to turn a lever for placing, changing, or removing them.

The extreme importance of light-filters in aerial photography is a consequence of atmospheric haze that the late Sir W. Abney has shown to scatter blue rays and transmit in preference yellow light. For aerial photography all the ground appears as the distance in an ordinary open landscape, and a satisfactory photograph cannot be obtained without the precautions customarily taken in tele-photography, viz., use of chromatic plates and of very absorbent light-filters. I spent more than three years without fully convincing the staff of the French Air Force of the absolute necessity of the technique. We were never supplied with panchromatic plates, but about in equal quantities with ordinary and with green-sensitive ones, the chromatic sensitiveness of which was not sufficient to permit the regular use of light filters of a greater absorption than a K.1 filter. For using ordinary plates it would have been necessary to possess æsculine filters; I made urgent requests during three years before receiving such a filter, and I received it only after it was known that they were in use on some German apparatus. Fortunately, the British Photographic Air Service, and afterwards the American one, adopted the only logical

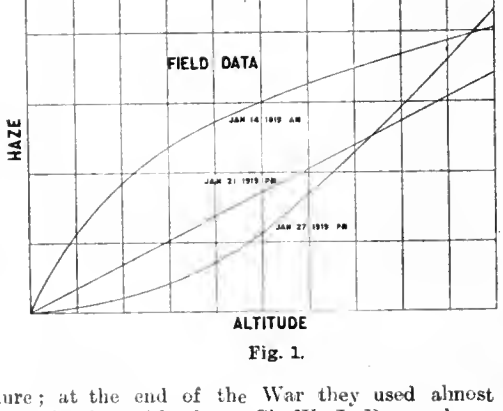

Fig. 1.

procedure; at the end of the War they used almost exclusively panchromatic plates (thanks to Sir W. J. Pope, whose work is too well known to need recalling), and intense light-filters, very short exposures being permissible due to the wide aperture lenses and to the high chromatic sensitiveness of the plates.

I owe to the courtesy of Dr. C. E. K. Mees the loan of some slides showing the researches on quantitative and qualitative effects of atmospheric haze undertaken by the workers of the Eastman Research Laboratory in co-operation with the U.S. Bureau of Aircraft Production. "In the determination of haze, test objects were utilised consisting of three squares of canvas 50 ft. square, one as white as it could be painted, another grey and the other black. The camera used permitted four photographs to be taken simultaneously through different coloured filters; it was one having three lenses, the fourth one being replaced by blocks of flat glass corresponding in absorption to the other lenses. Through the fourth comparison area a scale of densities was impressed on the plate, under a sensitometric tablet. The instrument was employed by flying over the field in ascending spirals and photographing, at intervals of 500 or 1,000 ft., the test objects on the field, sets of pictures through the different filters thus being obtained from which measurement of the apparent brightness of the areas could be determined and the amount of haze present at different altitudes could be deduced. The haze was expressed mathematically as the relation of the exposure effect produced by the black area at any altitude compared with that produced by the black area near the

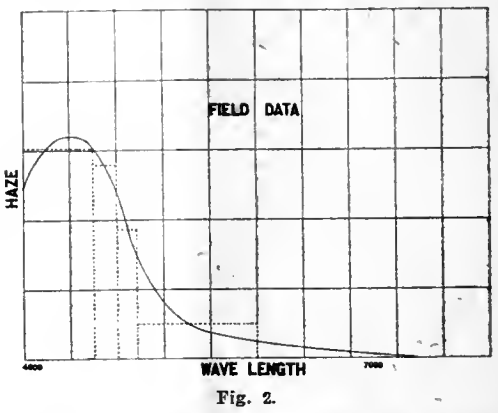

Fig. 2.

ground when the haze was negligible, this being expressed as a proportion of the total intensity deduced from the brightness of the white area measured at the same time. The results obtained showed that the distribution of haze in the air usually follows one of three types (represented by fig. 1). The haze was found to be much less as the wave-length of the light increased; fig. 2 shows the haze wave-length curve as finally calculated. A mathematical calculation was made of the amount of haze due to the molecules of air *alone*, which was found to be about one-fifth of that found in practice.

"The quantitative results thus obtained as to the distribution and colour of haze were used to duplicate in the laboratory the atmospheric conditions; in front of a camera lens was an attachment by means of which a veiling haze could be superimposed upon the image of the test object; this veiling haze was produced by a lamp which was screened by colour filters to the colour which was found experimentally to represent the average colour of haze in the air. The light from this lamp was diffused by an opal glass and reflected from a semi-platinised reflector, transmitting also the image of the test objects, consisting of squares similar to those used in the field. Between the lamp and the reflector was interposed a large neutral wedge, by means of which the intensity of the haze could be modified. From the plates exposed in this haze cabinet a reading of contrast was obtained, and curves were then plotted of this contrast factor against the amount of veiling; the exposure (fig. 3) and development (fig. 4) were found to influence the contrast obtained very greatly, and only through a narrow range of exposures could the best results be reached." It was found that an orange filter, such as the Wratten E filter, enables a panchromatic plate to photograph through a strong haze between the clouds, but not through the clouds themselves (these specimens have been reproduced in Ives' "Airplane Photography," without any reference to their source, as many other documents used in this book).

It would be necessary, in the calculation of lenses to be used in photo-surveying of a high precision, to consider the light-filter as an integral part of the lens, in order to avoid the various aberrations resulting from the use of the most perfect light-filter. For commercial and for reconnaissance work, such a precaution is neither necessary nor advisable, as photographs must sometimes be taken by poor light, and it is convenient to be able to change the light-filters and in some cases to use, in place of a contrast filter, a special filter for the detection of camouflage. Wide aper-

ture lenses are obviously of great advantage, enabling the use of intensely coloured filters.

Shutters.—With only one exception (namely the Lamperti automatic camera, used by the Italian Army, and also on some scouting planes of the French Army), all cameras used by all armies engaged in the War were equipped with focal-plane shutters without always using these to their last advantage, too great a distance being frequently allowed between the plane of the blind and the sensitive plate.

If substantially built, the focal-plane shutter is very convenient for reconnaissance or pictorial aerial photography, and also for

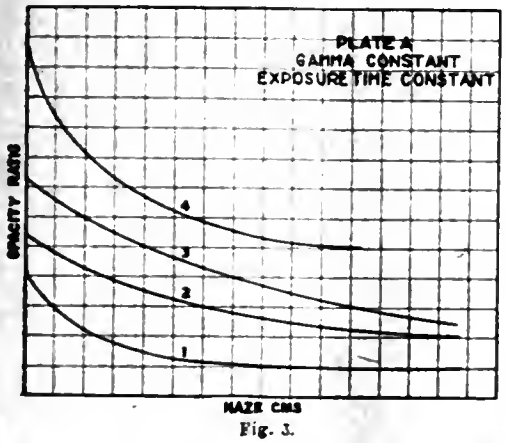

Fig. 3.

mapping on a very reduced scale; but the focal-plane shutter must be rejected for precise cartographic work. Without reproducing here the calculations that can be found in my book, "Applications de la Photographie Aérienne," let me state that the displacements of a high-speed aeroplane, and at times its oscillations by rolling or pitching, during the time used by the slit of the shutter to run over the width of the image (not much less than the tenth of a second for the whole plate size), is the cause of deformations of the image (elongation, compression, or torsion), the error of location of a point on the ground being in some cases more than 15 ft., when photographed vertically.

A palliative has been used by O. E. Messter in some of the last models of the roll film camera (*Reihenbilder Kamera*), with which Germans obtained photographic mosaics of some quarters of London and of Paris; the blind is moved alternately, for consecutive photographs, forward and backward; alternate elongations and compressions can sufficiently compensate themselves for approximate work.

One defect frequently encountered with some makes of focal-plane shutters is the slow initial movement of the blind, the speed of which grows progressively; the image shows then a strip of 1 inch or so in width, considerably over-exposed, requiring local reduction of the negative, unless some vignetting device be fitted in the camera to project a penumbra on this part of the plate. The building of a central shutter with high efficiency and sufficient speed to be used on rapid aeroplanes at a height of about 6,000 feet, sometimes required for photo-topography on big scales, such as cadastral work, is a very difficult problem. To give an exposure of three to four-thousandths of a second, at an efficiency of about 60 per cent., with a lens the aperture of which has a diameter of 3 inches, it is necessary to give to the leaves of the shutter a speed of about 140 feet per second; practically, such a speed cannot be given to a mechanical piece starting from stillness.

Two equivalent solutions have been recently given to this problem by French inventors: MM. Poivilliers and Dumont have devised a shutter of the five-sectors type, and M. Guilleniet a shutter of the double circular guillotine type. In each of these shutters the sectors, or the perforated discs, are constantly moved at uniform speed, and supplementary sectors or discs permit of selecting only one of the periodic openings at the will of the operator, or at regular intervals controlled by some automatic mechanism; in the first named of these shutters the motor is an air-turbine, concentrically mounted, which acts as a gyroscopic stabiliser. Of course, such shutters are large and heavy mechanisms, but there is no serious objection to this unavoidable state of things.

Size and Shape of the Image.—Opinions are very divided on the question of the most advantageous shape, and some people have been astonished at the general choice of an oblong shape instead of a square one; their principal argument is that a square is the quadrilateral of the greatest area which can be inscribed in the circle bounding the field of the lens. Let me note that on either side of a maximum the variation is low, and that the loss of field due to the use of usual shapes is almost negligible; almost all the armies had adopted, at the end of the war, the French size, 18 by 24 centimetres (about 7 by 9½ inches), on which the useful field is 17 by 23 centimetres; the square incribed in the same circle has a side of 20¼ centimetres (20.22); the loss of area when adopting the square instead of the oblong is of about 4 per cent. (391 square centimetres instead of 409 square centimetres). But two reasons operate in favour of the oblong shape.

While the consecutive photographs can be taken at all frequencies required for a sufficient overlap, it is not always easy to ensure the overlap of the parallel flights necessary to cover a wide field; the elongation of the shape of the image, transversely to the line of flight, is therefore of great advantage; this advantage was fully realised in the *Reihenbilder Kamera* of the German army, the images of which measured 2 inches parallel to the flight and 10 inches transversely.

Experience shows that on aerial photographs taken in fine weather from an aeroplane conducted by an able pilot, the vertical plane, which is perpendicular to the plane of the plate, makes usually a very acute angle with the plane of symmetry of the aeroplane. The calculations I have made ("Brit. J. Phot.," vol. 66, May 30, 1919, pp. 297-299) on the limit of admissible angling in vertical photography have shown that the area of the oblique photograph susceptible of being united with the vertical photograph taken from the same view-point is limited by a curve the form of which recalls that of a *Nicomedes conchoid*, of which the directrix is parallel to the horizon-line of the photograph; a plate of elongated shape tranversely to the flight is therefore more suited for photographing the best portion of the field covered by the lens.

Plates or Roll Films.—The question at present so much discussed in British photographic circles is not stated in the same terms with respect to aerial photography: the choice is limited to plates or to roll film, as the cut film would involve all the inconveniences of both plates and films.

The advantages of the plate are chiefly its rigidity, the fact that the image, solidly bound to the rigid support, is practically undeformable, the possibility of developing without any intricate appliance, and the possibility of quick drying for emergency work. We must, however, point out that F. E. Ross ("Astrophysical J.," vol. 52, September, 1920, pp. 98-109) has discovered some deforma-

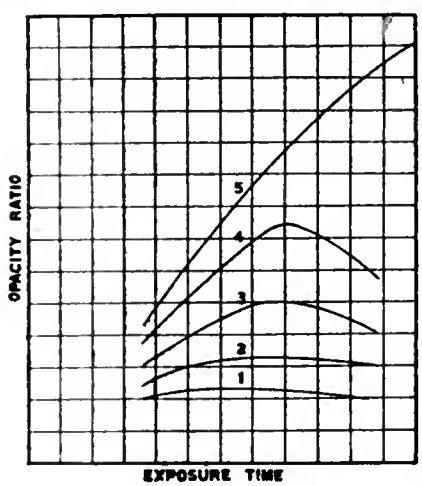

Fig. 4.

tions on the image by contraction of the gelatine due to the use of tanning developers or to uneven drying.

The advantages of the roll film are its lightness and the simplicity of the feeding, but it is known that a film does not keep its dimensions, but suffers a shrinkage during the photographic manipulations, this shrinking being not always uniform, and varying with the age of the film and with atmospheric conditions.

To permit subsequent use in mapping on a mean scale of photographs made on roll films for mosaic work or for preliminary maps at a very low scale, it would be necessary to register in the camera,

on the four sides of each image, either some metric division or squaring, or some marks, the distance of which is an aliquot fraction of the focal length, or, more precisely, of the principal distance, actual distance of the exit nodal point from the plane of the sensitive film.

Some device must be provided to ensure the flatness of the film in the focal plane: three typical devices have been used to do so. In the Libmann camera the film is applied to a patent-plate glass by the pressure of a felted board, pressure being released when winding the exposed part of the film; the same device has also been described in one of H. Workman's patents. In the German film camera the support glass was sometimes used as a yellow filter. In the Eastman K.1 automatic film camera, and also in a R. Aubry's apparatus, and in a film-changing box patented by Zeiss, the film is drawn against a flat plate by means of suction applied through numerous small holes in the plate; this suction is furnished by a Venturi tube mounted on the outside of the fuselage of the plane. In Boucher-Duchatellier's Aerophote the film is stretched by slipping between the velvet edged blind of the focal-plane shutter and a bridge located behind the slit; the edges of the slit touching the film during the travel of the blind, the efficiency of the shutter attains 100 per cent.

As is well known in cinematography, the friction of the celluloid back of the film against all surfaces with which it comes in contact produces static discharges, registered in the image as arborescences; the United States Air Service has been able to avoid these discharges by holding in contact with the celluloid, during its travel from one reel to the other, a cloth impregnated with graphite and connected with the metallic parts of the camera.

Body of the Camera.—The extended use of metals or metallic alloys for building the body of aerial cameras may be criticised in the case of apparatus equipped with long-focus lenses and designed to be used above 10,000 feet or for precise surveying; the contraction of ordinary metals, when cooled by about 75 deg. F. (a not infrequent cooling in flights at 15,000 feet) is about 1 per 1,000 of their length—that is to say, a shortening of half a millimetre for the distance of the lens to the plate in an apparatus using a lens of 50 centimetres focus; such a shortening introduces an error in the measurement of the principal distance, an essential datum for photo-topography, and spoils the sharpness of the image, giving for the image of a point a circle of diffusion the diameter of which is one-tenth of a millimetre if the aperture of the lens is one-fifth of the focal length.

The metal construction could preferably be done by using a practically non-expansible metal, such as the "invar" alloy (a special nickel-steel), the variations of which are about 4 per cent. of those of aluminium or duralumin, or by some device comparable to the compensating pendulum of some clocks. To reduce to a minimum the possibility of alterations under varying conditions of temperature and moisture, the best plan seems to be that adopted by the Royal Naval Air Service, at Mr. Chas. W. Gamble's instigation (I believe): A framework is made of four longitudinal members, constructed of well-seasoned mahogany, slit into three and reversed, glued together, the whole bar being then treated with paraffin wax; this framework is securely fixed to stout aluminium castings, one for the lens board, the other for the shutter case; the sides of the framework are then plated with duralumin sheets, not fixed, but free to move in grooves running the length of the members.

Some German cameras captured in the last year of the war were equipped with electrical heating coils, connected with the general heating and lighting current supplied by an electric generator driven by an air propeller; such a heater, or the heating envelope patented by the French Government, avoids the troublesome effects of cooling on the sensitiveness of the photographic emulsion, on the operating of springs and of rubber-covered blinds, on the viscosity of lubricating oils; it avoids also the condensation of moisture on the photographic plates when the aeroplane descends, but not the condensation on the external surface of the lens.

L. P. Clerc.

(To be continued.)

A Link with the Past.—Former photographer to the English and French Royal Families, Charles Taylor has died at Sidcup at the age of 79. He had a studio at Chislehurst during the Empress Eugenie's residence there, and his patrons included Queen Victoria. Mr. Taylor, we are told, took the last portraits of Napoleon III. and the Prince Imperial at Camden House, Chislehurst.

THE BUSINESS OF A SHOP.

An Important Judgment on Assistants' Half-Holidays.

In the King's Bench Division on Thursday last, November 3, the Lord Chief Justice, Mr. Justice Sankey, and Mr. Justice Acton gave judgment in favour of the London County Council in a case which raised the question whether employees in multiple shops could be transferred to a shop belonging to the same proprietors other than that at which they normally worked on the day fixed for their weekly half-holiday under the Shops Act, 1912.

As reported in the "Times," a confectioner named Wettman was the occupier of two confectioners' shops, one at 263, Old Street, London, E.C., and the other at 30, Goodge Street, W.C. On December 8, 1920, between 5.30 and 6 p.m., an inspector employed by the appellants found that a female shop assistant who usually worked at 30, Goodge Street was employed dressing the window at 263, Old Street. December 8 was a Wednesday, and Wednesday was the day of the week fixed by the respondent pursuant to the Shops Act, 1912, for the weekly half-holiday of his employees.

The respondent was brought before the Old Street Police Court for failing to comply with Section 1, Sub-Section 1, of the Shops Act (which provides that on at least one week day in each week "a shop assistant shall not be employed about the business of a shop" after 1.30 p.m.), but the magistrate dismissed the information.

The following facts were proved or admitted at the hearing of the information: (*a*) The respondent was the occupier of two confectioner's shops in London, one at 263, Old Street, E.C., and the other at 30, Goodge Street, W.C.; (*b*) the shop assistant, Miss Wilson, to whom the proceedings referred, was employed by the respondent in his shop at 30, Goodge Street; (*c*) Wednesday was the day of the week fixed by the respondent for the weekly half-holiday of Miss Wilson, pursuant to the Shops Act, 1912; (*d*) on Wednesday, December 8, 1920, an inspector visited 30, Goodge Street, and seeing the respondent there asked where Miss Wilson was. He replied that she was having a holiday. The inspector then went to 263, Old Street, the respondent's other shop, where he found Miss Wilson employed about the business of that shop, dressing the window, between the hours of 5.30 and 6 p.m.

The Lord Chief Justice read the judgment of the Court, in which he said: We assume from the findings in this case that the assistant was employed at Old Street with the knowledge and consent of her employer. It is, therefore, unnecessary to consider the case of Ward v. Smith (29 *The Times* L.R., 536; [1913] 3 K.B., 154). On the point of law raised by this case the magistrate held that he was bound by the words of Mr. Justice Channell in George v. James (30 *The Times* L.R., 230; [1914] 1 K.B., 278)—namely, "The words 'a shop assistant shall not be employed about the business of a shop' mean 'about the business of the particular shop in which he is an assistant.'" He then appears to have assumed that, on the facts found by him in this case, a shop assistant employed in dressing the window of the shop at 263, Old Street was not employed about the business of the shop at 30, Goodge Street. It is here that we do not quite follow him. In our opinion it is open to the Court to accept the words of Mr. Justice Channell as they stand in relation to the facts of the present case (very different, by the way, from those in George v. James) and yet to decide, with all respect to the magistrate, that the conclusion that he arrived at was wrong.

The words "employed about the business of a shop" clearly are, and are intended to be, capable of very wide application. They may readily be contrasted, for example, with such words as "employed in a shop" or "in or about a shop," which are the words found in Section 2 (1) of the Act. With regard to the words "the business of a shop," strictly speaking, a shop cannot be said to be a business. "The business of a shop" or "a shop's business" is, indeed, to the logical mind a figurative expression. It may, we think, be fairly paraphrased for the purposes of this case as the business carried on in the shop by the shopkeeper. Here the business carried on by the respondent at the shop in Goodge Street was that of the retail sale of confectionery. But he did not carry on that business at Goodge Street exclusively. He also carried on that business at 263, Old Street. He carried on that business partly in one shop and partly in the other. On these facts it seems to us to be no straining of language to say that a person employed by the respondent in window dressing at 263, Old Street was employed "about the business" carried on at 30, Goodge Street or, in other

words, about the business "of" the shop at 30, Goodge Street, although, of course, not "in" nor "in or about" that shop. On the contrary, to say so appears to us to be in accordance alike with strict reasoning and common sense. In the sense which we have sought to make clear, the business "of" the shop at 263, Old Street was also the business "of" the shop at 30, Goodge Street, and for the purposes of this decision there is no valid distinction to be made between them. And certainly to hold otherwise would, in the words of Mr. Justice Channell in George v. James "be opening a wide door to evasion of the Act." We think that the magistrate was wrong in dismissing the information, and that this appeal must be allowed.

DEATH OF MR JOHN SPILLER.

THE news was announced at the Royal Photographic Society last Tuesday, November 8, of the death in the early hours of the morning of that day, of Mr. John Spiller, one of the oldest members of the Society, and its president for the years 1874-1875. Mr. Spiller was 88 years of age.

He was a scientific member of the firm of dye-makers of Brookes, Simpson & Spiller, was among the leading early experimenters in photography, and worked in collaboration with the late Sir William Crookes. Their joint labours are particularly remembered in the

Photograph by Alfred Ellis & Walery.

JOHN SPILLER F.I.C., F.C.S.

Crookes-Spiller process of preserving the sensitiveness of the semi-dried wet-collodion plate which, so to speak, bridged the gap between the wet plate of Scott Archer and the collodion dry-plate of Hill Norris. As was pointed out recently in these pages by Mr. E. J. Wall, Mr. Spiller appears to have been the first to suggest and to prepare a silver printing paper containing the gold required for its toning—a forerunner of the modern self-toning paper. A chemical paper of his which afterwards had a photographic application of importance, was one on the solvent powers of the alkaline citrates on many inorganic substances. The use of citrate in the copper toning solution of Mr. W. B. Ferguson is an instance of the later employment of these properties.

Up to four or five years ago Mr. Spiller retained an extraordinarily large measure of vitality and preserved the spring and physical energy of one thirty or forty years his junior. His striking resemblance to the late Lord Roberts was frequently the cause of his being taken for the eminent soldier by men of various military ranks. His cordial disposition made him welcome in the circles of membership of chemical and other scientific societies which he frequented until a few years ago, and his death removes one of the veterans of photography who have witnessed its development from almost its origin.

FORTHCOMING EXHIBITIONS.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22

November 23 to 26.—Rotherham Photographic Society. Particulars and entry forms from the Hon. Exhibition Secretary, Sydney G. Liversidge, "Orissa," Gerard Road, Rotherham

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Latest date for entries, January 30. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick Glasgow.

February 11 to 25.—Scottish Photographic Salon. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club "St. Denys," Bellevue Road, Exmouth.

Patent News.

Process patents applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, October 24 to 29 :—

CAMERAS.—No. 28,455. Photographic cameras. J. W. Beaufort and J. H. Hewitt.

ENLARGING.—No. 28,705. Apparatus for producing photographic enlargements with multiple impressions. C. Costantini.

DEVELOPING APPARATUS.—No. 28,273. Apparatus for developing, etc., photographic films. W. J. Crowe.

LANTERN-SLIDES.—No. 28,294. Production of slides for optical projection apparatus. Howells Cine Equipment Co. and D. P. Howells, Ltd.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

BROMIDE PRINTING BOXES.—No. 169,359 (October 23, 1920). The box *a* is of wood and fashioned to contain electric batteries marked *b*, lamps *c c'* and switch *d*.

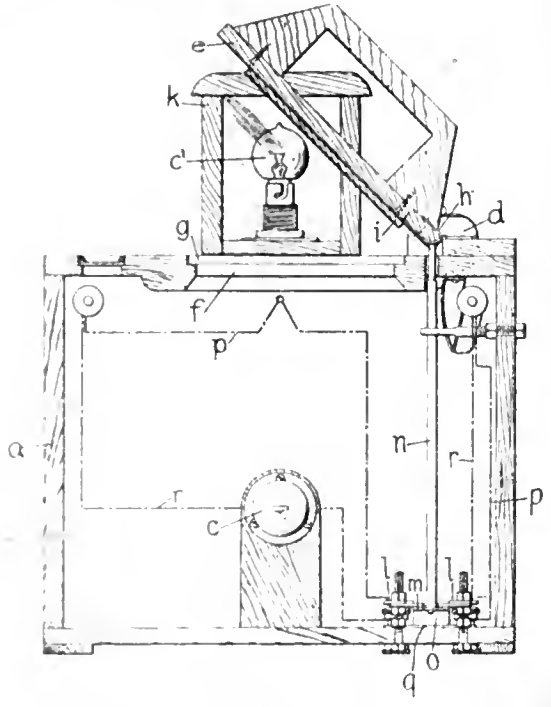

Fig. 1.

On the inner side of the lid *e* of the box means are provided for receiving the plate and the card to be printed.

The top of the box *a* is formed with a suitably sized opening *f* in the centre thereof, recessed or countersunk around its upper edge to form a ledge *g* (see fig. 1); the lid *e* hinged at *h*, being formed with a corresponding raised portion *i* on its under sur-

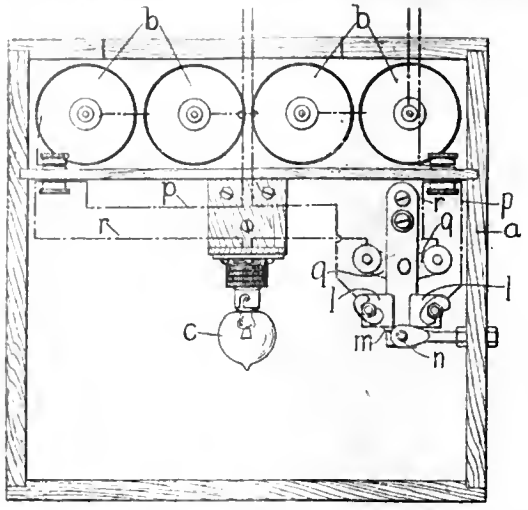

Fig. 2.

face to fit in the opening—a cavity and frame thus being formed to contain the plate, and the card to be printed is inserted in the same.

A red lamp c^1 is housed in a casing *k* mounted upon the box *a*, and by opening the lid *e*, the lamp is lighted when the current is on, the current being controlled by the switch *d*.

l, *l* are terminals mounted within the box *a*, and *m* is a contact carried upon the vertically arranged rod *n*, which serves to close the circuit by the action of a spring *o*.

The upper end of the vertical rod *n* makes contact with the rounded rear edge of the lid *e* in such manner that as the lid closes the rod is depressed, and overcoming the action of the spring *o*, breaks the circuit *p* of the red lamp and bridges the

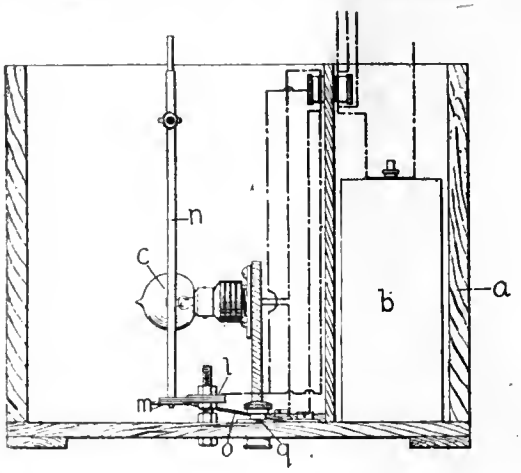

Fig. 3.

contacts *q* and closes the circuit *r* of the lamp *c*, but as the lid is opened the upper end of the rod is released from pressure and the spring *o* operates to raise the rod bridging the contacts *l*, and close the circuit *p* of the red lamp c^1.

After placing the card in position, the lid *e* is closed, which operation breaks the red lamp contact and closes the circuit of the white lamp, the latter lighting up when the lid is closed tightly.

The card is exposed for 3 to 5 seconds with three or four dry cells.—Herbert Booker, Woodside Road, Chiddingfold, Surrey.

The following complete specifications are open to public inspection before acceptance:—

PHOTOGRAPHY.—No. 170,595. Photography. M. de Sperati.

CINEMATOGRAPHY.—No. 170,560. Method of and apparatus for producing tone films. W. Greaff and P. Dresla.

CINEMATOGRAPH-PHONOGRAPH.—No. 170,561. Apparatus for taking animated pictures and recording tone oscillations. W. Graaff and P. Dresla.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

TYRCO.—No. 416,784. Cinema screens of linen, not in the piece. Eben Williamson Morrison, 940, Sauchiehall Street, Glasgow, merchant. July 8, 1921.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

TREFOIL DESIGN ("AS DE TREFLE").—No. 416,088. Photographic paper. Grieshaber Frères & Cie., also trading as Société des Produits Photographiques "As de Tréfle," 27, Rue du Quatre-Septembre, Paris, France, manufacturers.

NOVABROM.—No. 416,635. Photographic printing paper and postcards. Photo-Produits Gevaert (Société Anonyme), 23, Sapta Straat, Vieux-Dieux, Belgium, manufacturers of photographic materials.

New Materials.

Mounts, Calendars, Passe-Partouts, and Albums. Made by Houghtons, Ltd., 88-89, High Holborn, London, W.C.1.

QUITE a variety of new introductions in the shape of mounts, etc., for the forthcoming season reach us from Messrs. Houghtons. Among them are a series of very attractive Christmas mounts of the folder slip-in pattern, with appropriate designs and mottoes in colour on the fronts. These mounts are sold in sets of six, for prints from V.P.K. to postcard, at prices from 1s. 3d. to 1s. 6d. per set.

The calendar mounts are in two styles, one the ordinary mount, with slip-in space for a print from V.P.K. to postcard, sold at prices from 4d. to 7d. each, for oblong prints only. The base of the mount is a stout board surfaced with a paper of grey velour

Fig. 1.

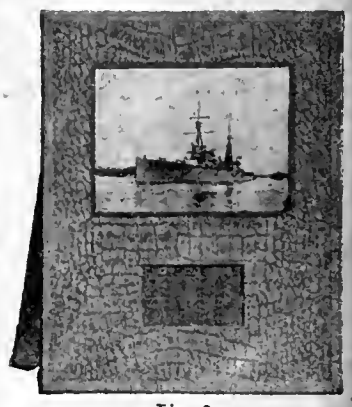

Fig. 2.

texture, providing a very pleasing imitation of crocodile leather. The tear-off calendar appears below the print. The illustration (fig. 1) by no means represents the very artistic appearance of the mounts.

In calendar passe-partouts Messrs. Houghtons have some exceedingly pleasing designs. Fig. 2 shows a ready-made passe-partout, made in the oblong and upright patterns. The print has simply to be slipped into position at the top of the mount. Again, the surface is the grey velour already mentioned, which is mounted outside the glass, the latter protecting the print slipped behind it. These complete passe-partouts, in sizes from V.P.K. to postcard, are priced from 1s. 3d. to 2s. each.

Another novelty in passe-partout mounts is shown in figs. 3 and 4. It is a self-contained passe-partout fitted with a strut back of special cut, which allows of the mount being supported either in the

upright or oblong position. In the grey velour finish these passe partout frames are supplied in sizes from V.P.K. to postcard, at prices from 9d. to 1s. 3d. each.

Fig. 3.

Fig. 4.

Lastly, in albums Messrs. Houghtons offer a number of new styles, among which we particularly like the "Carlton" (fig 5), a slip-in album, with padded rounded covers of most artistic appearance. The

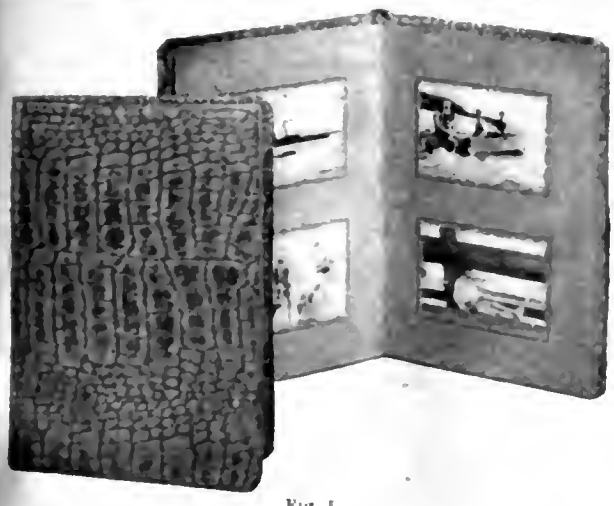

Fig. 5.

leaves are appropriate in colour to the covers, and give a double-line border to each slip in opening. Each album accommodates 24 prints, two on a page. In sizes from V.P.K. to postcard, the prices are from 3s. 3d. to 4s. 9d.

Ensign Passe-Partout Outfits.—The artistic mounting of photographs in the passe-partout style is being further popularised by the issue by Messrs. Houghtons of a series of complete outfits, including mounts, back boards, glasses, binding strip, adhesive and hangers. The outfit is put up in three sizes: No. 1, for prints up

to 5½ x 3½ inches, price 7s. 6d.; No. 2, for those up to 6½ x 4½ inches, price 9s. 6d.; and a third for prints up to 8½ x 6½ inches, price 13s. 6d. The illustration shows the attractive form in which the requisites are boxed. Outfits of this kind, providing indoor occupation, should contribute to maintain the interest of amateurs in photography during the winter months.

Venus Retouching Pencils.—Messrs. Alpco Pencils, Ltd., 173-175, Lower Clapton Road, London, E.5, send us specimens of the most recent addition to their series of retouching pencils. In addition to the series of Venus pencils in 14 degrees of hardness, from 3H to 9H, which they have hitherto supplied with great satisfaction to users, they have just issued a new pencil, No. 3818, of round instead of hexagon section. Many retouchers appear to prefer a round to a hexagon pencil, and in deference to the expressed wishes of their customers the Alpco Company have now put on the market this new pattern, which at present is made only in the soft degree. We should mention also that the price of Venus pencils has been reduced to 6d. each, 5s. 3d. per dozen, or 54s. per gross net, and that the makers have recently introduced some neat pocket wallets, price 6s., containing Venus hexagon pencils for the convenience of those users who must continually carry pencils of three or four degrees of hardness with them. The price list of the firm gives the most complete description of the many grades of lead pencils for ordinary as well as for retouching use, and also of retouching leads and refills now supplied at 2s. each and 2s. per box of six, respectively. Dealers in photographic requisites should also be interested in noting the extremely attractive style in which the Venus goods are packeted.

New Apparatus.

Ensign Amateur Dry-Mounting Outfit.—Messrs. Houghtons have just put on the market a set of outfits for the dry-mounting of prints by a modified method which is easily within the purse of the amateur worker of moderate means, inasmuch as the mounting press is dispensed with and the prints attached by means of a strip of adhesive tissue round the edges in conjunction with the use of a small hand piece for heating the tissue when in position. Each outfit contains a selection of both mounting boards and border tints, the process thus allowing of an appropriate narrow border being given to each print. The outfits are issued in three sizes for prints up to half-plate, whole-plate and 10 x 8 at the respective prices of 3s., 4s. and 5s.

Exeter Camera Club.—This club is organising an exhibition to be held from February 4 to 17, 1922, at Exeter, and to include three open classes: A, for prints of any description in any medium; B, lantern-slides in colour by any process; and C, monochrome lantern-slides. A gold medal will also be awarded for the best picture in the exhibition. Dr. C. Benuchamp Hall, St. Denys, Bellevue Road, Exmouth, is the hon. secretary, and the exhibition will be judged by Mr. Bertram C. Wickison.

Cinema Films in Schools.—There is no indication that it would be possible to make any reduction in teaching staff as the result of using the cinematograph in schools, says a report by sub-committee of the London Education Committee, who have been considering the subject. "Financially, therefore," proceeds the report, "the present is not a suitable time to embark upon any programme of cinematograph developments in schools, but rather to examine cautiously its possibilities for a more appropriate period. Meanwhile, an effort should be made to secure the elimination of undesirable features in cinematography."

Lunar Photographs.—A report of the moon section of the British Astronomical Association deals with the many additions that have been made to the map of the moon by recent photographs taken with the great 100-inch reflector at Mount Wilson, California, and suggests that a complete photographic atlas of the moon made by the same instrument would be a magnificent achievement. For example, one of the Mount Wilson photographs depicts the whole of the Mare Imbrium. A rough count of the craters and craterlets shown in this region gives a total of more than 700, of which about 300 are not found on any existing maps. It would, we are told, take an observer, using a powerful telescope, several years to detect and map all of these minute details, which have been recorded by the camera in less than two seconds!

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, NOVEMBER 14.

Bradford P.S. Members' Print Night.
City of London and Cripplegate P.S. "Some Points on Picture Making." B. C. Wickison.
Dewsbury P.S. "Developing Negatives." Albert Lyles.
Kidderminster and Dist. P.S. "Amateur Photographer" Prize Slides.
Leeds Camera Club. "Transferotype." W. H. Hammond.
Southampton C.C. "Anastigmat Lenses." Aldis Bros.
South London P.S. "Pictorial Ideals." M. O. Dell.
Wallasey Amateur Phot. Soc. "Bits in the Hundred of Wirral." W. Tansley.
Walthamstow & Dist. P.S. "Development." E. Willcocks.

TUESDAY, NOVEMBER 15.

R.P.S. "Some Sea Birds." Frank R. D. Onslow.
Birmingham P.S. "The History of Photography." E. C. Middleton.
Cambridge and Dist. Phot. Club. Annual Dinner.
Exeter C.C. "'Tri-Colour' Photography, Principle and Practice, Demonstrated with Diagrams, Cameras, and Prints," etc. Frederic G. Tutton.
Hackney Phot. Soc. Short Papers by Members.
Leeds Phot. Soc. "The Magic Carpet." H. Crowther.
Morley Phot. Soc. "With Cycle and Camera in North-East Yorks." H. Guy.
South Glasgow C.C. Lantern Slide Monthly Competition.
Tyneside Phot. Soc. Print Criticism

WEDNESDAY, NOVEMBER 16.

Accrington C.C. "Seltona." J. R. Killeya.
Borough Polytechnic P.S. "Printing Processes."
Croydon C.C. "Ramble with the Paget Col. Plate." F. R. Newens.
Dennistoun Amateur Phot. Assoc. "Bromoil." John Thomson.
Halifax Scientific Society. The "Amat. Phot." 1921 Prize Slides.
Ilford P.S. Lecture by Mr. Bertram Cox.
Partick C.C. First Lantern Slide Competition.
Rochdale Amateur P.S. "Thro' the Grecian Archipelago and the Near East." Messrs. Butchers.
South Suburban P.S. "London from Many Points of View." H. Creighton Beckett.

THURSDAY, NOVEMBER 17.

Camera Club, The. "Elements of Bromoil." R. Crowther.
Hammersmith Hampshire House P.S. "The Isle of Skye." Arthur Gardner, M.A.
North Middlesex P.S. "Vitegas and Novex." C. J. Gooch.
Tunbridge Wells Amateur P.A. "The Gates of the Orient." Rev. H. O. Fenton, B.A.
Wimbledon and District C.C. "That which makes a thing what it is." E. C. Perry.

FRIDAY, NOVEMBER 18.

R.P.S. Pictorial Group Meeting. "Photography in Relation to the Graphic Arts." J. Dudley Johnston.
Edinburgh Photographic Society. Social Evening.
Wombwell and Dist. P.S. Exhibition Prints.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 8, Mr. F. F. Renwick, F.I.C., in the chair.

Papers arranged by the Scientific and Technical Group were read.

Mr S. O. Rawling, B.Sc., of the British Photographic Research Association, read a paper on sepia toning with colloidal sulphur. Experiments had been made for the purpose of examining the ability of sulphur in the colloid state to tone a silver image to a sepia colour. Sulphur was dissolved in absolute alcohol, and the solution mixed with a large quantity of water. The diluted solution was found to tone, but very slowly, requiring three hours at a temperature of about 125 deg. F. It appeared that the action did not take place in the manner ascribed to colloid sulphur by Lumière and Seyewetz, viz., by intermediate formation of hydrogen sulphide. Mr. Rawling had found that a saturated solution of the latter in air-freed water did exert a certain toning action in the heat, but very slightly. The action was retarded by reducing agents such as formaline and sulphites, and was accelerated by oxidising agents. Altogether the experiments showed that colloid sulphur was perfectly effective in toning.

The next paper, by Mr. W. T. Wilkinson on "Scott Archer's and Hardwick's Wet-Collodion Formulæ Revised," described an improved form of the process based on the use of a mixture of bromide and chloride of silver instead of iodide. An advisable proportion of bromide to chloride in the collodion was 4 : 1. The sensitising bath could then be a 60-gr. solution of silver nitrate rendered slightly acid with nitric acid. Owing to the insolubility of silver bromide or chloride in the silver solution, the difficulties of keeping the bath saturated (as when silver iodide was the sensitive salt) were not experienced. Also the sensitiveness of the plate was about twice that of one prepared with iodide.

Mr. Wilkinson explained that the exposed plate could be washed and developed with any alkaline developer. Also it could be treated with an organifier and could then be exposed dry and also colour-sensitised with the Sensitol dyes.

Mr. A. C. Banfield showed a dish of his design for the development by time of panchromatic plates. He had made it on account of the pinholes and other markings occasionally encountered in developing in a tank with vertical grooves. The dish had a loose flat bottom provided with two pairs of parallel grooves, into each of which six 45 x 60 mm. plates could be slipped end to end. An upright piece served as a handle for placing the loose plate-holder in the dish and removing it. The device thus allowed him to wipe the surfaces of the plates with his finger, and he declared that he could feel an air-bell on a plate and remove it—a statement that aroused a lively discussion and called forth completely contradictory experiences in the avoidance of air-bells when developing plates in a tank.

Mr. Renwick read, in abstract, a paper on "The Optical and Photographic Properties of some Isomeric Isocyanines," by Miss F. M. Hamer, B.Sc., of Cambridge, who had carried out experiments for Sir William Pope. Starting from the isocyanine iodide parent substance, Miss Hamer had prepared derivatives by substitution of other radicles in different places in the group, and testing the absorptive and colour-sensitising properties of the resulting compounds. The radicles substituted were the cinamaroyl-amino, acetyl-amino and amino groups, and the experiments had brought to light several excellent colour-sensitisers, and also examples of departure from the customary relation between the absorption and sensitising properties.

Votes of thanks were accorded to the authors of the papers.

CROYDON CAMERA CLUB.

Mr. H. W. G. Bidgood, representing Necol Industrial Collodions, Ltd., of 62, London Wall, E.C.2, demonstrated the various uses of its products, and is to be congratulated on a successful first appearance in the rôle of lecturer. The demonstration was a "trade" one, pure and simple, with no pretence to the contrary; it was, however, made quite interesting by Mr. Bidgood, who evidently has a thorough grasp of his subject, a feature which, if shared by all representatives of commercial houses, would render trade demonstrations more sought after by the larger clubs.

He started with a description of the various collodions made by his firm, and their many applications, incidentally revealing an intimate knowledge of several trades, particularly those in leather. In fact, he rather over-dosed his audience with leather, and will know better next time. Of course, collodion is prepared for photographic emulsions, but is only supplied in bulk, and attention need only be drawn to a few products apparently of real utility to the average man.

"Necol" household cement, just on the market, is a special collodion in collapsible tubes, and, it is claimed, will unite everything except india-rubber. When set, it is impervious to heat, is waterproof, and will even resist boiling water. China, xylonite, glass, and leather, among other things, can be dealt with. Excellent also for sticking "invisible" patches on old boots, ever grateful and comforting. A leaflet printed in red ink for those who prefer this colour to legibility, gives full particulars.

A "Necol" colourless lacquer (shortly to be placed on the market) makes an impervious negative varnish, applied cold; will waterproof anything; renovates leather, and affords a durable cold lacquer for metal. Mixed with finely ground black pigment, it gives a tenacious dead-black on metal. Specimens of a dead-

matt white surface on metal, and transparent coloured lacquers were also shown. The demonstrator next passed round a perfectly watertight developing dish composed of a thin strawboard of ultra-rotten quality. The corners had been reinforced by thin card or paper stuck with the cement, and the interior given three coats of the lacquer.

"Plastic wood" (only supplied direct) is another Necol product which appears to have many uses apart from its primary object—the making of engineers' patterns. It is a dough which can be moulded to any shape, and when set may be regarded as waterproof wood, taking kindly to all wood-working tools. Unlike the more adventurous putty, it is ideal for filling in cracks, as once in it invariably stops at home. So tightly indeed does it stick, that if any gets on the hands nothing will remove it completely except a special solution supplied for the purpose. The plastic wood can be had in half-pound tins, and it is to be hoped the special solution in quantity less than the gallons airily referred to by the lecturer from time to time, otherwise the small user may find himself in rather an awkward position.

A hearty vote of thanks was accorded Mr. Bidgood, who undoubtedly made good.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held at 4, Southampton Row, on Friday, October 14. Present: Messrs. Adams, Basil, Bennett, Frank Brown, Chaplin, Chapman, Chase, Chidley, Corbett, Dickinson, Ellis, Gray, Haines, Hana, Illingworth, Lambert, Read, St. George, Speaight, Spink, Wakefield, Swan Watson, Wedlake, and Lang Sims (secretary).

The Secretary read a letter from Mrs. Fry and from Mr. Arthur Fry expressing their gratitude to the Council for their floral tribute and their words of sympathy. He also read the letter which he sent to Mrs. Fry on learning of the death of her husband. The Council stood in silence in memory of their late colleague, and, on the motion of Mr. Swan Watson (President), seconded by Mr. Frank Brown (ex-President), it was agreed that the secretary's letter should be entered on the minutes.

The Council, which was deeply moved, formally recorded the vote of condolence which had already been sent in anticipation by the secretary.

Mr. George Hana, with his consent, was unanimously appointed a trustee in place of the late Mr. Fry.

Mr. Reginald Vaughan (Solicitor) attended to report progress with regard to incorporation, and there was a general discussion on many important points.

Mr. Vaughan said that although this would not be an association which was known as an association "not for profit," it would be a company limited by guarantee. The company either had to have a share capital, and the liability of the members was limited to the shares for which they subscribed, or it was limited by guarantee, the amount of the liability of each member being specified. In this case the liability, in the event of winding up, was limited to ten shillings. The expression "not for profit," it was his duty to tell them, had a technical meaning. It was the heading of the section of the Act which described an association similar to the one he had mentioned, the Royal Geographical Society, where the members took no benefit. Directly the phrase was used every judge and lawyer would say that this was the kind of association. He was afraid, therefore, that it must be put beyond question, and a general meeting would be a simple way of dealing with it. The Solicitor added that the delay which had occurred had been unavoidable. He had prepared the draft of the memorandum and articles at once, but had had to wait for the Board of Trade.

The Chairman suggested that they should accept the solicitor's advice and call a special general meeting at the earliest possible moment, asking for instructions to register under the title of a limited company, limited by guarantee. He further suggested that Mr. Vaughan should be asked to draft the notice convening the meeting and to explain briefly the situation.

This was unanimously agreed to.

Before the solicitor withdrew, the Chairman, amid applause, heartily congratulated him upon the good work he had been doing on behalf of the Association.

The Secretary reported upon the case of Bone *v.* Etches, which concluded on October 11 with a verdict for Miss Bone (a member of the P.P.A.), with £150 damages and costs. The case was conducted by Mr. Reginald Vaughan, solicitor to the P.P.A. Miss Bone, of Peterborough and Hunstanton, brought an action against Mr. J. B. Etches, who formerly carried on business at Peterborough under the style of the Rapid Photo Co., which the plaintiff purchased from him in 1916. By the deed of assignment Mr. Etches covenanted not to sell photographs to any persons at less than the prices current for the time being of the Rapid Photo Co., or of the plaintiff. On the defendant's return to business after being demobilised he restarted in 1919 in the photographic trade at the old address, Narrow Street, Peterborough, under the style of the Aerial Photo Co., and issued a price list, in which he offered to do view work of "second quality finish" at prices which were less than those current at the Rapid Photo Co. and those of the plaintiff in the action.

The Secretary read a letter from the Eagle and Star British Dominions Insurance Company, Ltd., stating that they must be informed, both by new proposers and existing policy holders, if celluloid films were being used, this to be followed by inspection of premises when necessary.

The Secretary reported 24 new members (Nos. 1,602-25), 11 of which were obtained through Messrs. Houghtons, Ltd. Five resignations were also reported.

Owing to the business on the agenda, a large proportion of the business was not reached, it was therefore resolved to adjourn the meeting to Thursday, October 27.

The Council adjourned at 7 p.m. for refreshment, after which Mr. Haines described his visit to America and to the Convention at Buffalo. A vote of thanks was passed to him unanimously for his very interesting address. The President handed to Mr. Herbert Lambert a silver cup from the Vancouver Exhibition, and Mr. Lambert returned thanks to the president for his congratulatory remarks.

The adjourned meeting of the Council took place at 35, Russell Square, on Thursday, October 27. Present: Messrs. Adams, Basil, Chaplin, Chase, Ellis, Haines, Hana, Illingworth, St. George, Speaight, Spink, Turner, and Lang Sims (secretary).

Mr. Alfred Ellis took the chair.

Apologies for non-attendance were read from Messrs. Frank Brown, Chapman, Corbett, Swan Watson (president), and Wakefield.

The Secretary read a number of letters from correspondents, and his replies thereto, which latter were endorsed by the Council. A country member asked for information with regard to apprenticeships. He was referred to the particulars given in the Handbook. It was agreed that a printed form of indenture might be sent to inquirers.

A seaside member wrote stating that he had all photographic rights on the pier, and that these had been infringed by a photograph taken on the pier which had appeared in the Press. The opinion was expressed that the rights which the pier company had given could only have applied to the taking of professional photographs—*i.e.*, sittings—on the pier, and could not be interpreted in such a way as would prevent visitors from using cameras.

A country member wrote asking whether the Association had a scale of fees for photographs illustrating trade advertisements. The Secretary, in his reply, had referred him to the instructions as to copyright which appeared in the Handbook. Some discussion took place as to whether definite figures could not be quoted in such a case, and it was pointed out that no figures could have a general application, and that the matter was one for individual arrangement.

Some correspondence was read concerning a dispute between an Irish member and a firm of dealers in second-hand apparatus, regarding a camera which, in the member's view, was wrongfully detained. Through the intervention of the Secretary, the misunderstanding was cleared up so satisfactorily that the member, as some practical recognition of the work done by the Association on his behalf, had forwarded 20s. to the funds.

A country member wrote with regard to a controversy over a Press reproduction of a photograph which had topical interest, and the Secretary reported that he had had an interview with the agency concerned, and had successfully proved the member's claim to a fee.

A London member wrote concerning the carriage of his photo-

graphic apparatus by rail, stating that his operator, going on a professional engagement, had been charged 10s. for passenger's luggage. The Secretary stated that he had interviewed the Assistant Manager of the Great Western Railway, and it was pointed out to him that any luggage over and above certain small hand luggage was liable to be charged. Several members of the Council gave their experiences, which varied considerably, and the subject was adjourned until the next meeting.

Mr. Adams proposed the establishment of a permanent Propaganda Committee for the purpose of ascertaining the best method of bringing forward the claims of the Association. Such a committee might consider a co-operative scheme of advertising.

A small provisional committee was appointed, consisting of Messrs. Adams, Basil, and Speaight, to explore the situation, and furnish to the next meeting of the Council a preliminary report on propaganda, with which was bound up the question of co-operative advertising.

CAMBRIDGE AND DISTRICT PHOTOGRAPHIC CLUB.—At the meeting held on November 2, Major F. Debenham gave a lecture on "Antarctic Exploration, with Notes on Polar Photography." The lecturer, who was a member of Capt. Scott's expedition, first described the various ice formations met with, and showed lantern slides of each kind. He then dealt with the animal life found in those regions, and mentioned that the only living creatures which remained in the Antarctic all their lives were two tiny insects, which often remained frozen inside lumps of ice for several years, and on waking only had perhaps an hour's hectic life before being frozen in again. The lecturer showed some very comical pictures of penguins, and told some amusing tales in connection with them. Amongst other things, he described the dogs and ponies used by the explorers, and gave some idea of the life led by the expedition. Dealing with photographic questions Major Debenham said that among the chief difficulties met with was the condensation of any moisture on the lens and plates, and its subsequent conversion into ice crystals, which were very hard to remove. The intense cold soon upset the working of focal-plane shutters, and it was difficult to get a good rendering of rocks and snow on the same plate owing to the extreme brilliance of the snow. On the other hand, the actinic value of the light was very high; when using a Watkins meter in sunshine the paper usually took only a second to darken to the standard tint, as compared with 4 or 5 secs. in England in summer time. The absence of any haze in the atmosphere made it easy to get clear views of distant objects. The lecturer's own slides were of a high quality, and he also showed some by Mr. H. G. Ponting, and one which represented one of Capt. Scott's first efforts at photography.

MESSRS. VENTIHETA, LTD., makers of ventilating gas stoves for studio heating, to whom we recently referred a correspondent, inform us that they have removed from Argyle Street, Oxford Circus, to 311 and 324, Old Street, London, E.C.2.

Drawn by Paul Reilly. From *Judge*.

UNCROWDED PROFESSIONS: THE PHOTOGRAPHY OF CHILDREN.

News and Notes.

BRITISH SHOWROOMS ABROAD.—Premises have been secured at 9, Rue de Ligne, Brussels, for the first of the sample showrooms which are to be organised in all parts of the world by the Federation of British Industries to enable British manufacturers to display their goods to foreign buyers.

BOWES PARK PHOTOGRAPHIC SOCIETY.—The thirteenth annual exhibition will be held at Unity Hall, Newnham Road, White Hart Lane, Wood Green, N.22, on the 17th, 18th and 19th of the present month. The exhibition will be judged by Mr. F. C. Tilney, and on the opening night Mr. W. L. F. Wastell will deliver his lecture, "A Loon in London." On the two following evenings lectures will be delivered by Messrs. H. Creighton Beckett and C. P. Crowther.

A NEW CRITERION PROFESSIONAL PAPER.—Messrs. Criterion, Ltd., inform us that they are just issuing a new matt bromide paper for professional use. Its special feature is a distinctive matt surface closely resembling the natural surface of the paper. The new paper is made in three grades of contrast, ordinary, hard and extra hard. Samples will be sent to bona-fide professional photographers, and orders can only be accepted for execution in rotation.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

ARTIGUE'S TWO-NEGATIVE METHOD FOR SOFT FOCUS PORTRAITS.

To the Editors.

Gentlemen,—Mr. Coles' letter on Artigue's two-negative process raises a point which occurred to me and led me to experiment considerably.

Contrary to my expectations I found film almost useless for the purpose. Used in combination with a plate, it is a remarkable fact that the film, even without the addition of a thickness of glass or film, produces the effect of dreadful halation in the rear plate, as compared with the general softened effect when a plate is used, thus rendering them almost useless for this purpose. The only cause I can think of is the coating of gelatine on the back of the film causes far more scatter than its transparency would suggest.

It would be interesting to have the experiences of other experimenters.

Dreadful thought—is the glass plate of the future to rise triumphant with emulsion on both sides, and put to shame its celluloid cousin?—Yours truly, WM. ASPDEN.

234, High Street, Bangor,
November 4.

EFFICIENCY OF THE FOCAL-PLANE SHUTTER.

To the Editors.

Gentlemen,—Referring to the reply to "C. C." *re* efficiency of focal-plane shutters in your issue of October 28, I have a half-plate Thornton-Pickard focal-plane shutter fitted to a camera by one of the leading makers. The plate is ¾ in. from the blind, which, with ¼ in. slide register, leaves ½ in. for thickness of shutter frame. It would seem, therefore, that this distance precludes anything near the maximum efficiency being attained, and it may account for the fact that, with exposures short enough to stop such motion as children playing games, I get hopelessly under-exposed plates at *f*/5 5 on a sunny summer day. It appears quite unnecessary to have the shutter frame ½ in. thick between slide and blind, as there is ample thickness of frame between blind and

camera to give sufficient strength, but apparently the Thornton-Pickard Co. think otherwise.

It would be interesting to hear from readers who are experts in this work as to the actual measurements of the apparatus they use.

You suggest a blind at only ¼ in. from the plate, but I do not see how this could be obtained save with a metal slide and a shutter reduced to the minimum thickness.—Yours faithfully,

M. R. Douglas.

9, Dundonald Road,
Kensal Rise, London, N.W.10,
November 2.

LENSES FOR PORTRAITURE: COMMERCIAL v. ARTISTIC PHOTOGRAPHY.

To the Editors.

Gentlemen,—I have read with more than usual interest the correspondence on the above heading, and am particularly impressed by the statement of Mr. Basevi in your issue of October 21. It bears out the assertion of Messrs. Beck and Andrews in their first issue of "Photographic Lenses," which I am perfectly convinced holds good now as well as it did then, viz., that there has never been produced a lens for portraiture to equal the extra-rapid rectilinear. With nearly forty years of experience I have yet to meet a lens that will give a portrait to equal the longer focus Ross *f*/5.6 "Universal Symmetrical." Other equally rapid R.R.'s may be equally satisfactory in the hands of their users. Of that I have not had the experience, but I have tried the newer anastigmats by several makers, and certainly never obtained the same pleasing results as with the Ross *f*/5.6 of 12 to 20 inches focal length, and still use the 20-in. for cabinet work.

As regards those things called "art" (bless the mark) I leave that sort of thing to the few who are unable to produce pleasing detail, and are content to smother their ignorance under the cloak of what they term art.

That class of work will soon die a natural death, and would be long since buried but for the effort of certain photographic papers which have been labouring in vain to make the ordinary mortals believe they: "Have eyes and see not."—Yours faithfully,

John Francis English.

Orion Studios, Londonderry, November 1.

CHROMIUM INTENSIFICATION.

To the Editors.

Gentlemen,—In your leading article on intensification you refer to chromium intensification, and I recently carried out certain experiments to ascertain the maximum amount of intensification which is readily possible. A panchromatic plate was developed in total darkness for about half the usual time, and was given three successive doses of the chromium intensifier with a minimum amount of hydrochloric acid, and as the density was not then sufficient, a fourth bleaching was performed with the usual ferricyanide mixture used in sulphide toning, except that a little mercury bromide dissolved in alcohol was added (mercury bromide was used only because the mercuric chloride was not available), and the image was sulphided. This gave a considerable degree of extra intensification, so that the negative gave a first-rate print.

There is one point on which some information would be useful when attempting maximum intensification, i.e., with a minimum amount of acid blackening is sometimes very slow, and is much accelerated by pouring the solution repeatedly on to the negative or print, the part on which the solution falls bleaching much more rapidly than other parts. The writer is at a loss to give an explanation of this.

In using this method for prints the process sometimes breaks down on papers of the brown-black or gaslight variety, and though my experiments are not conclusive, it would appear to be safer to conduct the operations by artificial light, and when, with this precaution, double tones are still obtained, as is sometimes the case, ammonium bichromate or potassium ammonium chromate should be used in preference to potass. bichromate. The writer does not attempt to offer any explanation, as he is not a chemist, but tried the salts named as they were more easily washed out of the paper, and the results were certainly better. Some brands of B.B. paper seem to be immune from this trouble, while of others, some of the surfaces are difficult to intensify, while the remainder give no trouble; generally speaking, the more glossy the paper the greater the chance of an inferior result.—I am, Sir,

Yours faithfully,

A. H. Hall.

1, Eliot Vale, Blackheath,
November 4.

THE NODAL SPACE OF A LENS.

To the Editors.

Gentlemen,—Mr. Lockett has an interesting method of finding this in his article in the "B.J." of October 21, 1921, but his formula is needlessly complicated.

Let m and n be two ratios of enlargement, of which m is the larger; let D_2 and D_1 be the corresponding distances between the object and the image; S = the internodal space, and f the anterior conjugate corresponding to the smaller enlargement.

Then $f=(D_2-D_1)\times\frac{m.n.(n+1)}{n(m+1)^2-m(n+1)^2}$ . . . . . (1)

and $F=\frac{f}{n+1}$, $f_1=\frac{f}{n}$.

How $D_1 = f + f_1 + S$. Hence $S = D_1 - (f + f_1)$.

Further, take $m = 2n$ and (1)² becomes

$f=(D_2-D_1)\times\frac{2n(n+1)}{2n^2-1}$ . . . . . (2)

and $S=D_1-(D_2-D_1)\times\frac{2n(+1)^2}{2n^2-1}$ . . . . . (3)

Further, in the particular case where $n=2$ $m=4$, then $f=\frac{12}{7}(D_2-D_1)$

$f_1=\frac{6}{7}(D_2-D_1)$ $S=(D_2-D_1)\frac{18}{7}$ and $F=\frac{4}{7}(D_2-D_1)$

Yours faithfully,

R. J. S. Simpson.

WATER-TIGHT STUDIO ROOFS.

To the Editors.

Gentlemen,—I think the following material will interest both your correspondent "M.W.," also Mr. V. L. Wyrall, and all who suffer from a leaky roof, no matter whether the roof is glass or any other kind. This is Masticon, sold by the Industrial Engineering Co., Ltd., Poland House, 167, Oxford Street, London, W.1, who, no doubt, would be pleased to send anyone a leaflet on its use.

I have stopped a very leaky roof (glass), which is almost flat, and, owing to the water not running off quickly, used to leak with the slightest drop of rain. But since using Masticon it is quite water-tight, even with some glass which was not puttied in at all, just laid on and a coat of Masticon put on top in place of the putty. I have also stopped a matchboard building from leaking through the joints. Anyone who tries this I think will find their troubles at an end.—Yours faithfully,

Ernest Dyche.

Palace Studios, Birmingham,
November 4.

To the Editors.

Gentlemen,—The exceptionally hot summer which we have experienced has played havoc with the old-fashioned sash-lights, causing the wood and putty to part company.

The rain this week-end has no doubt caused the studio proprietors to put their "thinking caps" on in order to effect a cure "ere the winter's storms begin." Like many other things it is often the case of "Out of sight out of mind," and no matter how sound the work is, in the first instance, the upkeep must be attended to.

May I be allowed to give the benefit of my experience in connection with a picture gallery? This had three sky-lights, good, bad, and ——, according to shade afforded by the surrounding buildings, which proved that it was the action of the sun which affected them.

"Lazy people take the most pains," and our theorist got to work inside with plumbob and line to locate the point of inlet.

After sundry patchings and "dodgings up" the matter seemed even worse, so we decided to make a job of it. The whole was

thoroughly washed with weak soda water, and a sharp coat of white lead and turpentine with a very little dryers was applied, followed next day by another of stone colour. Here I must emphasise the importance of the white lead being the main foundation of the paint, and in colouring the less pigment there is the better.

If a ready mixed paint is used white lead and boiled oil should be added, but it is far preferable to mix one's own.

This did not effect a complete cure, but it became an annual institution, and *when* we at last got them water-tight we still carried on with the good work, and have not been troubled since.

While on the subject, should any of your readers have a leak in corrugated iron or zinc, I can recommend the following:—Two parts of powdered resin, one part of tallow, and a little white lead. Melt in an old baking tin, and cutting some strips of calico, dab the same in the mixture and apply hot. This will stick instanter, and can then be painted, taking care to cover the edges well. G. S.

TESTING THE VIGOUR OF DEVELOPMENT PAPERS.

To the Editors.

Gentlemen,—In my article last week I made use of the word "steep" in connection with soft papers (paragraph 10). As this word is commonly associated with the idea of vigour or contrast, my wording of the paragraph was rather unfortunate. My endeavour was to contradict the idea that soft papers (having long exposure ranges) have some inherent power of rendering a bigger number of gradations than other papers, irrespective of other factors. My meaning would have been clearer had I said: "Taking all emulsions as capable of rendering the 100 gradations which are visible to the human eye, a soft emulsion will render them from 100 steep gradations of a harsh negative, while a contrasty emulsion renders them from 100 shallow gradations of a soft negative, providing that the negatives contain 100 gradations, and are properly suited to the papers, this latter being a serious point when we have so many grades of soft, and so many of vigorous, in both negatives and papers."

THERMIT.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

T. F.—Bolton sheeting is to be obtained of most furnishing drapers. Messrs. B. Burnet and Co., Ltd., 22, Garrick Street, London, W.C.2, usually have it in stock. It is used for casement curtains.

M. A.—We published a specification of a drying-machine by Bates in the "B.J." of September 30 last, page 585. In 1919 we published two specifications by Morse, one in the issue of February 28, page 103, and the other December 19, page 744.

W. A.—You can obtain vanadium chloride from chemical firms such as Hopkins and Williams, 16, Cross Street, Hatton Garden, London, E.C.1, or British Drug Houses, Ltd., 16-30, Graham Street, City Road, London, N.1. The current list of the latter prices the 50 per cent. solution at 5s. per oz. In both copper and uranium toning the silver image is converted by the ferricyanide into ferrocyanide. In the copper process this latter is converted simultaneously into copper ferrocyanide, and in the uranium process into the corresponding uranium salt. We do not know what is the chemical basis of the red toning of a sulphide-toned print in a gold bath.

P. G.—The best method of storing sensitive photographic materials, both plates and papers, is in an air-tight metal box, which itself can be kept in a cool place. Very suitable boxes are the tin trunks sold by the ordinary department stores. A number of somewhat similar boxes are now obtainable at moderate prices in the shape of surplus goods; one firm is R. Black, 51, High Holborn, W.C.1. Without any further protection papers will keep for months in these conditions if the storage place is cool, and a further available means towards keeping is to provide the box with a false grid bottom and to place below this a few pounds of dry calcium chloride, which may be put in muslin bags for convenience.. When the chloride becomes damp it is only necessary to roast it thoroughly in an old iron saucepan over a fire to restore it to its original condition.

MODELS IN ADVERTISEMENT PHOTOGRAPHS.—My young lady, while in the employ of a small commercial photographer as a printer, was told to sit for two photographs, and was told they were for a catalogue No payment or agreement was made. They have now appeared on the screen of the local theatres as advertisements for the firm whose furniture was photographed. Can she in any way make the firm or the photographer take them off the screen or catalogue, or alter the photograph so as to make her unrecognisable? She has since left the employ of the photographer.—W. E. A.

We do not think that your fiancée can take any measures to prevent the exhibition of the photographs which have been taken of her in any form whatever, so long as their exhibition does not constitute a libel of her. The law defines libel as something which holds up a person to ridicule or contempt. We do not think either of the photographs which you send would be regarded as libellous.

B. G.—We should have liked to have seen the negative in order to have been able to say whether the colour is the general stain which is sometimes produced by the uranium intensifier, or the natural brownish-red image which is produced. If it is the former, hypo will account for it, although generally the stains in this case are patchy. We should try soaking the negative for a quarter of an hour or so in a weak solution of ammonium sulphocyanide which, as a rule, will remove general stain produced by the uranium intensifier. For thoroughly washing a few negatives there is no better method than laying them, film up, on an inclined board down which a stream of water constantly passes from a short length of tube arranged transversely at the head of the board and perforated every quarter-inch or so by a fine hole. This uses little water and is very efficient. We think half an hour's washing in this way is ample. It should also be sufficient for ordinary purposes to give the negative a succession of 7 or 8 five-minute soaks in successive lots of clean water, but if intensification with mercury or uranium is to be done a longer washing is necessary, as either method is, so to speak, a delicate test for hypo in the film.

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THE BRITISH

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Contents.

SUMMARY.

The publishers' supply of the 1922 "B.J. Almanac" is practically exhausted. Intending individual purchasers are advised to place their orders immediately with a photographic dealer, bookseller or bookstall. (P. 681.)

Mr. R. R. Rawkins in a contributed article, describes how to make a folding mask for convenient production of white-margin enlargements. (P. 684.)

In a leading article we refer to some of the points raised in a recent controversy in these pages on the respective commercial merits of what may be termed "ordinary" and "exhibition" portraiture. A conclusion is that no matter how "ordinary" a photographer's work may be, it is to his interest to cultivate artistic aims and equally to interest the public in things artistic. (P. 682.)

In a further portion of the paper on scale in optical reproduction the condition under which the size of image is proportional to the focal length of the lens is defined from two points of view; the rule governing the variation of exposure when photographing on different scales of reproduction is also explained. (P. 685.)

Dr. B. T. J. Glover examines proposals for a contrast rating of printing papers, and comes to the conclusion that a set of comparison prints will serve the photographer more effectively than will such sensitometric rating, as could be stated by the paper makers. (P. 694.)

The concluding part of the Traill Taylor lecture, recently delivered by M. L. P. Clerc on aerial photography, reviews types of cameras, methods of suspension, and choice of photographic material. It also contains a brief survey of the methods hitherto employed in aerial mapping. (P. 688.)

Aerial photographic survey is to be employed in planning the proposed new road between London and Southend. (P. 693.)

In a paragraph on page 682 we remind assistants in studios that in the event of their posing in photographs they have no subsequent remedy whatever as regards the use which may be made of the results.

The essential provisions of the Business Names Act, particularly as they affect photographers, are set forth in a pargaraph on page 681.

Notes on the use of the uranium intensifier will be found in a paragraph on page 682.

Mr. T. P. MacNally describes and illustrates a simple device for ensuring the secure action of dark-slide clasps. (P. 695.)

A French inventor, M. Ratier, has patented a modification of the Ozobrome process. (P. 691.)

EX CATHEDRA.

The 1922 Almanac. At the request of our publishers we announce that almost the whole edition (of 30,000 copies) of the 1922 "British Journal Almanac" has been disposed of to the distributing firms in the photographic and bookselling trades. It must, therefore, be pointed out to individual would-be purchasers of the book, who have not yet placed an order with their photographic dealer, bookseller, or bookstall, that their means of now ensuring the delivery of a copy is to place an order without delay in one or other of these quarters. Our publishers desire it to be known that within the next few days they will be unable to supply further copies either singly or for re-sale. The price of the "Almanac" remains the same as that of last year, namely, 2s. net in paper covers; 3s. net in cloth binding. Although high costs of production continue to prevail in the book-publishing trade, we believe it will be found that the "Almanac" preserves its customary usefulness to photographers of all classes. It may be said that there is no photographic process for which it does not contain particulars of both standard practice and of latest developments. These and other data, including a directory of the photographic trade, are revised and supplemented, and make the "Almanac" the most up-to-date of reference volumes for the photographic work-room or office.

* * *

The Business Names Act. Some recent correspondence shows that there are still a number of people who entertain a very hazy idea of the nature of the registration of business names. One correspondent, who wrote to us a day or two ago for information, was of the view that by registering the fancy name under which he carried on a studio he obtained the means of keeping his own name undisclosed, as he wished to do for family reasons. In fact, of course, the object of the Registration of Business Names Act is exactly the opposite. This war-time measure, passed for the purpose of preventing the resumption of businesses here by ex-enemies under British titles, makes it a civil offence to carry on a business under a name other than that of the true name of the proprietor unless the assumed business name is registered at the office established for the purpose at 39, Russell Square, London, W.C.1. Further, any business which thus comes within the scope of the Act is required to comply with certain provisions. The chief of these is that the real name of the proprietor, whatever the nationality of the latter, shall be stated upon "essential business literature." This definition is understood to include ordinary note heading, invoices and other stationery by means of which business transactions are carried out. In the case of photographic studios it is, however, not required that the real name of the proprietors should be published on the mounts of the photographs themselves, on view postcards, or in any adver-

tisements which the firm may issue; nor is it required that the real name should be displayed outside or inside the place of business. A circular, explanatory of the provisions of the Act, may be obtained on application to the address given above.

* * *

Rights in One's Face. Although under the present Copyright Act a very wide scope of ownership is conferred in respect to the right of reproduction of original works of many descriptions, there is still nothing in copyright law which enables a person to restrain anyone from publishing or using photographs of the person's face which by some means or another have been obtained. We are speaking now of portraits produced in circumstances in which the copyright does not become the property of the subject, as, for example, the snapshots of people such as are reproduced in the newspapers. The absence of means of protection under such conditions as these sometimes gives rise to somewhat curious disputes. A case was referred to us recently in which a girl assistant had posed in two photographs, advertising furniture, taken by her employers for a firm of manufacturers. The latter then used the photographs as advertisement lantern-slides in the local cinema theatre, where, apparently, the identity of the model was recognised by many friends. Assistants who are asked to pose in photographs taken in these circumstances should, however, bear in mind that they have no control whatever over the subsequent use of the photographs in any shape or form by the owners of the copyright. Such use can be restrained only if the publication or exhibition of the photographs constitutes a libel of the subject; and even if it is thought that the photographs are objectionable in this respect, it is extremely doubtful if any action could be successfully taken if the photographs in the first instance were made with the consent of the model.

* * *

The Soft-Focus Cure. Particularly in the United States the soft-focus lens is being pushed as a species of elixir which automatically imports the desirable quality of "art" into a portrait. New soft-focus objectives continue to appear on the market. While the softening of definition has its obvious merits, the tendency to apply soft focus indiscriminately to portraiture generally is one which requires to be resisted. Already it is evident that the practice is creating a technical form which tends to destroy much of the strength and variety of the camera portrait. We are inclined to think that the method of M. Artigue, described in our issue of October 21 last, is a surer means of preserving photographic quality in combination with such diffused definition as may be necessary, and we are encouraged in that belief by hearing from Mr. N. E. Luboshey that this identical method has been practised by him for the past twenty years, and was, in fact, the subject of a demonstration at the Vienna Photographic Society some years ago. Mr. Luboshey tells us that he used it in making the portraits of Mr. Eastman and Dr. Rodman shown at the last R.P.S. exhibition and cordially reviewed by the critics.

* * *

The Uranium Intensifier. The recent dull weather has perhaps been the cause of a crop of questions, which has reached our table, relating to uranium intensification. Let it be said at once that for a negative, which has been under-exposed and has taken its chance along with others in time development, or has been "forced" in dish development, there is no better intensifier than uranium. The degree to which detail, together with respectable contrast in the print, is obtainable must be a revelation to those who have not tried this intensifier. It needs, however, to be emphasised that the negative must be both thoroughly fixed and thoroughly washed, otherwise a disastrous result in the form of patchy stains is almost a certainty. One correspondent complains of a uniform yellow staining of the negative, which makes printing extremely slow. The reddish-coloured uranium negative is, of course, not a quick printer, but its defect in this respect may be aggravated by a residue of yellow stain from the uranium salt. A solution of ammonium sulphocyanide (5 or 10 grs. per oz. of water) will usually clear away this general stain. Another querist inadvertently applied the intensifier to a negative which had retouching on it, with the consequent result of absence of intensification on the parts of the negative thus protected. The remedy in this case is to clean off the retouching with turpentine or ether and remove the intensification, and at the same time clean up the surface of the film by swabbing it with cotton wool dipped in ammonia solution. After washing, the negative may be re-intensified, preferably after soaking it for a few minutes in a weak solution of acetic acid.

EXHIBITION AND COMMERCIAL PORTRAITURE

THE somewhat desultory discussion which followed the letter by Mr. Godfrey Wilson in our issue of October 7 provoked diametrically opposite views on a subject which concerns every portrait photographer, but did not result in drawing conclusions which to us appear to follow naturally from the very discordance of the opinions expressed. It may be well, therefore, to glance again at the issue in dispute.

It will be remembered that Mr. Wilson felt disappointed at the examples of portraiture—for the most part by professional photographers—in the exhibitions of the London Salon and the Royal Photographic Society; disappointed, because he found himself unable to discover there scarcely any portraits having (from the fact of their exhibition) a kind of certificate that they are "Art," and also a character which, in his opinion, would recommend them to the customers of a studio. If they were one, they were not the other. He confessed to finding only one which he believed would satisfy the second condition as well as the first, namely a portrait by Mr. Drummond Young. In regard to this expression of discontent, it is almost so obvious as not to need pointing out, that the writer was adopting as a standard of comparison something which is highly variable, viz., "really good professional studio portraiture." Photographers' own opinion of work which may be so described is wide enough; and that of the public, which is what really matters, wider still. Impossible, then, to point to this or that example of portraiture in the exhibitions as a type to be emulated.

But when the apostles of artistic expression in portraiture, in the persons of Mr. Marcus Adams and Mr. F. C. Tilney, enter their protests against the very modified approval bestowed upon the portraiture at the exhibitions, they may be said to treat photography as though customers as a whole cared about artistic expression to the extent of being willing or anxious to pay the price for it. We entirely share the opinion of Mr. Tilney that the future of photography lies on the lines of true art, and that training of the mind in receptiveness to art of any kind is a necessary preliminary to real artistic expression in photography. That is all very well, but in the meantime there is the great undiscerning public which puts down its money in order to purchase things which artistically are atrocious—not photographic portraits only, but carpets and wall papers, illustrated

magazines, and music-hall performances. In parenthesis we anticipate the retort that the public does dimly recognise and appreciate what is artistically good in manufactures, books or music. There is, however, little evidence in shops and advertisements of artistic merit determining the saleability of these things even among those to whom price is not the first consideration. Therefore, so far as concerns a great part—much the greater part—of the photographic portraits which are produced, it is a fact that the qualities which earn them the approval of art critics are not the qualities which bring customers to the studio.

Now a change from this state of things can only be one of slow development, in which photographers of all degrees must take a part in two ways. It is necessary that they should cultivate the artistic element in their work and that, at the same time, they should employ any means within their power to elevate the taste of the public. The two things rank fairly equally in importance and should go hand in hand. It cannot be said, as some correspondents have suggested, that portraiture done for the sections of the public which are inappreciative of artistic qualities can, therefore, dispense with those qualities. To take this view is to deny the very considerable, though perhaps minor, improvements from the artistic standpoint, which are evident in even "cheap" portraits at the present time, compared with those of ten or fifteen years ago. So far as characterisation and artistic expression are concerned there is not perhaps much reason for congratulation, but the signs of a higher æsthetic standard on the part of photographers and of those who purchase their work are provided in a number of lesser features, such as the surfaces and colours of prints, styles of mounting, the disappearance of the hideously artificial backgrounds and accessories, and also the more tasteful arrangement and furnishing of studio premises. In these respects, which are not to be despised, we have moved from a state to which we shall never return; and the comparatively few photographers who have not moved with the spirit of the times in these things provide a measure of the movement from the fact that they are regarded as "back numbers."

But, after all, these amount to very little in raising photographic portraiture to the rank of art which it should and, one day, must generally hold. In contributing to its more rapid advancement to this end, photographers—each one individually—must seek to link themselves more closely with the aims of artists in whatever medium—painting, sculpture, music, or letters. The word "culture" has not gained much in value from the use made of it by our ex-enemies, but in its English sense it stands for the diversity of interests and qualities in which portrait photographers require to be sharers if their craft and business is to obtain the status that is within its reach. In plain words, besides taking and developing negatives and making prints (as much as doing these things), it is the business of the portrait photographer to cultivate an individual delight in what is beautiful, and to use every little step which he may make along this road in contributing to a like appreciation in the minds of the public within his sphere of influence. And the latter is not to be set aside as negligible. In most towns, the two classes of shops where the passers-by in the streets may expect to see art represented in some form or another, are those of the photographers and the print-sellers, yet it is not too much to say that from this point of view the windows of the drapers and the furniture dealers often provide a more satisfactory display. Here, obviously, is one direction in which a photographer can do himself good and, at the same time, contribute to the progress of his profession as a whole. In regard to the question which was raised by our correspondents, namely, the exhibition of examples of portraiture of a more "art" character than the average taste of the public, our own view is diametrically opposed to that which holds that the exhibition of such work is without effect. We are convinced that though the public taste in artistic matters is not refined or discriminating, yet it is amply sufficient to recognise the ability to produce work which may perhaps be above its own standards of preference. And from that admission, it follows as a matter of commonsense that the public will value at a higher rate the services of a man which it seeks for its own purposes. Could there be a more desirable form of linkage between art and commerce? Therefore, in our judgment, it is an entire mistake for a man capable of producing portraits, such as those in the exhibitions, to refrain from showing them to his customers; and we would go further and lay down the general proposition that it is a good policy on the part of the photographer to show not only the best that he can do, but also the works which he personally likes best. How many photographers, we wonder, are at the pains to let their choice in the purchase of a painting, engraving, etching, or articles of artistic craftsmanship, such as bronzes, be known to their customers by the exhibition of these possessions? Yet it is surely a platitude to say that the photographer has a great deal to gain by obtaining recognition as a discriminating lover of the arts, even if he cannot aspire to be a connoisseur.

"Flurographs": An X-ray Innovation.—While experimenting in an effort to make X-ray negatives of documents, Dr. J. A. van Brakle, of Portland (U.S.A.), made a discovery, the product of which he calls "flurographs." Writing on the subject in the "Scientific American," he says: "The original negatives were made by placing the cheque or other document between two fluorescent screens while in contact with an unexposed X-ray film. An X-ray exposure of this combination which was tightly clamped in a light-proof cassette, was then made with the resulting negatives. Development of the exposed film was the routine development for X-ray exposures as made in the medical laboratory.

"At first it was thought that a true radiograph had been made of the exposed document, but further experiment demonstrated that the best negatives were made by means of an X-ray exposure entirely too intense and penetrating for such a slight object as a sheet of paper. Endeavours to X-ray documents without the use of the double fluorescent screens, which in medical work are used simply to intensify the action of the X-ray and thus shorten the time of exposure, were entirely without result. We finally came to the conclusion that these negatives were produced entirely by the action of the fluorescent light set up in the intensifying screens which were in turn activated by the recognised action of the X-rays upon their structure.

"Blurring of certain portions of the samples submitted is due to our inability as yet to obtain a holding cassette with sufficient compression to secure perfect apposition of the document and the film. Contrast between the paper and the printing can be further intensified by refinement of the technique of X-ray exposure. These films were taken with an exposure of 20 milliamperes, an intensity of current represented by an air spark-gap of 4½ inches, distance of 36 inches and time of ½ second.

"Practical uses of this process may include commercial reproduction of documents and other papers, the detection of changes in cheques and bank notes, and a means of measuring and standardising the fluorescent action of intensifying screens."

AN ENLARGEMENT MASKING DEVICE.

CARDBOARD, glue, and some fabric such as bookbinder's linen is all that is required to make a device that will give enlargements with perfectly rectangular masked edges. Enlargements made on card-thickness bromide with the image masked in the centre to show a clear margin of some inches make an attractive "line," and if sent out in an art-paper folder will save the cost of mounting and cardboard. The mask can also be used for the production of enlargements with just a bare margin of white around the picture, which, when trimmed neatly, gives the production a finished appearence.

The device is like the covers of a book (fig. 1), and when closed and the hinged flap folded over the back (fig. 2), presses the mask opening squarely upon the paper in intimate contact with the sensitive paper. It will be noticed that the mask opening is built up and not cut out, and I think this method is easier and infinitely

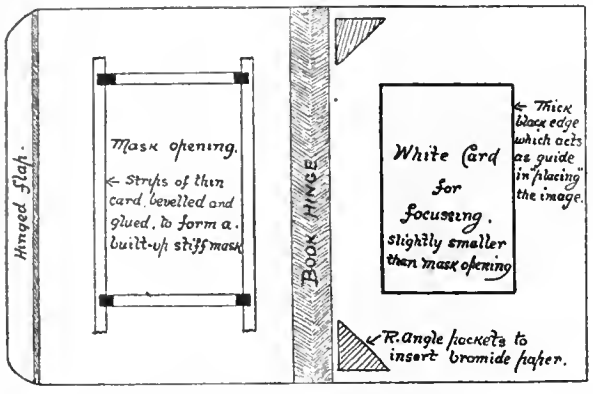

Fig. 1.—Enlargement mask, open.

better than the tricky cut-out which few photographers can do really well. The opening is built up from strips of hard thin card, bevelled, and the focussing is done upon a piece of white card glued to the inside back of the device. This white

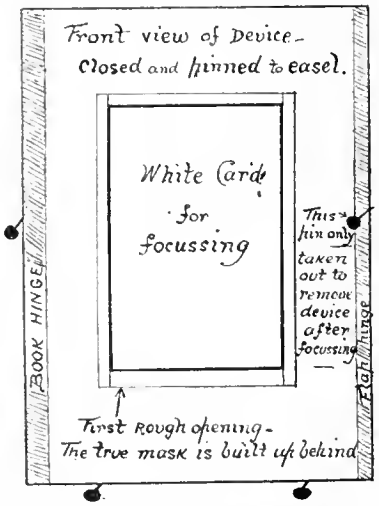

Fig. 2.—Enlargement mask, closed.

card is a trifle smaller than the opening of the mask and acts like the templet of a plate-marker by pushing the sensitive paper into perfect contact with the edges of the mask opening.

Making the Masked Opening.

Take two pieces of 8 to 12-sheet cardboard and cut them together about one inch larger both ways than the particular size of the enlarging paper. This forms the two covers of the "book." On one of the pieces plot out the size of the mask opening by means of a set square and rule, and proceed to cut out an opening about a quarter of an inch *larger* all round than the actual mask opening. This cut-out can be quite roughly done as the mask opening is built up behind the rough opening. Cut some strips of thin card about one inch wide and bevel one edge on the beveller, or cut them to a slight bevel with a sharp knife and straight-edge. Glue one length first to the back of the rough opening so that it overlaps the rough opening by about ¼ inch, bevelled side down. Next cut a piece of thin white cardboard the *exact* size of the actual mask opening, and see that it is perfectly rectangular; then place this piece of cardboard against the first attached strip to act as a guide in fixing the other three strips in position. The other length strip should be fixed next, followed by the two width strips, which must be measured off and cut neatly to fit. If any light leaks through the joins a piece of black paper glued across the joins will soon stop this.

Hinging the Covers.

The next step is to hinge the covers together. Dark-room lamp fabric answers well, but bookbinder's linen is preferable. There are two cover hinges, one inside and one outside, and it is best to fix the inside hinge first in the following way:—Stretch a piece of thin medium parcel twine on the work-bench, pin it down at both ends, push the edge of the *back* cover up to the string at one side and the edge of the front cover to the other side. This is to ensure an even tiny space between the covers (a floating hinge) so that the "book" is flat when closed. Next glue the strip of linen and fix in position with an even margin on both sides of the covers. Now glue another strip of linen to form the back or outside hinge and fix it by closing the "book," pressing the edges upon the glued linen and allowing it to adhere. Then pick up the "book" and firmly press the linen in contact.

The Focussing Card.

The focussing card can now be fixed to the inside back cover. The piece of white card previously cut as a guide for building up the mask opening should be trimmed about 1-16 inch smaller all round, glued, and fixed accurately by closing the book and placing the card in the opening of the mask so that about 1-16 inch margin in shown all round. The whole book should now be well pressed in a cold dry-mounter or press to ensure perfect adhesion. This focussing card should have a black edge around it to facilitate placing of the image, and this is done by ruling a thick black line about 1-16 inch wide close up to the card.

The Side Flap.

This flap can be made of thin card and hinged as shown. The width of the space between the edge of the front card and the edge of the side flap is governed by the thickness of the closed book. The flap is an essential part of the device as it folds over the back cover and clamps the two covers together, thus ensuring perfect contact between the sensitive paper and the mask opening. It also means that only one pin is required to keep this side of the book flat.

The Feed Pockets.

The last stage is to make the "feed" pockets to hold the sensitive paper in position when loading. Very thin linen,

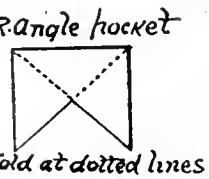

Fig. 3.—Feed pocket.

or leatherette, is best, and can be made as shown in fig. 3 and glued to the inside back cover. These pockets can be dispensed with if desired, and a series of black guide lines can

be drawn upon the inside back cover to act as "feed" marks for whatever sizes of paper are used.

The Device in Use.

The image is roughly focussed upon the easel as usual, and the closed device (empty) placed in position and fixed either by pins as shown, or by other means. The pins most suitable are the steel 2-inch glass-headed variety, and are inserted in the easel at an angle so that the book not only rests upon the pins, but is kept flat against the easel. Fine focussing is then done and the device removed for "loading" by withdrawing one pin only as shown. To load the device, open it and place the bromide paper in the pockets (or to the guide lines) coated side up, close the book and replace on the easel.

R. R. Rawkins.

SCALE OF OPTICAL REPRODUCTION.

[The arithmetical calculations relating to the size of the image formed by a lens are among those which have frequently to be made in such diverse branches of photographic work as, for example, copying and enlarging, aerial photography, and lantern and cinematograph projection. The following article deals with this subject. The present chapter adopts the Gauss conception of the action of a lens as a simple method for derivation of the rules of optical image formation. It considers in particular the case of objects at a distance which is great relatively to the focal length of the lens, thereby emphasising the disturbing effect of depth of focus on certain scale calculations. It also presents the rule determining the relative exposures for different scales of reduction or enlargement. In Part II., to appear in a subsequent issue, the formulæ and rules contained in the present chapter are arranged in a form corresponding with the various conditions occurring in practice, with examples of their use.—Eds. "B.J."]

PART I. *(continued).*

Extra-Focal Distances.

As is seen from formulæ (*b*) and (*c*), calculations involving the focal length f of the lens become simpler by reckoning the distance of the object or the image from the front or rear focal point respectively. These distances, which are therefore u-f and v-f, are the *extra-focal distances* of object and image, and are denoted here by E_u and E_v. Therefore,

$$E_v = v - f = fR$$

$$E_u = u - f = \frac{f}{R}$$

That is to say, the extra-focal image distance is equal to the focal length of the lens multiplied by the ratio of image to object; whilst the extra-focal object distance is equal to the focal length divided by the ratio of image to object. Examples of the usefulness of this simple rule in practical calculations will be given later.

Image-to-Object Distance.

In fig. 3 the distance between the image and the object is denoted by D. It is seen to be equal to $u + v +$ the distance between the nodes, or *nodal space*. For many practical purposes the nodal space is insignificant in comparison with u and v, and can be neglected. The fact that it is neglected in formulæ which follow is indicated by the black patch interpolated in the dimension of D.

A ready means of keeping in mind the relations between the focal length and the distances of object and image from the lens in reproduction on any scale is to think of the distance, D, from object to image as always composed of five distances end on end (see fig. 3). These are:—

1. Focal length multiplied by number of times of reduction or enlargement...	On one side of the lens.
2. One focal length	
3. The nodal space—almost always negligible.	
4. One focal length	On the other side of the lens.
5. Focal length divided by number of times of reduction or enlargement ...	

In the case of reduction, (1) and (2) are on the object side of the lens. In the case of enlargement, (5) and (4) are on the object side of the lens. In the case of same-size reproduction, (1) and (5) become each equal to the focal length, the whole distance from object to image (not reckoning the nodal space) being then four focal lengths. Almost any required calculation relating to the sizes and distances of object and image may be worked out from the first principles embodied in the above easily remembered schedule.

Having now arrived at the fundamental formulæ concerned in the reproduction of objects on any scale of reduction or enlargement, and before setting down the variations in them which are of service, we must refer to the special case which is sometimes the cause of misapprehension.

Scale with Lenses of Different Focal Length.

It is sometimes stated, usually in reference to distant objects, that the scale of reproduction is proportional to the focal length of the lens, for example that a 12-inch lens gives twice as large an image as a 6-inch. From formula (*b*) it is plain that theoretically this is never absolutely the case unless

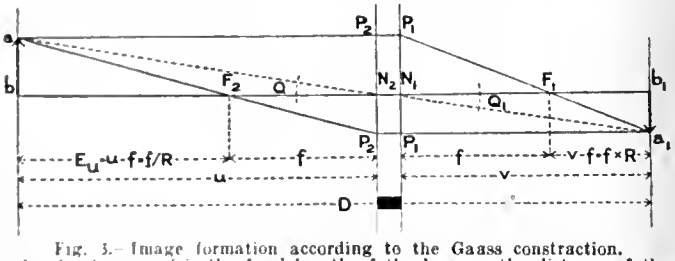

Fig. 3.—Image formation according to the Gauss construction.
In the diagram f is the focal length of the lens; u, the distance of the object, or object conjugate distance; v, the distance of the image, or image conjugate distance. D is the image-to-object distance less the nodal space shown as ■.

the distance of the object is reckoned from the front focal point. At comparatively close distances, the difference between u and $u-f$ considerably modifies the scale of reproduction. For example, when reproducing an object at 6 ft. distance with a 6-inch lens, the scale by formula (*b*) is—

$$\frac{6}{72-6} = \frac{1}{11}$$

whilst with a 12-inch lens the scale is not exactly double, but is

$$\frac{12}{72-12} = \frac{1}{5}$$

It, however, the object distance u is very great relatively to the focal length f, the scale of reproduction, though never absolutely proportional to the focal length, is so nearly so that the error may be neglected. For example, in photographing an object 2,000 ft. distant with a 20-inch lens the size of image (from formula *b*) is 1-1199th (=2-2398ths) the size of the object, whilst with a 10-inch lens it is 1-2399th. If the object measured 200 ft., the size of the images in the two cases would be:—

20-inch lens.	10-inch lens.
2.0017 in.	1.0004 in. $= \frac{2.0008}{2}$ in.

The image with the 20-inch lens is therefore twice the size of that with the 10-inch within an error of .0009 of an inch,

say, 1-1000th of an inch (= 1 per cent. of the size of the image), a negligible amount for almost every purpose for which photographs are taken.

Hence it is evident that in the case of objects which are not nearer to the camera than a certain great multiple of the focal length, the scale of reproduction is equal (with sufficient accuracy, according to the value of the multiple) to the ratio of the focal length to the distance of the object. In other words, within the prescribed limit, the size of the image is directly and separately proportional to the focal length of the lens and inversely and separately proportional to the distance of the object. The case is that of photographing exceedingly distant objects, e.g., in aerial photography, and therefore may be examined a little further in order to ascertain how near the object may be and the size of its image still be proportional to the focal length of the lens.

Also it follows that if, under these conditions, the scale of reproduction is f/u, the camera extension v (formula a) remains the same and is equal to f when photographing objects at various great distances, and therefore formula (c) and others to be given in Part II. containing v cease to apply.

Scale, Focal Length and Depth of Focus.

One way to look at this question is that so long as the camera extensions v remain equal to the respective focal lengths f of the lenses, the scales of reproduction, when employing a series of lenses, are proportional to the focal lengths. Thus, although depth of field theoretically has nothing whatever to do with the scale of reproduction, it does in fact, enter into the question in so far as objects at different distances may be obtained in sharp focus with the lens, or rather its node of emergence, at the distance of the focal length f from the plate. The degree to which the object may be allowed to approach the plate without requiring the latter to be moved from the position of the rear focus will obviously depend upon the aperture of the lens. From the depth standpoint, it can be shown that the minimum object distance beyond which scale is proportional to focal length of lens is, in fact, the so-called hyperfocal distance, *i.e.*, the nearest distance of an object which is obtained sharp when the lens is in focus on "infinity." According to the usual formula this distance is:—

$$\frac{f^2}{FN^0}\times\frac{1}{c}$$

where c is the permissible diameter of the circle of confusion, e.g., 1-100th or 1-250th of an inch, according to the standard of sharpness of definition adopted*.

Hence it is clear that from this standpoint, which is the one corresponding with the use of a camera at "fixed focus," as for example in aerial photography, the fact of depth of focus alters the assumptions upon which formula (c) rests. Owing to depth $v=f$ (that is, $v-f=o$), and thus the formula (c) assumes the form corresponding with the truly infinitely distant object, whilst actually the object is at not such an enormous distance and, if the depth of field is greatly increased by stopping down the lens, may be fairly close. Therefore, under such conditions calculations relating to the scale of reproduction require to be made by means of formula (b). Formula (c) is of value in calculations relating to enlargement or projection.

Scale Calculations and Admissible Error in Size of Image.

But putting aside depth of field as a factor, that is to say, regarding the lens as having no depth of field and therefore requiring a different camera extension for every different distance of object, the problem may be considered from the point of view of the error tolerated in an image. If such admissible error is, say, 1 in 1,000 (0.1 per cent.), then it follows from formula (b) that the distance of the object must be at least 1,000 times the focal length of the lens. For example, in using several lenses of, say, 10, 20 and 36 inches focal length, the sizes of the images produced by them will be proportional to the focal lengths within 1 in 1,000, provided the object is not nearer than 1,000 times the focal length of the longest under comparison, *e.g.*, 1,000 times 36 inches = 1,000 yds.

Generally, if the distance u of the object is n times the focal length f of the lens, the size of the image, according to the assumption that the image is proportional to the focal length and inversely proportional to the distance, is too small by the amount of $1/n$th of its *true size**.

This may be put in a slightly different form which also holds good in all cases. If an object is at a distance u equal n times the focal length f the expression

$$\text{Size of object}\times\frac{f}{u}$$

gives a value for the size of the image which is less than the true size. The value requires to be larger by $\frac{1}{n-1}$th of the image according to the *approximate* rule. For example, if the distance is 100 times the focal length ($n=100$) the size of image by the approximate formula is too small by 1-99th of its size.

These rules therefore provide the means (on the basis of the accuracy of scale required and leaving depth of focus out of consideration) of deciding what is the minimum distance of an object in order that a series of lenses may yield images of sizes proportional to their focal lengths.

The foregoing considerations (from the point of view of depth or accuracy of scale) apply to formulæ Nos. 3, 6, 11 and 12 to be given in the second part of this article. They also apply to the case when the distance of the lens from the *object* becomes practically equal to the focal length of the lens, viz., in reproduction on a great scale of enlargement. Projection with the optical and, particularly, the cinematograph lantern is the only operation of this kind which commonly occurs in practice, the scales of enlargement being respectively about 60 and 180 times. As the image distance is always ascertainable in these circumstances, calculations are made with it as the basis, and therefore it is not necessary to refer further to the effect of depth in this case. The reader will, however, see that for the reasons already mentioned formulæ Nos. 2, 5 and 9 in the next section, namely, those containing the object-distance, cease to be of service in calculations involving a high scale of magnification.

Depth of Definition, Scale and Angle of View.

If a very small stop is used in the lens, the convergent pencils of light which form the image are made very narrow. The angle of each pencil at the focus then becomes so small that the plate may be moved a considerable distance in either direction from a position of focus at a large aperture without causing perceptible unsharpness of the image. The lens in these cir-

* According to other views on depth of field, the distance obtained by the above formula may be halved.

* This perhaps is not obvious at a first glance, but will become so by comparing the true size of the image with that obtained by assuming the scale to be proportional to the focal length whatever the distance of the object.

In any circumstances,

$$\text{image}=\text{object}\times\frac{f}{u-f} \quad \text{(formula } b\text{)}$$

Assuming the size of image to be proportional to the focal length for any distance of object,

$$\text{image}=\text{object}\times\frac{f}{u}$$

$$\text{Therefore error}=\text{object}\left(\frac{f}{u-f}-\frac{f}{u}\right)=\text{object}\times\frac{f^2}{(u-f)u}.$$

Admitting an error of 1 in n, error is

$$\text{object}\times\frac{f}{n(u-f)}.$$

Therefore,

$$\frac{f}{n(u-f)}=\frac{f^2}{u(u-f)}$$

whence

$$\frac{f}{u}=\frac{1}{n}$$

that is, $u = n$ times f.

To put this result in words, if you calculate the size of an image on the basis that the image is equal to the size of the object multiplied by the focal length of the lens, and divided by the distance of the object, the calculated size of the image is smaller than the true size of the image. It is smaller by an amount which is exactly the same proportion of its true size as the proportion of the focal length to the distance of the object. Thus, if the focal length is 1-1000th of the distance, the size of image which is calculated in this way is 1-1000th (= .1 per cent.) smaller than the true image—that is, is 999 thousandths (= 99.9 per cent.) of the true size.

cumstances approximates in its action to a pinhole. Advantage can occasionally be taken of this fact in practice. For example, in the use of a folding camera fitted with a 4-inch lens, a picture of a distant object may be obtained on a larger scale by setting the lens front so as to afford an extension of, say, 4½ inches (the position for focus on an object at 3 ft. distance) and stopping down the lens to *f*/32, or *f*/45. On the other hand, when photographing in confined quarters, a greater angle of view may be included (on a reduced scale) by placing the lens, say, 3½ inches from the plate and again obtaining sharp focus by the use of a small stop. In these circumstances the focal length obviously ceases to be a factor in the scale of reproduction; the latter is then simply the ratio of the image distance *v* to the object distance *u* (formula *a*).

Camera Extension. Back Focus.

As already stated, the term "camera extension" will be used in the formulæ and examples to follow as a convenient name for the distance of the image from the exit node in ordinary photography. Since the exit node in most lenses is fairly near to the diaphragm, the actual camera extension (lens flange to focussing screen) is almost always an inch or so less than this distance. If the exit node is well in front of the diaphragm, as it is, for example, in the Aldis lens, the actual extension demanded of the camera is correspondingly less. In photographing very distant objects, the distance from the focussing screen to the exit node is almost exactly the focal length of the lens. The term *back focus*, sometimes found in opticians' catalogues, is usually employed to denote the distance of the hindermost part of the lens mount (the flange or the rear cell) from the focussing screen in these circumstances. While giving an indication which is of practical utility it does not enter into calculations relating to image formation.

Scale of Reproduction and Exposure.

In a previous paper on the speed of a lens ("B.J.," September 16, p. 550) it has been shown that with any lens the intensity or brightness of the image is proportional to the area of the stop and inversely proportional to the distance from the lens to the image, *i.e.*, to $\frac{d^2}{v^2}$. The relative exposure is therefore proportional to $\frac{v^2}{d^2}$. Hence, with a given lens and with the same stop used for successive copying or enlarging operations on different scales the exposures required are proportional to v^2, that is, to the camera extension multiplied by itself.

But, leaving out of consideration the possibility of photographing on different scales (with the same lens) at the same camera extension owing to depth of focus, we have seen that the distance *v* is always equal to the focal length of the lens *plus* the focal length multiplied by the scale of reproduction R, that is, $v = f + f \times R = f(1 + R)$. Therefore the exposures when photographing on different scales are proportional to $f^2 \times (1 + R)^2$. And since f^2 is a common factor as long as the same lens is used, the exposures are proportional to $(R + 1)^2$.

Thus, for example, the relative exposures, with the same lens and stop, when (1) photographing same size and (2) copying-enlarging three diameters are:—

(1) ..... $(1 + 1)^2 = 2^2 = 4$.
(2) ..... $(3 + 1)^2 = 4^2 = 16$.

The exposure when copying-enlarging three diameters requires to be four times that when photographing same size. This rule applies to any scales of enlargement or reduction, but it will be seen that for considerable degrees of reduction R is a correspondingly small fraction, and therefore beyond a certain limit does not appreciably increase the value of $(R + 1)^2$. For example, in photographing on the scales of reduction of one-fifth and one-tenth (= .2 and .1 respectively) the relative exposures are $(1.2)^2$ and $(1.1)^2 = 1.44$ and 1.21 respectively, showing that in photographing to one-fifth scale only about one-sixth more exposure is required than for a copy under similar conditions on a scale of one-tenth. It is therefore unnecessary to make allowances for variations in exposure due to the scale of the image when the degrees of reduction to be compared are greater than about 10. When copying on various scales of enlargement, the variations are, however, considerable.

In practical work, such as copying originals, allowance for the variation of exposure due to the scale of the image is usually made by taking the exposure when copying same size as 1 and expressing the exposures on other scales by proportionate numbers. This table, familiar for many years in the form drawn up by Mr. W. E. Debenham, serves for use with one lens employed with a given actual stop. The following examples of its construction will further illustrate the application of the $(R + 1)^2$ rule already given, and will serve to show the derivation of the rule from the formula connecting the scale of reproduction and the focal length of the lens.

Scale R.	*v* relative camera extension. (*a*)	(*b*)	v^2 (relative exposure).	Relative exposure same size=1.	
1	$f+f$ =	$2f$	$4f^2$	1	1
½	$f+\frac{f}{2}$ =	$\frac{3f}{2}$	$\frac{9f^2}{4}$	$\frac{9}{16}$	.56
⅓	$f+\frac{f}{3}$ =	$\frac{4f}{3}$	$\frac{16f}{9}$	$\frac{16}{36}$	.44
1/10	$f+\frac{f}{10}$ =	$\frac{11f}{10}$	$\frac{121f^2}{100}$	$\frac{121}{400}$	.30
2	$f+2f$ =	$3f$	$9f^2$	$\frac{9}{4}$	2.25
3	$f+3f$ =	$4f$	$16f^2$	4	4
4	$f+4f$ =	$5f$	$25f^2$	$6\frac{1}{4}$	6.25

G. E. B.

(To be continued.)

PHOTOGRAPHS FOR THE ARGENTINE.—According to the daily Press thumb- and finger-prints are to be required from all persons entering the Argentine after the end of this year. Intending passengers are already required to make personal application at one or other of the Consulates in this country, and to supply two small loose unmounted photographs.

BARGAINS IN CHEAPSIDE.—A distinctive publication among catalogues of second-hand apparatus is that just issued by Messrs. Robbins Manistre, The London Camera Exchange, Ltd., 2, Poultry, Cheapside, London, E.C.2, an excellently printed 64-page list which will repay inspection by intending purchasers, professional or amateur. Messrs. Robbins Manistre adopt the slogan "Something you want for something you don't want," in double reference to their large stock of goods and their terms for supply on a part-exchange basis. The list includes full specifications of enlargers, vest-pocket and other small cameras, reflex cameras, folding focal-plane and stereoscopic cameras, as well as a very great variety of hand and stand instruments. Lenses, from the largest to the smallest, by all the leading makers likewise make up a large section of the list. Prices, we are informed (and we see evidence in the list) have been adjusted to come into line with current market values, and commendable emphasis may also be laid on the firm's declared practice of endeavouring to give the most accurate description of the features of each article and also of its condition. We can heartily recommend the list to those looking around to revise or supplement their equipment. The list is sent free on application.

B

AERIAL PHOTOGRAPHY AND PHOTO-TOPOGRAPHY.

The Twenty-fourth Traill-Taylor Memorial Lecture. Delivered by M. L. P. Clerc at the Royal Photographic Society.

(*Continued from page* 672.)

Internal Orientation of the Image.—In the cameras to be used in mapping on a large scale, it is necessary to provide some means indicating on the photograph the intersections of the optical axis by the plane of the image, supposed to be exactly perpendicular to the said axis; this "principal point" is customarily furnished in photo-theodolites by the intersection of two lines, each of which is defined by two points, registered in the image; these points can be the centres of small conical holes in metallic masks, slightly protruding on to the image or images of the exit pupil of the lens projected by auxiliary lenses of a very short focus. In the absence of some registration of the "principal distance," the distance of the exit nodal point from the principal point, it would be necessary to register the number of the apparatus or of the lens, or some specific sign permitting without any doubt the identification of the camera used to get each photograph.

The use of metal sheaths in the changing box of a photographic camera gives no security of the exact location of the plate relatively to the lens; the rebates are frequently warped, and the thickness of the metal is not always the same. For very precise work it would be desirable to provide some firm abutment to the plate itself at the moment of taking the photograph, as is the rule in the building of photo-theodolites, and not to the rebates. The application of this desideratum to a magazine is obviously a mechanical complication; a somewhat analogous device was used formerly for another purpose by a German maker established in France, Mackenstein ("Bull. Soc. Fr. Photo." [2], vol. 19, August 15, 1903, p. 392).

External Orientation of the Image.—Long before the war the first experimenters in aerial photography attempted to register on each image some of the necessary data to define the location of the plate relatively to the ground at the instant when the photograph was taken. Readings of a compass, of an altimeter, and of various styles of clinometers have been photographed on a corner of the plate. The effects of inertia, during rapid rotary motions of the aeroplane, are able to falsify the indications of these instruments, but when photographs are taken in regular sequence with sufficient overlap, photographs taken in abnormal conditions are easily detected when proofs printed from the negatives are used to mount a mosaic, such photographs protruding out of the common line of those taken in straight flight.

Clinometers regularly used on some German cameras of Zeiss or Goerz make were founded on gravity and gave the slope of the plate and the angle of the lines of maximum slope with one of the geometric axes of the plate: they were used only for the taking of oblique photographs, but it would be easy to adapt them to vertical photography. Instead of photographing pendulums, a French photographer, Liabeuf, in a field-made clinometer, used two air-bubble levers, the indications of which permit of calculating the same data as above. It would be very desirable that an inclinometer be constructed, founded on gyroscopic stabilisation of the indicator, and some attempts already made in this way will lead, let us hope, to a practical solution of the problem.

Some Plate Cameras.—Whereas the magazines used on French and German cameras are derived from the old Hanau's magazine, used with some little differences on many hand-cameras for amateur or press work, the Gaumont magazine was the only one of this type specially devised for aerial photography.

The magazines used on British cameras (Thornton Pickard), and some French ones built in the field by some experimenters (Boulanger, etc.), seem to proceed from the idea of a German inventor, Th. Bänder, to whom was granted, ten years ago, an English patent (22,533, 1911: "Brit. J. Phot.," vol. 59, 1912, p. 618).

Rotary changing boxes built in France in the last months of the war by De Ram and by Fournieux have some analogies with a device described about twenty years ago by J. A. Pantasso in a French patent (317,959, January 21, 1902).

Let us mention also magazines with two adjacent compartments (Ploeck, Folmer, Chassel, etc.), derived from the old Flo changing box, the Italian Lamperti apparatus, recalling the mechanism of the old detective-cameras, and some ingenious but somewhat intricate plate-changing mechanisms of H. Jacquelin and of R. Aubry.

It was rapidly realised that hand-operated cameras cannot give regularly perfect results without employing very trained operators, who suffer severe strain, and who are prevented from paying sufficient attention to more useful things than the supply of muscular labour.

The first step in the way of a simplification of the working of aerial cameras was the connection between the changing of the plate and the setting of the shutter, as in the E camera of the Royal Flying Corps, or in French cameras built by various experimenters as Boulanger, Borzecki, etc., sometimes also the releasing of the shutter was obtained by the reverse movement of the lever actuating the two other functions, as in the Lamperti apparatus and in those evolved by Jacquelin, Aubry and others; most of these cameras were operated at a distance by Bowden wires.

The second step was the employment of motive power for changing the plate and setting the shutter, the releasing being left at the personal control of the operator; the power can be supplied either by a wind motor or by an electromotor; the use of clockwork is out of the question, the elasticity of the springs being too greatly depressed at low temperatures, and this circumstance is probably the cause of the systematic failures of the Brock camera.

The last step was the complete automatism of the apparatus, some mechanism releasing the shutter at regular intervals, the time elapsing between the taking of two pictures being changeable at the will of the operator, either by speed-reducing gears or friction discs, or by an alteration of the pitch of the propeller, or by varying the supply of air to the wind turbine. Preference is to be given to the less intricate mechanism, all delicate adjustments being inclined to go wrong after some rough landing.

In the last period of the war almost all makers of aerial cameras had solved this problem, but these automatic cameras were delivered too late to be effectively used before the cessation of hostilities.

Coupled Cameras.—Long before the war multiple cameras were used to cover at a time, from one standpoint, all visible ground, partly by a vertical camera and partly by a number of oblique cameras symmetrically disposed around the vertical axis of the system. Such a device was necessary for photography from ordinary balloons, without any control on their travel, but has no real advantage for photography from an airship.

But the coupling of several cameras is interesting for another purpose. For precise mapping it is necessary to have at least three photographs of each part of the ground, each taken from a different standpoint: one of them for the verification of the graphic constructions made from the two others. The easiest way to get these three sets of photographs is to use three cameras, suitably coupled and simultaneously released; the axis of one of these cameras must be vertical, the two others being located in two rectangular vertical planes containing also the axis of the vertical camera, the angle of these axes with the vertical being about 30 degrees. In such conditions, the three lines of which the common intersection will give a point on the map cross at an angle of from 45 to 90 degrees, the point being perfectly determined.

The experiments actually pursued in France for the cadastral surveying of devastated countries are made on this principle; it is hoped that three automatic cameras, each of them supplied with a magazine for 150 plates 18 by 24 centimetres, will be so coupled for the execution of this work.

Camera Suspension.—While the first cameras used on aeroplanes at the beginning of the war were held by hand outside the fuselage and, afterwards, through an opening in the floor, the extending use of long-focus cameras, heavily loaded with a number of large-size plates, made it necessary to extemporise in the field some means of suspension not provided by the technical services The

most extravagant conceptions were given full vent, and each squadron, or somtimes each observer, had a special model built by the engine-men of the squadron.

An efficient suspension must not only absorb or considerably weaken vibrations of short period, but also subdue and slacken pendular oscil'ations and torsions, this last condition being of particular importance for precise mapping, where it is necessary that the image of a point be a point, and not some element of a line. It is also very desirable that the suspension ensures the verticality of the axis of the camera, or some invariable slope of the said axis. For convenience of installing and to ensure good regulation of the suspension, the camera and its vibration absorbers should be preferably built as a unit, easily fastened to the aeroplane by some bolts or straps and easily removed after each flight, without any intricate adjustments, for which the time allowed is rarely sufficient.

I believe that the British Air Force, and afterwards the American, were the only ones to use a testing method of camera suspension by flying over some intense lights, one of which is periodically interrupted, on a dark background with the lens uncovered, getting thus undulated trails on which can be measured the period and the amplitude of the residual vibrations.

Practical comparisons of the various mountings showed that any rigid mounting is to be avoided and that almost all modes of suspension are efficient if the camera is mounted at its centre of gravity, this condition involving the rejection of all plate cameras in which the changing of plates leads to an appreciable displacement of the centre of gravity.

I mention, as being very convenient, a mounting introduced in the French Army and consisting of four parallel bell cranks, rigidly linked, transforming all shocks into translation movements, deadened by springs, and also the use of conveniently adjusted springs or of tennis balls, rubber sponge, thick felt and similar vibration absorbers. Pendular suspensions and floor mountings have almost always given very bad results. The maintenance of the verticality of the axis could only be ensured by some gyroscopically controlled mounting; some patents have been granted for such devices, but I have not heard of the results so obtained.

Photographic Manipulations.—In addition to the condition of having a high chromatic sensitiveness, the photographic emulsions suitable for aerial photography must possess a high resolving power and be able to be rapidly developed to great contrast, with the minimum of fog. The gelatine used in the preparation of these emulsions must be sufficiently hard to withstand warm solutions and rapid drying.

Desensitisation, according to Luppo-Cramer's process, is very valuable in permitting visual control of the development and keeping the balance between the necessity of sufficient contrast and avoiding that the fog due to atmospheric haze gives a too high density; desensitisation is actually adopted by the French and Japanese Armies.

Experiments made for the United States Air Force at the Eastman Kodak Research Laboratory have shown the perfect suitability of chlorhydroquinone and metol developer, as giving a high value to gamma infinity, a high speed and a very good resolving power; the chlorhydroquinone is, unfortunately, not a regular article of manufacture, and has to be replaced by hydroquinone.

Sensitive papers used for printing or enlarging must be coated with very rapid emulsions of a high gloss, and giving extreme contrasts; the paper must possess a high tensile strength, even in the wet state; the gelatine must be sufficiently hardened to permit of very quick hot drying.

The shrinkage of the paper is a serious objection to the use of paper prints in photo-surveying; experiments made by the French Naval Surveyor, H. Rousilhe, seem to give proof of the suitability of paper prints for very precise work, if the paper is, before any use, wetted until it is fully expanded and then stretched on a stirator board, in which it is left until the completion of the work. The most convenient contrivance for the development of plates is certainly the single plate-holder suggested by E. Cousin, a number of these grooved frames being immersed at a time in a vertical tank, but it is necessary that such pieces are heavily nickel-plated to avoid the effects of chemical fog due to the contact of ordinary developers with copper or tin.

For the developing of films the Eastman Kodak Co. has issued an enlargement of their well-known film tank with a teeth-bordered apron of sufficient length to receive a 75-ft. film.

The distribution of very large issues of a number of aerial negatives in a very short time compelled, during the War, the design of various models of rapid printing boxes; a very ingenious type was that conceived by R. Aubry for the printing on continuous bands of sensitive paper, the printing box being completed by a very simple developing and finishing machine.

I will show on the screen, without any description, the successive models of travelling dark rooms used in the French Air Service.

The Photographic Correction of Negatives taken Obliquely.—I do not intend to repeat here the calculations I have already published in full in the "British Journal of Photography," Vol. 66, 1919, Nos. 3038 to 3091, but only to show, comparatively to the Schweimpflug's Perspectograph, the automatic enlarger-corrector, permitting a variable enlargement, I had devised in the form of a demonstration model; in this apparatus the law of conjugate points is automatically maintained by applying to the two axes of the swinging frames the cinematic connection known as Paucellier's inverter, and the connection of the planes of the two frames is ensured by two arms, each of which is perpendicular to one frame, these two arms crossing themselves in a slot, perpendicular to the optical axis, and constantly maintained by the inverter in a symmetrical position of that of the lens relatively to the middle of the portion of the optical axis bounded by its crossings with the axis of the swinging frames. In this apparatus the use of angular division was avoided by a sine scale.

A non-automtatic correcting camera has been devised by H. Rousilhe and is now being used in France for the preparation of cadastral maps; in this model the rising movement of the lens is replaced by the swinging of the said lens around an axis, cutting the optical axis between the two nodal points; if such swinging of the lens is not objectionable from a strictly mathematical standpoint, on the condition that the lens is of an ideal perfection, it is not certain that in practice it realises an improvement.

The Interpretation of Aerial Photographs.

I will consider only some properties of the shadows and the use of these properties.

First of all, it is important to hold the photograph in the right position to be able to have a correct perception of reliefs and hollows; contrarily to a rule admitted in some French circles, and reproduced in Ives' book, the best position of the photograph is not that in which shadows are falling toward the beholder, but that in which shadows are cast at 45 degrees on the right and the bottom side. I will pass round a photograph of a quarry in which the effect is quite convincing.

If the time at which a vertical photograph was taken is known, it is an easy matter to locate the true north on the photograph; I devised a dial which, when placed on the image, the hour-line being pointed in the direction of the shadows, gave the direction of the north for each period of the year. If, furthermore, the scale of the photograph is known, it is easy to deduce from the length of each shadow the height of the object casting it. I had computed a chart giving for all hours of the day (Greenwich time), and for all periods of the year, the length of the shadow, the height of the object being taken as the unit. This chart, with the corresponding calculations, has been published in the "British Journal of Photography" (May 30, 1919); it was also reproduced, with the above-mentioned dial, in Ives' "Aeroplane Photography," without any mention of their source.

Photo-topography.

Mosaic Mapping.—An aerial photograph, even if taken with a camera, the axis of which was perfectly vertical, or corrected to compensate for any inclination of the axis, is never coincident with a map, unless the ground be perfectly horizontal, a rarely satisfied condition. The photograph is, in fact, a conical projection, while a large scale map is an orthogonal projection on a plane tangential to the terrestrial sphere. All points of the ground located above the mean plane are projected on the photograph outwards of their true map position, and inversely all points located under the mean plane are photographed inwards of their true position in the map.

It results from this fact that when assembling prints for a mosaic, if the joining of successive photographs is not made along a horizontal line of the ground, the images of some high points are wanting and the images of some low points of the ground are duplicated on either side of the junction.

I should abuse your patience if I attempted to describe the necessary precautions for scaling a sequence of photographs joining two known points in a country of which no map has already been drawn, and also to scale and assemble a series of independent flights, each of them containing the images of at least two apices of the geodesic polygonal groundwork; instructions for this work are given at length in a recent French book by E. de Larminat; let me add that these methods are able only to give approximate maps on a low scale. It would be very desirable, for the making of mosaic maps, to possess a positive emulsion coated on a waterproof paper, to avoid the unequal stretching of the paper according as the measure is parallel or transverse to the fibres. All photographs taken for the building of a provisional mosaic map must be filed to be used for the drawing of a more precise map when a more complete trigonometrical survey will have been done by the classic methods.

Photo-topography.—A precise surveying on a large scale by aerial photography is possible only if the ground is covered by a network sufficiently dense of signals easily perceptible on the photographs, generally white panels symmetrically placed around each land-mark, the co-ordinates of each signal having been ascertained either by the classic methods of surveying or by photogrammetric or stereophotogrammetric methods.

Before using the data supplied by a photograph it is necessary to have ascertained the external orientation of the image, that is to say, to know the base on the ground of the vertical drawn from the standpoint, the height of this standpoint above the sea-level, and the intersection of the optical axis by the horizontal reference plane when the said photograph was taken. This problem can be solved either by graphic methods or in a correcting camera, or in a correcting enlarging lantern by successive trials, trying to get the coincidence of the images of at least four signals with the corresponding points of the map, for a first approximation, and with the projections of these signals, from supposed position of the standpoint, on the horizontal plane containing the lowest signal, for each following approximation, the unknown data being deduced from the readings on the various scales of the apparatus.

If one negative does not contain the images of a sufficient number of signals, but if this negative has a sufficient overlap with the adjacent photographs, it is generally possible to choose, in the common part of the two images, a sufficient number of well-identified points in the same plane to be able to get in a correcting camera a transformed image of one of the negatives such as would have been obtained, from the same standpoint, in the plane of the other. The two photographs can then be assembled, and such an assemblage does probably include the necessary number of signals.

This method can be generalised to any number of photographs and would permit the correction of a series of photographs, previously transformed in the plane of one of them, if the whole series contains the images of four known points.

It has been suggested to dispose on the ground a number of signals in great excess of the requirements, and to defer the trigonometric survey of these signals until the photographs have been taken; it is then possible to choose most of the signals in the common parts of successive photographs in order to lessen the necessary number of calculations.

In a paper by Capt. A. Guillemet it has been asserted that in some attempts at cadastral surveying made two years ago near Lagny-sur-Marne with a very imperfect equipment, all points would have been located with an error of less than 8 ins., the map being drawn by the intersection method, and each point being determined by the intersection of three vectors, each supplied by a separate photograph

In Germany, graphic methods seem to have been superseded by actual measurements on the negative, either in a "Komparator" for the measurement of the co-ordinates of each point of the image, or in a "Bildmesstheodolit" for measuring angles as it would be possible to measure them with an ordinary theodolite from the same standpoint from which the photograph was taken. A full description of these apparatus and examples of calculations made from such data are given in Hugershoff and Cranz's book.

Attempts are now being made to use for aerial photo-topography modified models of the "stereocomparator," and of von Orel's "autostéréograph," each negative being presented in such conditions that its angle with the optical axis of the eyepiece is the same as its angle with the vertical when the photograph was taken. It seems difficult to hope for the same degree of precision attained in stereophotogrammetric work from steady standpoints the location of which is perfectly known.

Aerial Stereoscopy.—The stereoscopic examination of aerial photographs has played an important part during the War, both for the interpretation of photographs taken of the trenches or other enemy works, and to get a detailed knowledge of the forms of the ground, not shown by the existing maps, giving an easy means to draw approximately the orography of the maps on a large scale necessary for immediate use. I had the good fortune to be one of the first to try the stereoscopic examination of aerial photographs, and to express the rules which were adopted by the Allied Armies for the taking and the mounting of such stereograms.

Two cases must be considered according as photographs are taken vertically or obliquely. In the first case, all objects are included between two horizontal planes the interval of which is a very small fraction of their distance from the camera; in the second case, the photographs are usually taken at a very moderate height, and the distance of the foreground is often a small fraction of the distance of the background.

In vertical photography (or zenithal photography, as it is sometimes called) it is an easy matter to get a correct representation of the reliefs; using a stereoscope with eyepieces of the same focal length as that of the lens used on the camera, *it suffices that the interval between the standpoints of the two negatives, measured on the common scale of the two photographs, be equal to the mean separation of our eyes.* The use of ordinary stereoscopes, of about 5 ins. focus, reduces the vertical sizes of all objects relatively to their horizontal sizes but without any alteration of the absolute value of the reliefs so perceived; in practice, the use of such stereoscopes is an advantage, due to the magnifying of details by the short-focus eyepieces

I have justified this rule in the book I published two years ago; the slide actually on the screen reproduces one of the panels I used for this demonstration to my military students and shows the various deformations of a cube when the above rule is not complied with; the worst of these deformations is obtained when the separation of the two standpoints is shorter than indicated, because the resolving power of the stereogram (its ability to show faint reliefs) is badly lowered. In oblique photography the experimental rule expressed by L. Cazes in the best study ever published on stereoscopy ("Stéréoscopie de Précision." Paris, 1895) does not give a sufficient sensitiveness at great distances from the base; I have found that in the particular case of aerial stereoscopy, where objects at various distances do not overlap, as in terrestrial photography, but are classified by growing remoteness from the bottom toward the top of the image, the separation of the two standpoints can be five times greater than that recommended by Cazes, being calculated from the condition that the separation of homologous points (the distance of the two images, left and right, of the same point of the ground) does not vary by more than one tenth of the focal length of the eye-pieces of the stereoscope.

The diagrams now on the screen translate in an easily readable form the two rules to be applied respectively to vertical and to oblique aerial stereoscopy; this chart was issued during the War in the form of blue-prints which were largely distributed to those interested in this question; it is reproduced in my book, and the diagram for vertical stereoscopy has also been reproduced in Ives' book, but after my signature was erased.

I believe it is necessary to point out that the forms suggested by an aerial stereogram can be largely different from the real forms if, when taking the two photographs, the optical axes are not exactly parallel, and their common direction exactly perpendicular to the line joining the two standpoints; unless the photographs be corrected before they are used in the mounting of the stereogram, the transgression of this rule will transform planes into cylinders of circular, elliptic or paraholic curvature; long after I had studied these deformations, and proceeding to bibliographical researches, I found that the same problem had been discussed between these walls by Lyndon Bolton ("Photographic Journal," Vol. 43, 1903, pp. 107-118) and elsewhere by German mathematicians.

I will not lengthen an already too long paper by discussing practical rules for the taking and mounting of aerial stereograms, and I prefer to show you some results, using some anaglyphic slides obtained by Mr. L. Gimpel, who has recently described his procedure ("Bull. Soc. Fr. Phot." [3], vol. 8, 1921, pp. 194-204).

L. P. Clerc.

FORTHCOMING EXHIBITIONS.

November 17 to 19.—Bowes Park and District Photographic Society. Particulars from the Hon. Sec., S. Smith, 68, Mannock Road, Wood Green, London, N.22.

November 23 to 26.—Rotherham Photographic Society. Particulars and entry forms from the Hon. Exhibition Secretary, Sydney G. Liversidge, "Orissa," Gerard Road, Rotherham

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Latest date for entries, January 30. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick Glasgow.

February 11 to 25.—Scottish Photographic Salon. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

Patent News.

Process patents applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, October 31 to November 5:—

STENCILS.—No. 28,982. Photographic stencils, and method for making. J. D. Coe.

CAMERAS.—No. 28,875. Cameras. F. W. Flood and M. B. Sheridan.

VESSELS.—No. 29,360. Vessel for photogeaphic processes. A R. Sammeregill.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

OZOBROME PROCESS.—No 148,462 (June 16, 1919). In practical operation it has been found advisable, in order to facilitate the development of the medium tones, to add alum to the bath in which the carbon tissue is to be immersed before applying the same upon the original print. But in this bath the alum causes the formation of insoluble precipitates which are deposited and whereby the bath is weakened, so that it becomes impossible to obtain successive prints of uniform character, save by adding to the bath the proper amount of those constituents which become weakened.

In order to obviate these drawbacks, and to obtain the pigment-coloured images with their relative values in the half tones, the invention consists in previously preparing the tissues by immersion in an ozobrome bath containing no alum. After drying, these papers are preserved in a dry place, and, upon using the same, it is only required to immerse them in water or in a solution of one of the constituents of the ozobrome bath before applying them in the usual manner upon the original print.

In this manner a new product is obtained, consisting of a tissue which is impregnated with the reagents constituting the ozobrome bath, no alum being used. The paper is dried and can be kept, and when required for use is immersed in water or in a solution of one of the constituents employed for the previous impregnation.

The pigmented paper is immersed in a complete solution which does not contain alum, that is to say, in a bath containing the following:—bichromate of potassium, ferricyanide of potassium, and bromide of potassium, and the paper is dried, and when required for use is immersed in water or in a solution of one of the above ingredients. Alternatively, one of the constituents of the solution may be omitted, for example, the bichromate of potassium, which consequently gives for the composition of the bath in which the paper is to be impregnated: ferricyanide of potassium and bromide of potassium.

In such alternative the paper is prepared for use by immersing it in a solution of the constituent which has not been utilised to obtain the previous impregnating solution, that is to say, in the above particular example, in the bichromate of potassium. This method of previous impregnation can be employed at the present time whatever may be the composition of the coated paper.

Instead of preparing the paper by using as a base a coated paper of a current type which is immersed in the bath as described, the paper according to the invention can be prepared by employing an ozobrome bath without alum and mixing therewith the colouring matter, the mucilaginous substances forming the support and the usual products contained in the coated paper. This composition is then coated upon the paper according to the well-known methods. The mucilaginous gelatine can be replaced by albumen, gum or other suitable mucilaginous substances, while the pigments can be constituted by inert colouring matter in powdered form other than carbon.

Instead of employing as in the usual methods a paper containing colouring matter which is to be immersed in the ozobrome bath immediately before the said paper is applied upon the silver print, which gives uncertain results and a lack of uniformity in the prints obtained, in the process according to the invention a paper is produced containing the colouring matter together with constituents of the ozobrome bath, which can be kept in the same manner as an ordinary paper containing silver salts.—Louis Ratier, Rue Lallier, Paris.

SILHOUETTE PHOTOGRAPHS.—No. 147,621 (July 8, 1920). The invention is a modification of the process described in Specification No. 169,233 ("B.J.", October 28, 1921, p. 647). One filter only may be used instead of two or the same result may be attained without any filter at all. Using, for example, a yellow background the first picture may be taken with a yellow filter upon an orthochromatic plate or film. In this case the background will appear opaque, that is, so much of the coating as is occupied by the background will, after development, appear on the negative as covered. The second view is taken on an ordinary plate or film which is under normal conditions almost insensitive for yellow, and in the negative the background will be transparent. On the print the background will thus in the first case become white, in the second case black. If an emulsion which is specially sensitised for yellow is used for the first picture, there is no necessity of employing a filter in either case.

Similar conditions exist for backgrounds of other colours. In the case of a blue background, for instance, the first picture may be taken with an ordinary plate or film, because its coating is, as is generally known, highly sensitive for blue, and, accordingly, the blue background will come out opaque. For the second picture an orthochromatic plate may be taken, the sensitiveness of which for blue is perfectly neutralised by a spectroscopically suited yellow filter, so that the background appears transparent, or a plate may be employed which has been rendered insensitive for blue by an impregnation with dianil red. In the former case only one filter is required for screening the blue rays, while in the second case no filter at all is required.—Hans Goetz, 1, Sendlingertorplatz, Munich, Germany.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

NOVEX. No. 418,671. Chemical substances used in photography, photographic plates and photographic films. Kosmos Photographics, Ltd., Balfour House, Finsbury Pavement, London, E.C.2, and Pixmore Avenue, Letchworth, Hertfordshire, manufacturers. September 20, 1921.

WELLINGTON (CHILD DESIGN).—No. 412,403. Photographic paper. Wellington and Ward, Shenley Road, Boreham Wood, Elstree, Hertfordshire, manufacturers. February 11, 1921.

MESSRS. WITT AND WESTLEY, manufacturers of photographic mounts, advise of their change of address from Finsbury Park to 13, Bishop's Court, Holborn, E.C.4, where their telephone number is Holborn 2094.

LITERATURE OF AERIAL PHOTOGRAPHY.—M. L. P Clerc appended to his Traill-Taylor lecture (the concluding portion of which appears in this issue) a valuable list of the articles, papers, books and patent specifications relating to aerial photography and photo-surveying. We hope to publish it in a later issue.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Monday, November 21.

Birmingham Photographic Art Club. "Bromoil" Demonstration. H. J. Shepherd.
Bowes Park and District Phot. Soc. "Flashlight Portraiture." Messrs. Johnson.
Bradford P.S. "Bromoil for Beginners." W. E. Gundill.
Dewsbury P.S. "North-East Yorkshire." S. Guy.
Glasgow and West of Scotland Amateur P.A. "The Mountains and Cities of Italy." Dr. Inglis Clark.
Kidderminster and Dist. P.S. "Winchelsea and Rye." Algernon Brooker.
Leeds C.C. "Rambles in Upper Wharfedale." Thos. Ryder.
Southampton C.C. "The Correction of Distortion with the Enlarging Lantern." E. N. Ellis.
South London P.S. "Camera Portraiture." C. P. Crowther.
Wallasey Amateur P.S. "Bromoil." J. B. Potts.
Walthamstow and District P.S. "A.P." Prize Slides.

Tuesday, November 22.

R.P.S. "Developments and Improvements in the Carbro Process." A. C. Braham.
Birmingham P.S. Annual General Meeting.
Cambridge and Dist. Phot. Club. "2,000 Miles up the Nile." Capt. E. A. Ketteringham.
Exeter Camera Club. "Dartmoor." G. T. Harris.
Hackney Phot. Soc. Print and Slide Competition.
Leeds Phot. Soc. "The Microscope." A. O. Allen, M.A., B.Sc., A.R.C.Sc., and G. Wingfield, M.A.
Mottingham P.S. Photographs by Members (Prize Competition).
South Glasgow C.C. "Combination Printing." Thos. Carlyle.
South Shields P.S. "Toning Bromide Prints." Harbit Heal.
Tyneside Phot. Soc. "Enlarging." A. J. Dalton.
Welfare C.C. "Common Faults and Defects in Plates and Films."

Wednesday, November 23.

Accrington C.C. "Old Processes and New Methods." W. F. Slater.
Borough Polytechnic P.S. "Simple Picture Making." R. H. Lawton.
Croydon C.C. "A Rational and Reliable System of ascertaining Correct Exposure in Bromide Printing and Enlarging." J. M. Sellors.
Dennistoun Amat. P.A. "Working up Prints." J. M'Clure.
Gateshead C.C. "Press Photography." J. R. Johnston.
Ilford P.S. "London from Many Points of View." H. Creighton Beckett.
Partick C.C. "Nature through a Microscope." J. G. Cree.
Photo-micrographic Society. Members' Evening.
Rochdale Amateur P.S. "Carbon." A. E. Cooper.
South Suburban P.S. "How I use Self-Toning Paper." P. R. Salmon.

Thursday, November 24.

Camera Club, The. "A Colour Photographing Trip in Canada." Miss Olive Edis.
Hammersmith Hampshire House P.S. "Photogravure, its History and Application." A. J. Bull, M.Sc.
North Middlesex Phot. Soc. "Some Points on Picture Making." B. C. Wickison.
Optical Society. "The Polariscope, from an Historical Standpoint." Prof. F. J Cheshire.

Saturday, November 26.

Edinburgh Phot. Soc. "The Structure and Growth of Edinburgh." F. C. Mears.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 15, the president, Dr. G. H. Rodman in the chair.

A lantern lecture, "Some Sea Birds," was delivered by Mr. F. R. D. Onslow, and dealt in a most interesting manner with the author's experiences as a photographer of marine birds. A large number of lantern illustrations showed the range of his work in this field. The hearty thanks of the meeting to Mr. Onslow were accorded

CROYDON CAMERA CLUB.

"Another of those rotten 'print displays' for next Wednesday," disgustedly exclaimed a worthy medical member whilst perusing the syllabus the previous week. He had evidently forgotten that photographic societies have as the reason, or excuse, for their existence the production of photographs, including, of course, every step necessary to the attainment of that object. With old members, who have seen many house exhibitions, all much of a muchness, and listened to more or less, stereotyped criticisms year in and year out, the appeal of such evenings must certainly tend to diminish with time. On the other hand, a few veterans appear to preserve an unabated interest, and the enthusiasm of the younger generation of pictorialists should make ample amends for any feeling of boredom experienced by some. Last week the "print display" comprised few exhibits, but of excellent quality. The fog prevailing doubtless prevented many members from arriving with masterpieces under their arms.

During the evening Mr. A. E. Issac showed an "Osglim" lamp of the General Electric Co. As the name suggests, it is of very low candle-power, and, indeed, may be regarded as an electric night-light. He suggested its use for a dark-lamp illuminant. A rare gas "Neon" glows orange between two electrodes contained in the bulb, and the life is far longer than that of a filament lamp. The consumption of current is only five watts (about one-fourth the lowest limit of filament lamps of the same voltage), and lamps are supplied for direct and alternating current at voltages 200 to 250. In cases where a small light is required continuously the "Osglim" lamp, in his opinion, seems just the thing. Another type is used for advertisement purposes, the cathode being shaped to various letters of the alphabet.

Mr. E. A. Salt said the lamp was very interesting, as many electricians thought that the electric light of the future would be on similar lines—the production of light without heat. The "Moore tube" is another example of gas being made to glow electrically, but the voltage required is very high and secured by a high-tension transformer. Such a tube can be run round the walls of a room, and careful provision has been made to safeguard against accident. A peculiar property of Neon gas is that it permits of the passage of the electric discharge at a comparatively low voltage. Although the light is of orange hue it is also rich in ultra-violet, an undesirable feature for a dark-lamp illuminant. A carbon (not a metallic) filament lamp, he said, is best for this purpose.

Among other cheerful items of the evening, which included the return of a valued old member, Mr. W. H. Smith, a set of photographs illustrating ruptures of the membranes of the brain was shown by Mr L. J. Hibbert. Owing to a slight misunderstanding sincere wishes were expressed for his speedy recovery

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EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Meeting held, Monday, November 7. Present: Messrs. MacKay, Moffat, Campbell Harper, Johnston, Fergusson, Laing, Norman Thomson, John Thomson, E. D. Young, George Balmain, W. J. Hutcheson, C. D. Crooke and Philip. Mr. Campbell Harper, the president, in the chair.

The President explained that at a meeting of the council of the Society it was unanimously resolved to send the congratulations of the members to Mr. Wm. Crooke, Princes Street, Edinburgh, one of their members, on the success which he had achieved at the exhibitions in America, and on the unique and distinguished honours which had been meritoriously awarded to him in that country. It was also agreed to invite him as a guest of the Society to the annual dinner in December. The Secretary read the letter addressed by him to Mr. Crooke, and Mr. Crooke's reply, thanking the members for their congratulations and accepting the invitation to dinner.

Mr. E. D. Young reported that in response to the circular sent out to the members he had an addition of three or four pupils to the drawing and retouching class at the College of Art. He thought if other six pupils joined that would assure the success of the

class and warrant the College authorities to continue it. The President pointed out the trouble which the Society had in getting this class started, and urged members to get as many as possible of their assistants to attend.

The annual dinner of the Society was fixed for Monday, December 5, at Messrs. Fergnson and Forrester's Restaurant, Princes Street. Messrs. Campbell Harper, Fergusson, Young, Moffat, Geo. Balmain and Philip were appointed a committee to carry out the arrangements.

The discussion on the minimum prices of commercial photographs was postponed to a further meeting, when it was hoped Mr. Hislop would be able to attend. It was unanimously agreed to invite Mr. Hislop to become a member of the Society.

The President mentioned that Mr. Crowther, of Messrs Marion, London, was giving a lecture to the Glasgow Society early next month, and that if an invitation was extended to him he would be pleased to come to Edinburgh and deliver one to the Society. It was agreed to invite Mr. Crowther.

Mr. Moffat mentioned that he had been approached by Mr. Turnbull, 20, Hillside Street, Edinburgh, the owner of a neat delivery van, offering to deliver photographers' parcels at the rate of 25s. per week, or 5d. each parcel. He thought that the proposal was a good one, and commended it to the members for their consideration.

A vote of thanks to the President concluded the meeting.

Commercial & Legal Intelligence.

Legal Notices.—Notice is given, pursuant to Section 242 (3) of the Companies (Consolidation) Act, 1908, that at the expiration of three months from November 11, 1921, the name of the Photographic Art Development Company, Ltd., will, unless cause is shown to the contrary, be struck off the Register of Joint Stock Companies, and the company will be dissolved.

Notice has been given that a petition for the winding-up of the Arundel Studio, Ltd., has been presented to the High Court of Justice by the Art Reproduction Company, Ltd., of 3-4, Plough Court, Fetter Lane, E.C., engravers and printers, a creditor of the company. The petition will be heard at the Royal Courts of Justice, Strand, W.C., on November 22. Any person intending to appear at the hearing of the petition must give written notice on or before November 21 to Arthur Benjamin and Cohen, 23, College Hill, E.C.4, solicitors, for the petitioners.

At a recent extraordinary general meeting of the members of the Langham Studio, Ltd., held at the offices of Messrs. Edward Moore & Sons, 3, Crosby Square, E.C.3, a resolution was passed to the effect, that the company be wound up voluntarily, and that Kenneth Alfred Edgar Moore, of 3, Crosby Square, E.C., be appointed liquidator. Notice is given, pursuant to Section 188 of the Companies (Consolidation) Act, 1908, that a meeting of creditors will be held at the above address on November 23, at 3 p.m., for the purposes provided in the said section.

Notice is given of the dissolution, by mutual consent, of the following partnerships:—(1) Between David Samuel Childs and Herbert Rowe, carrying on business as process engravers, at 20-21, Bride Lane, London, E.C.4, under the style of Childs & Rowe. All debts due to and owing by the late firm will be received and paid by David Samuel Childs. (2) Between Arthur Priestley Boocock and Frank Newsome, carrying on business as photographic publishers, at 178, Garnett Street, Bradford, under the style of The Northern Photographic Co. All debts due to and owing by the late firm will be received and paid by Arthur Priestley Boocock, who will continue to carry on the business.

Eastman Kodak Company.—In addition to the usual quarterly dividends of 1½ per cent. (being at the rate of 6 per cent. per annum) upon the outstanding Preferred Stock, and of 2½ per cent. (being at the rate of 10 per cent. per annum) upon the outstanding Common Stock, the directors have declared an extra dividend of 7½ per cent. upon the Common Stock, all payable on January 2, 1922, to stockholders of record on November 30, 1921.

NEW COMPANIES.

R. F. Hunter, Ltd.—This private company was registered on November 3, with a capital of £3,000 in £1 shares. Objects: To acquire the businesses carried on at 9, Cavendish Circus, Buxton, and 3, The Promenade, Cheltenham, and to carry on the business of photographic chemists, camera and other photographic apparatus manufacturers and dealers, portrait painters, photographers, etc. The subscribers (each with one share) are:—R. F. Hunter, 9, Cavendish Circus, Buxton, Derbyshire, photographer; Mrs. M. M. Hunter, 9, Cavendish Circus, Buxton, Derbyshire; E. Grundy, 22, Booth Street, Manchester, C.A. The first directors are not named.

News and Notes.

View-Stealing in America.—Mr. D. W. Griffith, the well-known film producer is suing the United States Government for spying on his studios from the air. He is taking this action to seek a definite ruling as to the rights of American Army airmen to fly over private property for the purpose of sight-seeing or taking photographs. Prying visitors, many with pocket cameras, have been excluded from the studios, and so aeroplane joy rides to see and photograph set scenes from the air have become popular.

Messrs. Wallace Heaton, Ltd., 84, High St., Sheffield, send us their November sale catalogue of sixty pages, listing 743 lots of apparatus which they are offering at special prices for the purpose of clearing stock. The goods represent leading models of all types of hand and stand cameras, lenses and enlargers, and a considerable variety of optical instruments, including binoculars, telescopes, microscopes, etc. The list contains full particulars of the firm's offer to forward on approval against deposit, or to supply on gradual payment terms, and is obtainable free on application.

The Kosmos Competition.—The list of prize-winners in the competition recently organied by Messrs. Kosmos Photographics, Ltd., has been published, and includes some hundreds of names. The first prize of £100 is gained by Mr. H. Victor Vokes, of Southampton. We are interested to learn that an enormous number of prints were received and that the general high standard of quality, particularly in the more expert classes, made the task of judging a somewhat difficult one. The Kosmos Company observe that the present competition brought in a very much greater number of pictures of real merit and confirms them in their view that very keen interest continues to be taken in serious photography. No doubt this fact will encourage them in the organising of future competitions and in repeating the very generous allocation of numerous consolation prizes.

Aerial Surveying by Photography.—The camera is to be used in order to expedite work on the new London to Southend road, the Ministry of Transport having decided to make a new survey by air of the proposed route between Romford and Prittlewell. The survey will be carried out by three men in about twenty minutes on the first fine day. If the survey of the 21-mile stretch were made under the old conditions it would take a small army of men several days.

An official of Aerofilms, Ltd., who will undertake the work on behalf of the Ministry, states that 170 separate photographs will be taken. The pictures will overlap, so that each shows an area roughly of ¾ of a mile wide and ½ a mile broad.. The Air Ministry has arranged to place ground signals a mile apart along the route to ensure that the airmen and photographic surveyors keep true to the straight ¾ of a mile belt.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

A CONTRAST RATING FOR PRINTING PAPERS.

To the Editors.

Gentlemen,—There have been three recent suggestions in the "B.J." to the effect that it is desirable for the manufacturers of printing papers to describe the "contrast" of their products batch by batch with a number indicative of the exposure range necessary to record upon any particular paper a white impression at one end of the scale of tones and the deepest black impression possible at the other end. It is considered that such a number would be more precise and informative that the expressions "soft," "vigorous," "portrait," and so on, in present use.

Precise information as to the properties of any particular batch of printing paper would be useful to the photographer in two distinct directions :—

(*a*) To enable him to renew an exhausted stock of paper with the certainty that similar prints would be obtainable on the new stock from the same or similar negatives.

(*b*) To enable him to decide which paper out of his stock of papers would be the most suitable for use with any one particular negative.

Let us consider (*a*) for a moment and examine to what extent a figure denoting the exposure scale of the paper would be sufficient to indicate the character of the resultant print.

In figure 1 there are depicted the characteristic curves of three printing papers which differ in every respect except that they possess the same exposure scale, and would in fact be labelled with

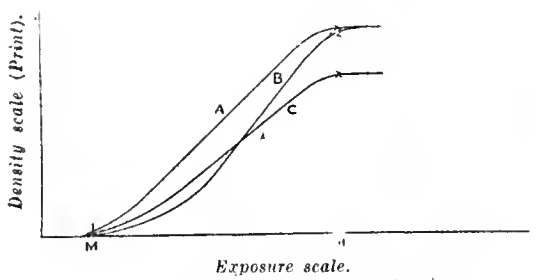


Fig. 1.—Prints A, B and C.

the same "contrast rating number" if manufacturers were to adopt the suggestions of Messrs. Hall, Taylor, and Thermit.

It is certain that these three papers A, B and C would yield prints of a totally different character when printed from the same negative. Paper A is a high-class paper giving a good reading for maximum black, and having a very desirably short under- and over-exposure period, together with a comparatively long straight line portion, indicative of its capacity to translate the negative gradations with fidelity. The gamma of this paper is less than that of paper B and greater than that of paper C. Paper B, possessing the same exposure range, is a paper with a prolonged under-exposure curve and relatively short straight-line portion. Except for the pure white and the deepest black tones, its rendering of the intermediate tones of any one negative would be totally different from the rendering of paper A. Paper C, possessing the same exposure range (MN), differs from A and B in giving a lower reading for maximum black. It would be, perhaps, a paper of different surface characteristics compared with papers A and B, such as a marked matt surface compared with a less matt surface, or its defective black may be due to a faulty emulsion. The rendering on C would be different from that on A or B.

It is certain that the "contrast rating" of a photographic paper cannot be adequately described by a figure indicative of its exposure scale alone. It would be moderately precise if both the exposure scale and the amma infinity were measured and given, or as an alternative the exposure scale and the measure of the maximum black. It would be still more precise if to either of these alternatives were added information as to the relationship between the length of the characteristic curve of the paper which was straight and that portion which was curved, a relationship termed the "rendering power" by Messrs. Mees, Nutting & Jones.

If a photographer were satisfied that a certain paper gave him the prints he required from certain negatives, then it is extremely unlikely that his request to the paper manufacturer for a paper of similar "contrast rating" would bring him a paper capable of giving precisely similar prints.

Let us examine the utility of this "contrast rating measurement" in enabling the photographer to decide what printing paper to use with a given negative. It is desirable in matching a negative with a printing paper to so choose a paper that the density scale (opacity range) of the negative should coincide with, or on occasions be somewhat less than, the exposure scale (range) of the printing paper. Given the exposure scale of the paper by the manufacturer under the title of "contrast rating," the figure which they are now being urged to give, we must in some manner estimate the density scale of the negative. Are we to guess it by viewing the negative in a good light and making an inspection estimate? Personally, I have been inspecting negatives and then actually measuring them for years, and my estimates based upon inspection alone are as erroneous as when I started. A grocer who sold tea and sugar by guesswork without the aid of a pair of scales, and who had practised that procedure for years, would doubtless be confident, unless bankruptcy or police court proceedings supervened, that he was capable of guessing weights with accuracy. It is fairly certain, however, that if he were persuaded to buy a pair of scales he would find that the guessed weight of a commodity was something very different from the real weight. The guessing of a weight with reasonable accuracy is simple compared with the accomplishment of a fairly accurate estimate by inspection of the density scale (opacity range, printing quality) of a negative.

It is quite certain that, in order to make full use of the "contrast rating" figure given by the paper manufacturer the photographer would have to be prepared to measure his negatives. The measurement of negatives involves apparatus which must be designed with care and used with care. Given satisfactory apparatus for the purpose and knowledge of its use it must be remembered that density measurements have two extreme values, a low value reading given when the measurement is made in perfectly diffused light and a high value reading when employing parallel light. The former reading is appropriate for contact printing and enlarging under conditions of perfect light diffusion, and the latter reading is appropriate when enlarging with the aid of a "condenser" lantern, provided that the degree of parallelism of the light illuminating the negative through the condenser is similar to that of the light by the aid of which the negative was measured. In the case of negatives in which the silver deposit is not perfectly neutral in colour, the density reading, no matter how made, will need correction to transform it into a value of use in actual printing.

It seems to me that the utility in practical photography of a figure giving the exposure scale of the paper is fading into insignificance. The figure does not indicate many of the properties of the printing paper emulsion which are vital to the question, and the difficulties in the way of utilising this information, so far as it goes, are sufficiently great to prevent its publication being of real value.

Practical photographers can do a great deal to help themselves in these matters without any additional information from manufacturers as to the numerical constants of the emulsion supplied. Choose a negative which will give a print upon soft Velox paper and will show a touch of white and a touch of black at the two ends of the tone scale. Between these two ends all the remaining negative gradations will be rendered in appropriate shades of grey. Such a negative will have a density scale of about 1.3, equivalent to an opacity range of 1 to 20. Keep that negative for making test prints on any paper. Make such a test print whenever new paper is bought, and if the print so made differs in appearance from any previous print on other papers, or other batches of the same paper, add it to the permanent collection of "differing"—

prints. In the course of a short time there will be formed a small collection of prints showing all the print differences that commercial papers are capable of yielding, inclusive of emulsion differences, paper surface differences, and colour of paper base variations. There will not be many prints in the permanent collection showing marked differences. Paste them on a chart and label them A, B, C, etc., in the order of their contrast. Compare a print from new paper with the prints in the permanent collection and label it accordingly. Store it when labelled in an appropriate compartment, and you have as much information as to its printing properties as you are ever likely to derive from the publication by the manufacturer of the emulsion constants.

The prints on such a chart are merely guides to the category in which new paper should be placed. It is unfair to examine such a chart and say that one print is better than another, unfair to the paper giving the worse print. The prints are purposely made from the *same* negative in order to bring out the paper differences, no matter what characteristic of the paper those differences may be due to. If the test negative chosen be one that gives a normal good print on soft Velox paper, then most of the vigorous gaslight papers will yield harsh prints with missing highlights and buried shadows, and most of the bromide papers will yield flat prints. If, however, such a chart be made, and if, upon the arrival of a new batch of bromide paper, the new paper be found to yield a print from the test negative equally as flat as a print on the chart, then it is certain that the new paper is suitable for all negatives which previously yielded good prints on the "chart" print paper and is equivalent to any stock in hand previously graded as equivalent to the same chart print. I have had the experience of making such a chart and writhing under the comments of brother photographers, to whom the chart conveyed no more than that "vigorous gaslight paper always gives hard prints of no value," and that "Messrs. Blank's bromide paper seemed to yield an unbearably flat result." It did, thus treated; and the fact that it did enabled it to be so classified that there was some chance of finding the right negative to make it yield a normal print of perfect quality.

The finished chart is a guide to the classification of papers in the order of their contrast-giving properties, and nothing else. The finding of a paper to yield a good print from a given negative remains (and is likely to remain, for the reasons already given) a matter of trial and error. The simplest and at the same time the most accurate way of ascertaining the printing capacity of a negative is not to study the negative or attempt to measure it, but to make a print and examine that. The print is either right, or flat, or too contrasted. If the error is flatness, then a paper of greater contrast picked out of the classified stock is the remedy. The classification of the papers has merely shortened the road to success via a trial print on some paper which at a guess the photographer thinks may possibly be about right.

I hope that I am forgiven for the excessive length of this letter. —Yours truly, B. T. J. GLOVER.

Sunnymere, Birkenhead Road, Meols, Cheshire.
November 6, 1921.

FOREIGN PHOTOGRAPHIC LENSES.

To the Editors.

Gentlemen,—In "Nature" of November 3 (page 505) I gave a short account of the result of the examination by the National Physical Laboratory of three lenses, two post-war ones, made in England of English glass, and one pre-war lens made by Goerz. The two English lenses were bought from stock at a large London dealer's, and the Goerz lens was specially selected for me by Messrs. Goerz's London agency.

As most photographic shops are now selling quantities of German lenses, it is to be presumed that the buyers imagine that these lenses are better than English made ones.

The following details may, I hope, help to correct such ideas. The full reports of the National Physical Laboratory being rather lengthy, I give a summary (kindly furnished by the Director of the N.P.L.) of the conclusions arrived at:—

"The series III 2 Doppel-Anastigmat, No. 118,054, by C. P. Goerz, full aperture $f/7$ (f = 176 mm.), has been examined over the field of view corresponding to a half-plate. The lens shows appreciable spherical aberration and distortion, and requires to be stopped down to $f/16$ to give satisfactory definition over the entire plate. The lens fails to reach the standard required for a certificate.

"The series II, Cooke Aviar lens, No. 960,024, by Taylor, Taylor & Hobson, full aperture $f/4.8$ (f = 214 mm.), has been examined over the field of view corresponding to a half-plate. The lens shows a little spherical aberration and slight distortion. The correction for coma, curvature and astigmatism are satisfactory, and at $f/4.8$ satisfactory definition is given over the entire plate. The lens reaches the standard required for a certificate.

"The Cooke telephoto lens, No. 86,732, by Taylor, Taylor & Hobson, full aperture $f/5.8$ (f = 371 mm.), has been examined over the field of view corresponding to a half-plate. As with telephoto lenses in general the distortion is appreciable, and amounts to a displacement of a point at the corner of the plate of nearly 2,3 mm. The corrections for spherical aberration, coma, curvature and astigmatism are satisfactory, and the definition at $f/5.8$ over the entire plate is excellent. The lens reaches the standard required for a certificate."

In another letter, the Director observes that "the Goerz lens is not as satisfactory as either of the Cooke lenses, although, on account of its smaller aperture, a better degree of correction might reasonably be expected."

I think it is a fair statement that the best English photographic lenses more than hold their own with the best Continental ones. Where the Germans score is in the excellence of their publicity departments. Most of our English firms ought to learn how to advertise. —Yours faithfully,

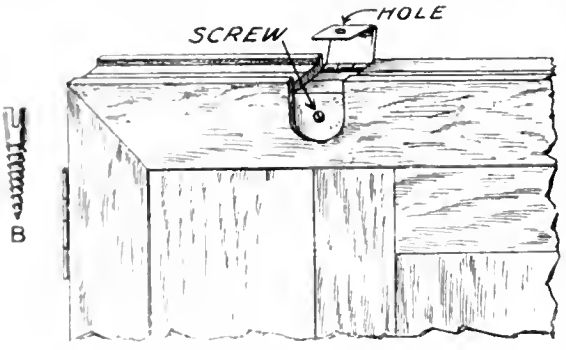
K. C. BROWNING.

16, Bridge Avenue Mansions, Hammersmith, London, W.6.
November 12, 1921.

DARK-SLIDE FASTENINGS.

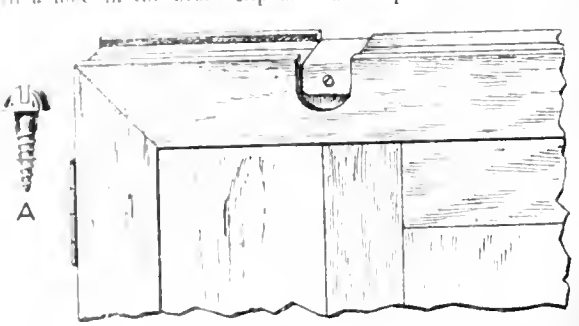
To the Editors.

Gentlemen,—In reference to the paragraph on dark-slides in your issue of November 4, p. 653, I beg to bring to your notice my



method of keeping the brass clips secure. It is the only dodge I know to be reliable.

Drill a hole in the brass clip as near as possible to the centre.



Bore a hole in the wood to correspond with the hole in the brass, screw in fully a small brass screw, remove the screw and cut off the head. Then screw into the wood by means of a pliers, or make

a cut in the top (B) by means of a small (hack) saw. Close the slide and you will find the clip will go into its place with a snap. You can make the grip tight or loose by adjusting the screw, and this is an advantage. If, however, this facility is not wanted a small brass nail (A) may be used, or a small screw with rounded head may be used if one can countersink the brass clip (inside) where it meets the screw head.

An extra safeguard is a rubber band—can be got any size at the stationer's. It must, of course, be slipped off before inserting the slide. When in use it is slipped over the slide to catch each clip.

I have endeavoured to draw the device for further explanation of above description.—Yours, etc.,

Tuam, Co. Galway, T. P. MacNally.
November 8.

THE NODAL SPACE OF A LENS.

To the Editors.

Gentlemen,—In my letter, page 679, of your issue of November 11, there are two errata.

Equation (3) should read $S=D_1-(D_2-D_1)\times\frac{2(u+1)^2}{2u^2-1}$

In the last line, $S=D_1-(D_2-D_1)\frac{18}{0.7}$ and not as written.

The latter error is my mistake, which I regret.—Yours faithfully, R. J. S. Simpson.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

K. J.—The firm we mentioned in our issue of June 3 as supplying a focussing magnifier with a sucker end was Messrs. A. W. Penrose, 347-349, Cathedral Street, Glasgow.

Mrs. F. N.—Legally the assistant was bound to work the full week, that is until the usual closing time on the Saturday, but we think any action for remedy in respect to his earlier leaving would probably be dismissed as trumpery by a magistrate.

W. A. H.—We are sorry we do not know where particulars of M. de Fontenay's work appeared, but are quite sure that you can obtain the information by applying to M. L. P. Clerc, c/o "Revue Francaise de Photographie," 35, Boulevard St. Jacques, Paris.

D. K.—The best suggestion we can make is that the painting should be fenced in on all sides with a kind of tent extemporised from thin muslin erected on a frame, the picture being placed at one end of the tent and the lens pointing into the other open end. This will avoid a good deal of the varnish reflection, but not enough to dispense with the usual panchromatic plate and a deep safelight, say K3.

F. J.—It all depends on what stipulation you made in agreement with the people when arranging the exchange of the cameras on approval. If there was no agreement at all then certainly the usual course is that a person who wishes to inspect an apparatus pays the carriage on it, but if nothing was agreed upon beforehand we do not think that you can hold the people to the payment of the charge on your apparatus.

Basement Dark-room.—Having a large cellar, 21 x 12, with one door leading into a small yard about 4 ft. square, could I convert this cellar into dark-rooms for assistants to work in? If so, would the Factory Inspector pass it? Do dark-room assistants come under the Factory Act?—J. N.

It does not sound a healthy place for assistants to work in, and we think it very likely that the place would not be passed by the Factory Inspector, under whose care assistants employed in workrooms come in accordance with the Factory Act.

S. M.—Under the Registration of Business Names Act you are required to register your business name if it is not your own name. That being so, you are required by the Act to print your name on business stationery, such as note headings or invoices. To omit to do so is a breach of the Act, in respect of which you are liable to be summoned. It is not necessary for you to use your true name in advertisements nor on the photographs which you supply. As regards the business card or price list we think the Act would require that your name should be printed on it. The Act applies equally to people of English nationality and to aliens.

J. O.—(3) For making the negative the best plate is one of the process or photo-mechanical variety, of which almost every maker has his own, or a process panchromatic, such as that of Wratten, if the original you have to copy is in colours. For the lantern-slides the best results will be got on one of the slow lantern plates. (4) There is no book on the production of lantern-slide advertisements, in the making of which there is nothing special beyond what is dealt with in the manuals on lantern-slide making and colouring, *e.g.*, "Practical Lantern Slide Making," by G. T. Harris, 1s. 6d. net, and "How to Colour Photographs and Lantern Slides," by R. Penlake, 1s. 6d. net. Both of these are published by Messrs. Iliffe, 20, Tudor Street, London, E.C.4.

C. J.—(1) We prefer backgrounds to be stretched upon frames and fitted with castors. (2) When so fitted the backgrounds remain quite flat and free from creases. They can be used in any part of the studio, and can be turned to or from the light to make them appear lighter or darker, as may be desired. Backgrounds or rollers must be kept in one position or on a heavy stand which is difficult to move. (3) If the roller system be used it is better to have the roller at the bottom with self-coiling cords to raise and lower it. This method is used for stage scenery and also for lantern screens. The roller tends to keep the background steady and the weight helps to pull out the flutes caused by rolling.

R. A. J.—The light from incandescent mantles is by no means so actinic for gas-light printing as that from a half-watt, but we should think that, say, two high-power mantles would allow sufficiently short exposures on the ordinary gaslight papers from reasonably quick-printing negatives. We do not think that any gaslight would be powerful enough for the slow gaslight papers. The Luna lamp of Messrs. W. C. Hughes is a very good lamp, burning methylated spirit, and being self-contained could be used with one or other printer as required. No doubt there are more powerful incandescent burners for gas, but our experience is that one of the very best is the "Howellite," sold by Messrs. Griffin. Three or four of these inverted burners ought to allow of sufficiently rapid exposures.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 3212. Vol. LXVIII. FRIDAY, NOVEMBER 25, 1921. Price Fourpence.

Contents.

SUMMARY.

The completion of the two recent articles on scale in optical reproduction takes the form of a somewhat lengthy arrangement of the rules and examples applying to calculations of the size and scale of the image of an object according to the particular circumstances of distance, camera extension, and focal length of lens. It is hoped that in some respects these rules have been made more explicit and free from liability to misuse than has hitherto been the case. (P. 702.)

In a contributed article, Mr. D. Charles describes an enlarging and reducing outfit employing diffused light from a set of half-watt bulbs. (P. 699.)

In his "Paris Notes" M. L. P. Clerc describes further experiments on de-sensitising. Lactic acid is being used for preserving the amidol developer, and a French worker of the Autochrome process employs a supplementary yellow filter during part of the exposure. A new lens and camera just placed on the French market are described. (P. 700.)

In a leading article we outline the measures which can easily be taken for introducing an adequate degree of system into the exposure of plates in the studio. (P. 693.)

The passe-partout style of mounting is capable of being used with good effect for fairly large prints inserted without any surrounding mounts. (P. 693.)

The interest which continues to be taken in automatic enlarging apparatus suggests the opportunity which exists for the combination of an enlarger of this kind with a printing box, providing the facility of the latter for feeding paper and for vignetting and masking. (P. 697.)

A maxim which might be applied with advantage to photographic workrooms, and particularly to those in which plates are tank developed, is that a temperature below that for physical comfort is also unsuitable for the photographic processes. (P. 693.)

It is interesting to look back upon the discussions which took place nearly thirty years ago on the respective merits of plates and film. (P. 693.)

Lieut.-Col. J. T. C. Moore Brabazon appeared before the Royal Commission on Awards to Inventors last week in support of a claim in respect to the invention of aircraft cameras. (P. 710.)

According to the "Scientific American," aerial photographs are being used in the detection of oil fields in Venezuela. (P. 705.)

Messrs. Ilford, Ltd., have declared a dividend of 8 per cent. on the ordinary shares for the year ended October 31. (P. 711.)

At the Royal Photographic Society, on Tuesday evening last, Mr. A. C. Braham gave a successful demonstration of the making of carbon prints by the Carbro process. (P. 709.)

Finders for cameras and an attachment for one-lens stereoscopic photography are the subjects of recent patent specifications (P. 706.)

EX CATHEDRA.

Projection Printing. Notwithstanding the great facilities which are provided by modern enlarging apparatus, it requires to be considered that a profitable field of invention still remains unexplored. As we pointed out in a leading article a month or two ago, the tendency in the future seems likely to be towards making printing (on development papers) an optical projection process. Among studios turning out portraits in quantity at low prices this system has, in fact, been widely adopted for a long time past; and it is somewhat remarkable that manufacturers of printing appliances should not yet have perceived the opportunity which exists for the supply of an apparatus which combines within itself the features of an enlarger and of a rapid printing box or machine. Judging from an illustration, something of this kind has been recently placed on the market in the United States by the Atlantic Photo Supply Co., of Baltimore, for the purpose of providing the means of copying, reducing and enlarging within one apparatus. We think, however, that a less comprehensive apparatus is likely to be more useful, namely, one which will allow of prints being made on scales of enlargement from, say, three times to same size and of upside-down vertical pattern, so that prints may be made with the speed of the present contact printing boxes. A device of this kind should allow of masking and vignetting being readily done, and an apparatus of this type could be designed to provide these facilities without much difficulty.

* * *

Optical Calculations. Although the application of the optical formulæ contained in the article "Scale in Optical Reproduction," which has appeared in our last two issues, is a question of quite simple arithmetic, we realise that there are many people who must have these rules expressed in a form without any mathematical symbols. While that is a perfectly easy thing to do, it cannot be done with the required explicitness in a small space; and therefore our desire to put these formulæ into ordinary language, and to adapt them to the various conditions occurring in practice, must be our excuse for the length of the compilation which appears on other pages of this issue. Even when all is said and done, cases arise in which certain rules or formulæ become misleading. This arises chiefly from the fact that the basic formula for these calculations assumes that a lens has no so-called "depth of focus," that is to say, that for every different distance of the object there is a different and measurable distance of the image from the lens. In consequence of "depth," however, this is not the case, and hence certain formulæ which are commonly included in such collections lead to erroneous results, unless regard is paid to this fact. In the rules which are given in the article on another page we have endeavoured to direct special attention to these cases,

so that the compilation as it stands provides, so we hope, a more explicit guide in these calculations than has hitherto been available. At the same time, the student is advised to make himself familiar with the principles lying underneath the rules, as set forth in the chapters which have appeared in our issues of November 11 and 18.

* * *

Passe-Partouts. The passe-partout method of mounting is often neglected by many professional photographers, though it is one that seems to be particularly well suited for the presentation and preservation of photographic prints, especially in the smaller sizes. The commercial passe-partout frame may be employed, but the shapes, sizes and tints in which these are obtainable are not to every photographer's taste, particularly in the case of those workers whose aim is to produce something distinctive. Some time ago we were looking at a number of pictures framed in this style, and subsequently learned that they were by the Transferotype process transferred to a rough cream drawing paper and bound up in the ordinary way to old cleaned-off 10 x 8 negatives. Though not often done, large prints may be framed "close up," which is a particularly suitable finish for this class of work, especially when a light binding is employed. There are doubtless many photographers who have large negatives stored that are of no further use, and these may be utilised in this way. Many customers, who will not willingly pay the extra cost of framing, may be persuaded to allow the lesser extra charge for passe-partout.

* * *

Film in the 'Nineties. We are reminded of the way in which controversies on matters of photographic practice come up again by noticing the report of a meeting of the now extinct Photographic Club held in June, 1893, and recorded in the "Annual Report" which the Club was accustomed to issue each year. There, nearly thirty years ago, members were debating the modern question of plates *versus* films, as the result of the exhibition of some 15 x 12 negatives taken on Fitch's slow films. The problem of keeping such large films flat for exposure was solved by rubbing the film down on a piece of strawboard covered with Meade's adhesive plaster, a hint that may have its value at the present day. Mr. Mackie, at this meeting, no doubt expressed the general feeling at that time when he declared that the advantages of films were their lightness and ease of storage; there the advantage ceased. Another member put forward the facility of printing from either side, but the rejoinder from the late Mr. Foxlee was characteristic of the *f*/64 school of that day. The plan, he said, might do for large work of the Emersonian kind, but would not answer for fine or small work. The remark shows how far we have travelled in the direction of soft focus, when the suggestion to print through one thickness of celluloid is put aside as inadmissible for "fine work."

* * *

With the Colder Weather Those workers who develop their negatives by the tank method will do well with the advent of the colder days to ensure not only that the developing solution is at the correct temperature when starting development, but also that the temperature is maintained throughout the whole of this operation. A bulk of developing solution may be at its normal temperature, but the fact that it is poured into a cold metal or earthenware developing tank, is enough to cause it to drop ten degrees or more, and it may continue to drop during the whole period, upsetting the time of development calculation completely, unless some means are adopted to prevent this possibility. Some workers add warm water to the stock solution until it is of the correct temperature, but this is worse than useless, as the solution speedily drops again. The only safe way is to keep the apartment in which developing is done, and where the tanks and other apparatus and materials are stored at the right temperature, when the possibility of trouble from under-developed negatives is entirely avoided. Some photographers we know do not make a practice of heating their dark rooms except in the coldest weather, but we would point out that if a room is not warm enough for the needs of modern photographic processes, it is not warm enough for those who work there to give their best attention to the production of good results.

EXPERIMENT AND SYSTEM IN EXPOSURE OF PLATES IN THE STUDIO.

It is fortunate that most plates allow a considerable amount of latitude, within which it is possible to obtain a negative capable of yielding a passable print, for if it were not for this many operators would find themselves faced with a greatly increased proportion of re-sittings. It is not wise, however, to trust too much to this latitude, for doing so not only tends to uneven quality in the prints, but gives endless trouble in printing, even if a selection of various grades of paper is at hand to suit hard and soft negatives.

The growing increase in plate speed renders the making of correctly exposed negatives more difficult than it was when plates which we should now class as of "ordinary" rapidity were used for studio work. The fact is that comparatively few portraitists take any steps to acquaint themselves with the capabilities of the plates they are using. Instead of doing this they either deny themselves the benefits of improvements in emulsion making, by keeping to a plate they are accustomed to, or they flit about from one make to another, in the hope of finding one which suits their particular methods of working. Such people are quite above regarding the makers' formulæ for developers; temperature is ignored, and the difference in time of development necessary for slow and rapid emulsions is overlooked. This may be thought to be an exaggerated statement of the case, but an inspection of the stock of recent negatives in many studios would prove that it is not so. Moreover, a pathetic feature of the matter is, that the operator does not know that his negatives are not as good as they might be in the circumstances.

The portrait photographer has rarely any scientific knowledge or inclination, hence laboratory methods of ascertaining the qualities of a plate are beyond his reach. Still, a ruder method of testing can be carried out and will probably be quite effective for ordinary purposes. It must, however, be recognised as a first principle that the print is the only true test of the quality of the negative, the visual appearance of the negative being an unreliable guide, particularly when the idea exists that the brilliancy of the image is an indication of good quality.

The procedure suggested is to make a series of exposures upon an ordinary sitter under the usual conditions of lighting, the times given ranging between the limits of decided under- and over-exposure. The negatives should be developed at the same time, preferably in one dish, and for the same time, if possible, at a temperature of 60 degs. to 65 degs. Fahr., rather full development being aimed at. Those negatives which show full detail and are not manifestly over-exposed should be preserved and printed by whatever process is used in ordinary

working, care being taken that correct exposure be given if development papers are used. The prints should be dried and mounted so that they can be readily compared with current printed work, since it is difficult to estimate correctly the quality of crumpled or curled scrap prints. If it be felt that further improvement is desirable, a second series of exposures—three or four will be sufficient—should be made, giving the time which is judged to be most nearly correct. These should be developed for different times, so that some may be thinner and some more vigorous than the pattern negative. Prints from these are made on normal paper and without any attempt at dodging the printing. This simple trial which necessitates only the expenditure of a dozen small plates and a few hours of work, will go a long way towards enabling anyone of average intelligence to gain a fair idea of the capabilities of a plate and the treatment necessary to produce negatives of even quality, which will give first-rate prints by any chosen process. At the same time it may be taken that such negatives will give good prints by any process, leaving out papers specially made for abnormally thin or harsh images. The idea that thin images are *necessary* for bromide printing, especially upon the new slower papers, is quite an erroneous one.

In order to compensate for variations in the strength of light, it is useful to employ some form of exposure meter, but it is not necessary to use the instrument in the way prescribed by the makers. The main object is to establish a definite ratio between the time taken for the test paper to tint and the exposure necessary with a certain plate and lens aperture. To obtain this, the time taken for the meter to reach its tint should be noted under normal conditions of light, and this time compared with the exposure which yields a good negative. Thus, supposing the known exposure to be two seconds and the meter time four minutes, we have a ratio of half a second per meter minute. Experiment has proved that variations in exposure, due to the colour of the light, come well within the latitude of the plate, even the change from daylight to half-watt lamps, or from ordinary to isochromatic plates, not seriously affecting the result. It would, however, be advisable to consider the colour of the light to some extent, and to add to or deduct from the exposure as indicated by the meter, according to whether half-watt or enclosed arc lamps were used.

Many errors in exposure are due to non-observance of the *f* value of the diaphragm when the nature of the subject demands the use of a larger or smaller aperture than that generally used. This should not occur when the apertures are marked according to the standard system in which each stop demands double the exposure or the next larger, but in many of the older lenses the stops bear no indication of their values. These should be ascertained, great accuracy being unnecessary, and the result, either as *f* values or as comparative exposures, scratched upon the tang of the diaphragms. It will probably be found that all iris diaphragms are engraved upon one or other of the standard systems.

The effect of the complexion of the sitter and the colour of draperies must be considered in relation to exposure. Though it might be theoretically correct to render a swarthy person in his true depth, it would probably not be agreeable to him or his friends. It is therefore desirable to increase the exposure to such an extent as to give the effect of a normal complexion.

A HALF-WATT ENLARGING AND REDUCING INSTALLATION.

It is probably the case that a half-watt system is not ideal for an enlarging installation as compared with mercury-vapour, but at the time this apparatus was constructed there were several factors that caused a decision in favour of the gas-filled lamps, in addition to the fact that just then it was not possible to obtain the mercury outfits. It was known that a large number of negatives very strongly pyro-stained would be among those to be worked from, and some doubt was felt as to the possibility of satisfactorily enlarging from these by the mercury lights. Then the question of first cost arose, and as it was required to have an installation that would cover a 12 in. by 10 in. negative, a condenser enlarger was ruled out from every point of view. The next consideration was the length of space available in the printing room, and as some rather large work was a probable requirement the outfit was at first built with the camera portion inside the room and the illuminant outside, a window in the partition affording the accommodation for the negatives. A large sheet of iron (painted white, of course) was supported outside this window, as in a daylight enlarger, and above this four half-watt bulbs, each of 1,000 watts, were hung, having a separate switch for each. These switches were fixed inside the room conveniently near the camera. This plan allowed the lights to be switched off between enlargements, and even between trials, thus somewhat compensating for the extra running cost of the light as compared with mercury.

Subsequently certain structural alterations made it essential that the whole of the installation should be inside the darkroom, and this obviously raised several problems, not the least of which was the great heat given out by the large gas-filled bulbs, and the small amount of space which could be spared for the lantern portion of the enlarger. A large box was made, of 1-inch boards, six feet in height and four feet wide, and one foot in depth, and this was left open at the back, whilst the front had an aperture in the centre about 13 in. by 11 in. and the inside was lined throughout with

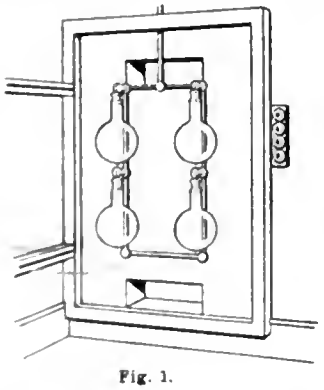


Fig. 1.

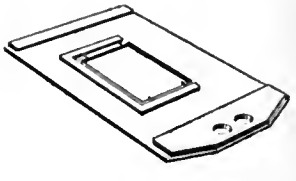


Fig. 2.

asbestos sheet. A frame of 2 in. by 2 in. quartering was built on to the wall to accommodate the open back of the box, and a hole for ventilation was left in the wall near the top as well as near the bottom of the area enclosed within this frame. Reference to figs. 1 and 3 will explain the arrangement.

The camera portion (fig. 3) was made from an old 12 in. by

10 in. camera, with a box about six inches deep at the back end to give a little extra extension. The reversing-back was left on the camera, and the frame holding the focussing screen was altered slightly so that it would slide in and out of the grooves. Similar grooving was fixed between the six-inch box and the "lantern," so that a similar carrier could be inserted there also. As a matter of fact, quite a number of carriers were made of three-ply wood, one for each size of negative from quarter-plate to twelve-by-ten. This is far more convenient than having them "nested," as well as being very much stronger from the wearing point of view and safer for the negatives. The horrible little turnbuttons usually provided on enlarger-carriers, which are so apt to wear loose and let the negatives drop out, were avoided altogether. The slots in the side of the apparatus, through which the carriers slide into the grooves, were made double the width of the grooves,

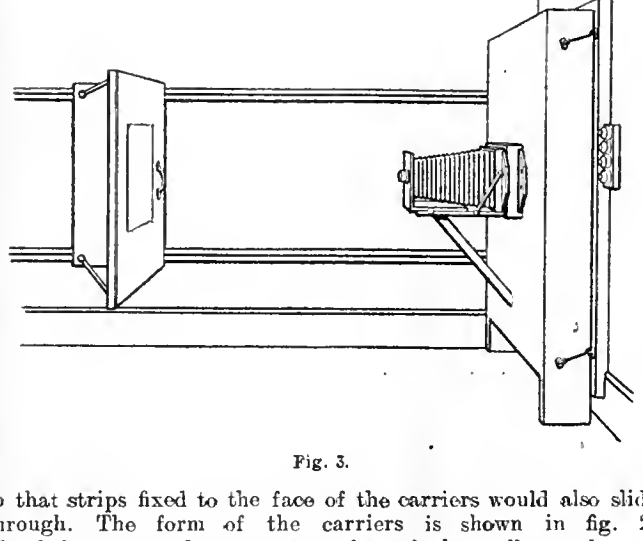


Fig. 3.

so that strips fixed to the face of the carriers would also slide through. The form of the carriers is shown in fig. 2. The hole was made a quarter of an inch smaller each way than the size of the negative to be accommodated, and strips were glued and screwed on three sides to form a rebate, this being made very loose, so that if any detail happened to fall, as occasionally it does, close to an edge of the negative it could be slid over the aperture. Into these strips very thin wire nails were driven and the heads then cut off so that the plates could be slid down from the top and so held securely though without being actually gripped. On removing the carrier from the enlarger and merely turning the top edge downwards the negative slides out and the next is inserted far more rapidly than under the old system.

A sheet of glass is loosely supported just inside the lantern box and helps to keep the heat away from the negatives. The heat may be said to be the only drawback to this installation, and, although the actual light efficiency is probably not so great as in an enlarger on these lines that would be made for smaller negatives only, it is found far better in every way than a condenser outfit that was in use previously. The heat has caused no more trouble in over a year's continuous work than to need a little attention to the joints in the box, and in one case some of the opaque came away from a blocked-out negative that had needed an extra long exposure when making a 20 in. by 30 in. enlargement with the lens stopped down. The heat is never enough to affect the lens in the slightest. Films, if there were many, would be regarded as a nuisance, but what few come along are either bound to a clean glass with lantern-binders, or are dealt with in the condenser outfit before mentioned, which has been retained as a stand-by in case of emergency

The easel is pretty solidly built, and is faced with cork lino of a thick and soft variety, which takes pins easily without leaving a hole when they are drawn out. The board is fastened by strong angle-brackets to runners which slide in the grooved rails, shown in the sketch, which run the full length of the wall. The face of the easel, as well as the entire inside of the lamp-house, are coated with white distemper. This provides a beautifully diffused illumination for retouched negatives without needing any ground-glass, as well as forming a surface on which the image is focussed without needing the continual renewal of white paper, as in most installations. So far the distemper has been applied only once a year. The original four lamps have been in use for quite eighteen months, and still seem to be going strong. That good fortune is attributable partly to the practice of switching off as often as possible, and partly to the fact that two spares are kept safely packed away on a shelf.

It may be added that a spare carrier is kept handy with a waste negative in it that has been fairly covered with lines cut through the film. This affords a rapid and easy means of ensuring sharp focussing, which usually is done rather by sliding the easel than by the pinion of the camera. This method does not alter the size of the image so much and permits of greater freedom of movement. A minor point, but one that adds materially to the convenience of this system, is that the lines on the waste negative are cut with a blunt and not with a sharp knife. This is because a blunt instrument cuts a line with a jagged edge and with occasional bits left across the lines. These irregularities afford a very ready means of knowing if the image on the easel is sharp or not. Most of the negatives that are worked from being complicated mechanical instruments, they are fairly covered with fine detail. Therefore it is not possible to enlarge through an objective of the rapidity that is usually employed when portraits form the majority of the subjects. The type of lens that is favoured for this work is an anastigmat of a maximum aperture of f/8, which seems to give better detail than a more rapid lens stopped down to the same relative opening, and rarely needs stopping down at all. It need hardly be said that for work of this kind the parallelism of the various parts of an installation is far more necessary than in a portrait outfit, which does not call for extreme sharpness all over.

At the same time, this installation avoids that deadly sort of sharpness that records every flaw in the glass and every ridge of any retouching medium that one may have to employ, and renders the retouching itself as so much wire-netting. It reproduces the quality of a negative without making the grain noticeable, even in large sizes, and the results rarely receive more than a few minutes' spotting, even when required for decorating the walls of board-rooms and the like.

D. Charles.

PARIS NOTES.

Before writing of photographic matters which have attracted notice in France since the last instalment of these notes, I should like to express my thanks to the many people who I had the pleasure of meeting in London during a fortnight which passed all too quickly. Their cordial reception was a great pleasure to me and no less so the many interesting exchanges of views which I was permitted to share.

Desensitizers.

At the October meeting of the Scientific Section of the French Photographic Society, M. J. Desalme made a preliminary announcement of the desensitising properties of the alkaline salts of picramic acid, which, for want of time, he had tested on bromide papers. Picramate of soda, when used as a desensitiser of plates, requires to be employed in much

stronger solution than safranine, but, on the other hand, has the advantage of being much more readily washed out from the gelatine film or the skin. Samples distributed by M. Desalme among his fellow-members will allow the latter to test the product for themselves. At the time of writing, these experiments are not complete, and have been made only on ordinary (non-ortho) plates or those sensitive to green, but they show that a 1 per cent. solution of picramate of soda has a desensitising action slightly inferior to that of a 1:2,000 solution of safranine.

Recently a saturated solution of aurantia in acetone was placed on the market as a desensitiser, and has been the cause of skin affections, and even, in certain cases, of more serious poisoning. The harm results from the full exposure of the skin to the toxic action of the aurantia in consequence of the complete removal of natural grease. The aurantia desensitiser is now supplied in the form of a much less concentrated solution in alcohol. Nevertheless, it is recommended to observe care in avoiding contact of the skin with the solution, as sold. In case the solution is spilt on the fingers, the latter should be well rinsed with spirit. In the diluted state in which it is used for bathing plates, the aurantia solution is altogether harmless.

Preserving the Amidol Developer.

M. L. J. Bunel has recently drawn attention to the value of the additon to the amidol developer of commercial lactic acid (sp. gr., 1.21) in the proportion of 5 c.c.s. per litre (1 drachm to 25 ozs.). The chemical properties of lactic acid are closely allied to those of glycollic acid, recently recommended in the "B.J." (1921, March 4, p. 125) for the same purpose. Also lactic acid is more readily obtained and is equally effective, its preserving action being greatly superior to those of metol, advised not long ago by Signor R. Namias. M. Lobel has compared a developer preserved with lactic acid with one containing stannous tartrate, according to Desalme ("Paris Notes," June 17, 1921, p. 359) and also with one not containing a special preservative and with the usual MQ formula. An equal volume of each of these four developers were left freely exposed to the air in identical vessels. A band of bromide paper exposed under a sensitometric step-wedge was developed each day in each bath. M. Lobel thus found that the amidol developer without special preservative continued to develop only until the fourth day, but when preserved with either stannous tartrate or lactic acid maintained its developing powers unimpaired up to the eighth day. The MQ solution continued to develop up to the tenth day.

It is important to note that in normal conditions a developer which is kept in a corked bottle, even if only partly filled, retains its activity much longer. An amidol developer becomes strongly coloured long before its developing power is exhausted. In the case of used developer, this change is still more marked, owing to the formation of colloid silver, and M. Lobel some time ago drew attention to a simple means of precipitating the colloid silver and thus prolonging the life of the developer. For this purpose addition is made of 200 gms. sodium sulphate to each litre of bath (1 oz. per 5 fluid ozs.).

The Autochrome Process.

Although many skilled users of the Autochrome plate do not admit any variation in its quality, others frequently experience a tendency to a slight predominant blue tint. It appears that those expressing themselves fully satisfied with the uniformity of the product at the present time are chiefly those who adhere to the pyro-ammonia developer recommended by M.M. Lumière on the introduction of the plates. Hence it seems that the tendency to blueness is counterbalanced by the colour of the pyro image. Such tint, when it is not too pronounced, is counter-balanced by toning the image to a brownish colour, for example, by uranium, or by binding up the transparency with a gelatine-coated glass slightly tinted in the complementary colour, but it is better in every respect to obtain a perfect result without the use of these methods.

At a recent meeting of the Colour Section of the French Photographic Society, M. Schitz, secretary of the Stereo Club, showed a very fine collection of landscape Autochromes made during the summer. M. Schitz is one of the most active of our colour workers and has adopted his own methods of dealing with Autochrome plates which exhibit a tendency to blueness. Preliminary tests showed him that with a lens aperture of *f*/7.5, the best time of exposure is exactly equal to the time required for the paper of the Imperial exposure-meter to darken to the standard tint, with the precaution that the paper is exposed to the light coming from the subject, excluding direct light from the sky. He puts his exposure-meter upright on the camera facing the subject, covering it by a piece of paper or card. He uncovers it when opening the lens and closes the latter as soon as the paper has darkened to the tint. During about a quarter of the exposure he holds against the lens a Wratten K1 filter film, in supplement to the action of the customary Lumière filter. The first development is done (after desensitising) with amidol containing little bromide.

At the same meeting Dr. A. Polack, an opthalmist of repute, showed some impressionistic studies obtained with an anachromatic lens, the chromatic aberration of which was purposely exaggerated. The results were put forward as experimental, so I refrain for the present from commenting on them.

Some New Introductions.

The Société d'Optique et de Mécanique de Précision (S.O.M.) has just introduced a new *f*/4.5 anastigmat named the Flor, the front component of which consists of two glasses with an air space between them, whilst the rear component is formed by three cemented glasses. The corrections have been carried out to a very high degree, particularly as regards coma, and the lens has a remarkably flat field. The lens of 135 mm. focal length (= 5 5-16 inches) is designed for a 9 × 12 cm. plate, yielding a sharpness of definition of 0.1 mm. (1-250th inch) over a field of about 6¼ inches diameter, which is a quarter of an inch greater than the diagonal of the plate. A sharpness of definition of 0.05 mm. (1-500 inch) is obtained over a field of 4¾ inches diameter. Owing to the favourable distribution of the corrections, the depth of field is distinctly greater than that which is customarily found in a lens of the same relative aperture and focal length.

An ingenious camera of very small size has recently been made by Messrs. Krauss, although it cannot be said that the makers have been very happily inspired in the form which they have given to it, namely, that of a small automatic pistol. Nor in the name, which is the "Photo-Revolver." I should be inclined to fear retaliation by some passer-by whose photograph I might have obtained with the camera. However, the little apparatus is fitted with an *f*/4.5 Krauss "Tessar" in focussing mount, and carries 48 plates of 22 × 36 mm. size, equivalent to about ⅞ × 1⅜ inches. These plates are obtained by cutting into six those supplied for the Verascope and similar stereoscopic cameras. The four-speed ever-set shutter is controlled indirectly by a trigger. On pushing the trigger the lens front is moved to the rear; this front is fitted with four rods (very accurately calibrated), which are caused to bear on the emulsion surface of the plate (not on the metal sheath which holds the plate). It is only after this contact has been made, with consequent assurance that the plate is in the position of the sharp image, that the shutter is released. Springs fixed round each of the rods bring the lens front back to its normal position as soon as the picture has been taken and when the trigger has been let go. The changing box, which forms the handle of the revolver, is made in two adjacent divisions, each operated by a blind which conveys a plate from one division to the other and *vice versâ*.

L. P. Clerc.

SCALE IN OPTICAL REPRODUCTION.

PART II.

THE relations between the respective distances of object and image from the lens and the scale of reproduction having been set forth in the previous chapter, and the departures therefrom owing to depth of focus having been considered, we can now proceed to express these relations in the various forms appropriate to the different calculations which occur in practice. We must first define the meanings attached to the various symbols.

Explanation of Terms in Formulæ.

Object is the thing reproduced by the lens, viz., a painting or any other object in ordinary photography, or a negative in enlarging; or a lantern-slide or section of cinematograph film in projection.

Image is the reproduction (smaller, same size, or larger) formed by the lens, viz., on the ground glass of a camera, on the enlarging easel, or on the lantern screen.

f is the *focal length* of the lens, or "focus" as often termed.

u is the *distance of the object* from the lens, strictly from the node of admission, which in a symmetrical doublet lens may be assumed to be near to the diaphragm. In enlarging, it is the distance of the negative from this point in the lens; in projection, it is the distance of the lantern-slide or film from this point in the lens.

v is the *distance of the image* from the lens (corresponding with an object distance of u), strictly from its node of emergence, which also in a symmetrical doublet lens may be assumed to be near to the diaphragm. In referring to conditions in ordinary photography v is spoken of as the "camera extension." It is the distance from lens to easel in enlarging, and from lens to screen in lantern projection.

D is the *distance from object to image*, neglecting the nodal space which almost always is negligibly small compared with D.

R is ratio of linear size of image to linear size of object, that is, the number of times that the size of the object divides into that of the image. Hence, when reproducing on an enlarged scale R is greater than 1: it is the *number of times of enlargement*. In the formulæ which follow, those employing R are indicated in connection with enlargement calculations for the purpose of avoiding fractions.

When reproducing same size, $R=1$.

When reproducing on a reduced scale, R is a fraction. Calculations relating to reduction are therefore more conveniently made by using r instead of R.

r is the ratio of the linear size of object to the linear size of image, that is, the number of times that the size of the image divides into that of the object. Hence, when reproducing on a reduced scale, r is greater than 1: it is the *number of times of reduction* or "*reduction figure.*" For this reason formulæ employing r are indicated in connection with calculations relating to reduction.

When reproducing same size, $r=1$.

When reproducing on an enlarged scale, r is a fraction. While it is common to speak of reproduction on a reduced scale in terms of R or r (e.g., "reducing to 1-10th" or "reducing 10 times"), the process of enlarging is described in ordinary language only in terms of R, i.e., enlarging so many times.

E_u is the *extra-focal distance of the object*, that is, the distance of the object from the front focus of the lens (for parallel rays). It is the distance of the object less 1 focal length of the lens, that is, is equal to $u-f$.

E_v is the *extra-focal distance of the image*, that is the distance of the image from the rear focus of the lens (for parallel rays). It is the distance of the image less 1 focal length of the lens, that is, is equal to $v-f$.

As far as possible the appropriate purpose of each formula is indicated by its heading. Explanatory notes also indicate the cases in which depth of focus causes certain formulæ to be inapplicable under certain conditions. Particularly in respect to Formulæ Nos. 3, 6, 11 and 12 (in case of large scale of reduction), and to Nos. 2, 5 and 9 (in case of lantern projection), the effect of small image distance or object distance relatively to the focal length requires to be understood from the considerations set forth in the preceding chapter.

In using the formulæ, all measures of length must be in the same units—feet or inches

Size of image from size of object, camera extension and distance of object.

$$\text{image} = \text{object} \times \frac{v}{u} \quad . \quad . \quad (1)$$

The size (linear) of the image of an object in sharp focus *with any lens* is equal to the size of the corresponding dimension of the object multiplied by the camera extension v and divided by the distance u of the object.

EXAMPLE.—In photographing a house 40 ft. × 20 ft. 60 yds. distant, camera extension is 6 inches. What is the size of the image of the house? 40 ft. = 480 ins. 60 yds. = 2,160 ins. $480 \times 6 \div 2{,}160 = 1\frac{2}{3}$ ins. The image of the house therefore measures $1\frac{2}{3} \times 5/6$ in.

Size of image from size of object, focal length of lens, and distance of object.

$$\text{image} = \text{object} \times \frac{f}{u-f}, \text{ i.e., object} \times \frac{f}{E_u} \quad . \quad (2)$$

The size (linear) of the image of an object at a distance u in sharp focus with a lens of focal length f is equal to the size of the corresponding dimension of the object multiplied by the focal-length of the lens, and divided by the distance of the object less one focal length.

EXAMPLE.—A picture 12 × 6 ft. 20 ft from the lens is photographed with a 10 inch lens. What is the size of the copy? 12 ft. = 144 ins. 20 ft. = 240 ins. $144 \times 10 \div (240 - 10) = 144 \times 10 \div 230 = 6.26$ ins. The copy therefore measures 6.26×3.13 ins.

Note (*a*).—If the object is at such a great distance that f is a negligible proportion of u, this formula becomes

$$\text{image} = \text{object} \times \frac{f}{u};$$

that is, the size of the image is equal to the size (linear) of the object multiplied by the focal length and divided by the distance.

In like circumstances, the size of the object is equal to the size of the image multiplied by the distance and divided by the focal length.

Example.—What is the size of the image of the full moon obtained with a 10 inch lens? Object measures, say, 2,000 miles: distance is, say, 240,000 miles. Therefore image is $2{,}000 \div 240{,}000 \times 10 = 1/12$ inch.

On the other hand, if the object distance is very little greater than the focal length of the lens, as in lantern and cinematograph projection, calculations based on this formula and on Nos. 5 and 9 cease to be precise owing to depth, and still more to inability to measure the distance u with sufficient accuracy.

Note (*b*).—It will also be understood that when the object distance u is very great relatively to the focal length, the image distance v becomes nearly equal to f, and in consequence of depth focus actually equal to f. For this reason in these conditions

formulæ involving $v-f$ cease to apply, viz., Nos. 3, 6, 11 and 12, and Nos. 2, 5, 9 and 13 should be used.

Size of image from size of object, camera extension and focal length of lens.

$$\text{image} = \text{object} \times \frac{v-f}{f}, \text{ i.e., object} \times \frac{Ev}{f} \quad . \quad (3)$$

The size (linear) of the image of an object obtained in sharp focus with camera extension v and lens of focal length f is equal to the size of the corresponding dimension of the object multiplied by the camera extension (less one focal length) and divided by the focal length.

EXAMPLE.—A postage stamp measuring 1 × ¾ in. is copied with 2-in. lens and 8-in. camera extension. What are dimensions of copy? 1 × (8 − 2) ÷ 2 = 3 ins. Enlargement of stamp measures 3 × 2¼ inches.

Note.—At very great distances of the object, or with a small stop, such that the image is in focus at a distance f behind the lens (*i.e.*, $v = f$), this formula ceases to apply. See Note (*b*) to Formula 2.

Size of object from size of image, distance of object and camera extension.

$$\text{object} = \text{image} \times \frac{u}{v} \quad . \quad . \quad . \quad (4)$$

The size (linear) of an object in sharp focus *with any lens* is equal to the size of the corresponding dimension of the image multiplied by the distance u of the object from the lens and divided by the distance v of the image from the lens.

EXAMPLE.—In photographing a tablet 6 ft. distant, camera extension is 8 and image is 2 × 3 inches. Object dimension of 2 inch dimension of image is 2 × 72 ÷ 8 = 18. Object is therefore 18 × 27 inches.

Size of object from size of image, distance of object and focal length of lens.

$$\text{object} = \text{image} \times \frac{u-f}{f}, \text{ i.e., image} \times \frac{Eu}{f} \quad (5)$$

The size (linear of an object at a distance u in sharp focus with a lens of focal length, f is equal to the size of the corresponding dimension of the image multiplied by the distance of the object less one focal length and divided by the focal length.

EXAMPLE.—The image of a flagstaff 160 ft. distant photographed with a 12-inch lens measures 5 inches. 160 ft. = 1,920 ins. Object measures 5 × (1920 − 12) ÷ 12 = 5 × 1908 ÷ 12 = 795 ins. = 66 ft. 3 ins.

See also *Note* (*a*) to Formula 2.

Size of object from size of image, focal length of lens and camera extension.

$$\text{object} = \text{image} \times \frac{f}{v-f}, \text{ i.e., image} \times \frac{f}{Ev} \quad . \quad (6)$$

The size (linear) of an object photographed with lens of focal length f and camera extension v is equal to the size of the corresponding dimension of the image multiplied by the focal length and divided by the camera extension less one focal length.

EXAMPLE.—When copying-enlarging a shell with a 2-inch lens the image measures 8 inches with 18 inches camera extension. The size of object is 8 × 2 ÷ (18−2) = 8 × 2 ÷ 16 = 1 inch.

Note.—At very great distances of the object or with a small stop such that the image is in focus at a distance f behind the lens (i.e., $v = f$), this formula ceases to apply. See *Note* (*b*) to Formula 2.

Scale of reproduction (*R* or *r*) from distance of object, distance of image and focal length of lens.

$$R = \frac{\text{size of image}}{\text{size of object}} \text{ (linear).}$$

$$r = \frac{\text{size of object}}{\text{size of image}} \text{ (linear).}$$

Degree of reduction or enlargement with given camera extension and distance of object.

$$R = \frac{v}{u} \quad . \quad . \quad . \quad . \quad . \quad (7)$$

The scale of reproduction (proportion of image to object) is equal to the camera extension divided by the distance of the object.

EXAMPLES.—A painting 8 ft. from the lens is obtained in sharp focus with 32-ins. camera extension (this would be with a 24-inch lens), 8 ft. = 96 ins. 32 ÷ 96 = ⅓, that is, the scale of reproduction is reduction to one third.

A midget photograph 3½ ins. from lens is copy-enlarged so that the camera extension is 21 ins. 21 − 3½ = 6, that is, the scale of reproduction is 6-times enlargement.

Note.—If the object is at a very great distance, say 100 or 1,000 times the focal length, the camera extension, is practically equal to the focal length, that is to say, f may be used in place of v in above formulæ.

Degree of reduction with given distance of object and camera extension.

$$r = \frac{u}{v} \quad . \quad . \quad . \quad . \quad . \quad (8)$$

The scale of reproduction (proportion of object to image) is equal to the distance of the object divided by the camera extension.

EXAMPLES.—A painting 8 ft. from the lens is obtained in sharp focus with 32 ins. camera extension (this would be with a 24-in. lens), 8 ft. = 96 ins. 96 ÷ 32 = 3, that is, the degree of reduction is three times. (Reduction figure = 3.)

The second comparative example cannot very well be cited by way of exhibiting the relation of *R* and *r*. While we speak of reduction "to one-fourth," or "four times," meaning thereby the same thing, we do not speak of the process of enlargement in corresponding terms.

Note.—If the object is at a very great distance, say 100 or 1,000 times the focal length, the camera extension is practically equal to the focal length, that is to say, f may be used in place of v in above formula.

Times of enlargement with given distance of object and focal length.

$$R = \frac{f}{u-f} \quad \frac{f}{Eu} \quad . \quad . \quad . \quad (9)$$

The scale of reproduction (times of enlargement) is equal to the focal length of the lens divided by the distance of the object (less one focal length).

EXAMPLE.—In a projection lantern, a 10-inch projection lens cannot be brought nearer to the slide than 10½ inches. What is maximum magnification? 10½ − 10 = ½. Magnification is 10 ÷ ½ = 20.

See *Note* (*a*) to Formula 2.

Degree of reduction with given distance of object and focal length.

$$r = \frac{u-f}{f} = \frac{Eu}{f} \quad . \quad . \quad . \quad (10)$$

The scale of reproduction (reduction figure) is equal to the distance of the object (less one focal length) divided by the focal length.

EXAMPLE.—A painting has to be photographed at a distance of 15 ft. with a 12-inch lens. What is the degree of reduction? Expressing the data in ft., 15 − 1 = 14. 14 ÷ 1 = 14, i.e., reduction is to 1 14th.

Times of enlargement (maximum) with given camera extension and focal length.

$$R = \frac{v-f}{f} = \frac{Ev}{f} \quad . \quad . \quad . \quad (11)$$

The scale of reproduction (proportion of image to object) is equal to the camera extension (less focal length of the lens) divided by the focal length.

EXAMPLES.—Camera has extension of 14 inches. What is greatest degree of enlargement that can be obtained when using 4-inch lens? 14 − 4 = 10 inches. 10 ÷ 4 = 2½: that is, maximum enlargement is 2½ times.

A hall allows 30 ft. between lens and screen. What is maximum size of picture from 3 × 3 lantern slide with 6-inch projection lens? 30 ft. = 360 ins. 360 − 6 = 354. Magnification is 354 ÷ 6 = 59 times. Therefore 3-inch slide is 14¾ ft. on screen.

Reduction figure with given camera extension and focal length.

$$r = \frac{f}{v-f} = \frac{f}{Ev} \quad . \quad . \quad . \quad (12)$$

The scale of reproduction (proportion of object to image) is equal to the focal length of lens divided by the camera extension less one focal length.

EXAMPLE.—In photographing with 6-in. lens, camera extension is 8 inches. 8 − 6 = 2. 6 ÷ 2 = 3; that is, reduction figure is 3

Note.—At very great distances of the object relatively to the focal length or when a small stop is used such that the image is in focus at a distance f behind the lens (*i.e.*, $v = f$) this formula ceases to apply. See *Note* (*b*) to Formula 2.

Calculation of distance of original, camera extension, focal length of lens and working space in photographing on various scales of enlargement or reduction.

For enlargement calculations, since, in these latter, R *is greater than* 1, *and is the number of times of enlargement.*

Distance of object for enlarging R *times with a given focal length of lens.*

$$u = \frac{f}{R} + f \quad . \quad . \quad . \quad . \quad (13)$$

$$Eu = \frac{f}{R} \quad . \quad . \quad . \quad . \quad (13a)$$

To find distance of original or negative from lens for given degree of enlargement, divide focal length of lens by required number of times of enlargement and add one focal length.

EXAMPLE.—For 6-times enlargement of negative with 3-inch lens. 3 ÷ 6 = ½ inch. Therefore required distance of negative from lens is ½ + 3 = 3½ inches.

Camera extension (or distance between lens and easel) for enlarging R *times with lens of given focal length.*

$$v = f\,R + f \quad . \quad . \quad . \quad (15)$$

$$Ev = f \times R \quad . \quad . \quad . \quad (15a)$$

To find camera extension or lens-easel distance for given number of times of enlargement, multiply focal length of lens by degree of enlargement and add 1 focal length.

EXAMPLE.—Enlarging 4¼ × 3¼-in. plate to 8½ × 6½ ins. with 12-inch lens = 2—times enlargement. 12 × 2 = 24. 24 + 12 = 36 ins. = 3 ft.

Focal length for copying-enlarging or projecting R *times with object at a given distance.*

$$f = u \times \frac{R}{R+1} \quad . \quad . \quad . \quad (17)$$

Multiply the distance by the number of times of enlargement and divide by a number 1 greater than the number of times of enlargement.

EXAMPLE.—For enlarging a negative 5 times in an enlarging box providing 8 ins. from negative to lens, what focal length is required? 8 × 5 ÷ 6 = 6⅔ inches. The lens requires to be fixed so that its node of admission is 8 inches from negative.

Maximum focal length permitted by given camera extension or lens-easel distance when enlarging R *times.*

$$f = \frac{v}{R+1} \quad . \quad . \quad . \quad . \quad (19)$$

Add 1 to the number of times of enlargement and divide into the available camera extension.

EXAMPLE.—In a camera for copying-enlarging up to 4 times, an extension of 30 inches (lens to plate) can be obtained. What is the maximum focal length of lens which can be used? 4 + 1 = 5. 30 ÷ 5 = 6. Maximum focal length is 6 inches.

For reduction calculations, since, in these latter, r *is greater than* 1, *and is the "reduction figure."*

Distance of object for reducing r *times with a given focal length of lens.*

$$u = (r+1) \times f \quad . \quad . \quad . \quad (14)$$

$$Eu = r \times f \quad . \quad . \quad . \quad (14a)$$

To find distance of object from lens for given number of times of reduction, add one to reduction figure and multiply by focal length.

EXAMPLE.—In photograph taken with an 8-inch lens, the figure of a tall man appears as 2 inches. What was the distance of the man from the camera? A 2-inch image of 6-ft. man is a reduction of 1/36th. $r + 1 = 37$. 37 × 8 = 296 ins. = 26 ft. 2 ins.

Camera extension for reducing r *times with a given focal length of lens.*

$$v = \frac{f}{r} + f \quad . \quad . \quad . \quad (16)$$

$$Ev = \frac{f}{r} \quad . \quad . \quad . \quad . \quad (16a)$$

To find camera extension when reducing, divide focal length of lens by reduction figure and add 1 focal length.

EXAMPLE.—Copying 8½ × 6½ ins. to 4¼ × 3¼ ins. with 12-inch lens. Reduction figure = 2. 12 ÷ 2 = 6. 6 + 12 = 18 ins.

Maximum focal length for reducing r *times with object at a given distance.*

$$f = \frac{u}{r+1} \quad . \quad . \quad . \quad . \quad (18)$$

Add 1 to the reduction figure, and divide into the distance of the object.

EXAMPLE.—In making the copy of a painting on a scale of one seventh, what focal length is required if the painting is 20 ft. distance? u = 20 ft. r = 7. $r + 1$ = 8. The required focal length is, therefore, 20 ÷ 8 = 2½ ft. = 30 ins.

Maximum focal length permitted by given camera extension when copying an original on a scale of r *times reduction.*

$$f = v \times \frac{r}{r+1} \quad . \quad . \quad . \quad (20)$$

Multiply camera extension by reduction figure, and divide by a number 1 greater than reduction figure.

EXAMPLE.—In copying originals half scale with camera of 9 inches extension, what is maximum focal length of lens which can be used? 9 × 2 = 18. 18 ÷ 3 = 6 ins. Focal length must not be greater than 6 ins.

Maximum focal length permissible when enlarging R *times or reducing* r *times within a given distance from object to image.*

$$f = \frac{D \times R}{(R+1)^2} = \frac{D \times r}{(r+1)^2} \quad . \quad . \quad (21)$$

Add 1 to the reqoired number of times of enlargement or reduction, and multiply the resulting number by itself. Divide the resulting number into the available object-image distance multiplied by the number of times of enlargement or reduction.

Examples.—In a room measuring 12 ft. enlargements up to 9 diameters have to be made. What is the greatest focal length of lens which can be used? Allowing 3 ft. for spaces behind negative and enlarging easel. D = 9 ft. = 108 ins. R + 1 = 10. 10 × 10 = 100. 108 × 9 = 972. 972 ÷ 100 = 9.72 = 9¾ inches approximately.

In a studio of 24 ft. run, what is the greatest focal length which can be used for a full-length portrait on a 6 × 4-in. plate? Taking height of sitter at 70 inches and image on plate as 5 ins., r = 14. Allowing 3 ft. for spaces behind sitter and camera. D = 21 ft. 21 × 14 = 294. 14 + 1 = 15. 15 × 15 = 225. 294 ÷ 225 = 1.307 ft. = 15.68 ins. = 15¾ ins. nearly.

Minimum distance required between object and image when enlarging R *times, or reducing* r *times with lens of given focal length.*

$$D = \frac{(R+1)^2 \times f}{R} = \frac{(r+1)^2 \times f}{r} \quad . \quad (23)$$

Add 1 to the number of times of enlargement or reduction, multiply the resulting number by itself, and then by the focal length. Then divide by the number of times of enlargement or reduction.

Examples.—Enlargements up to 10 diameters are to be made with 8-inch lens. What space is required between negative and easel? R + 1 = 11. 11 × 11 = 121. 121 × 8 = 968. 968 ÷ 10 = 96.8 ins. = 8ft. ¾ in.

For making full-length cabinet portraits with 12-inch lens, what distance is required between sitter and focussing screen? If sitter is 70 inches and figure 5 inches on negative, r = 14. r + 1 = 15. 15 × 15 = 225 ins. 225 × 12 = 2,700. 2,700 ÷ 14 = 192¾ = 16 ft. ¾ in.

For most purposes it is sufficient to use the approximate formula :—

$$D = (R+2) \times f = (r+2) \times f \quad . \quad . \quad (24)$$

Add 2 to the number of times of enlargement or reduction, and multiply by the focal length

Maximum focal length permissible when enlarging R *times, or reducing* r *times within a given distance of object to image.*

Approximate Formula.

By neglecting the distance between the image and the rear focus when reducing, or between the object and the front focus when enlarging or projecting, Formula No. 21 may be given the much simpler form of No. 22. This approximate formula is quite exact enough for most enlarging and studio calculations, provided the number of times of reduction or enlargement is greater than about 6. If this is the case the distance which is left out of account is less than one sixth of the focal length of the lens.

$$f = \frac{D}{R+2} = \frac{D}{r+2} \quad . \quad . \quad . \quad (22)$$

Add 2 to the number of times of enlargement or reduction, and divide into the distance available between object and ground glass (or enlarging easel or projection screen).

Examples (data as for Formula 21).—D = 108. R + 2 = 11. 103 ÷ 11 = 9.82 ins.

D = 21 ft. R + 2 = 16 21 ÷ 16 = 1.312 ft. = 15.744 ins = 15¾ ins.

Degree of enlargement or reduction permissible within a given separation of object and image and with given focal length of lens.

This is the only calculation in scale of reproduction which cannot be worked out exactly by ordinary arithmetic. For precise calculation it is necessary to solve the quadratic equation.

$$2R^2 - (D - 2f)\ R + 2 = 0.$$

The easiest way is to guess the enlargement or reduction figure, and test the guess by using the guessed value of R or r in Formula No. 23

Example.—If a space of 5 ft. is available for distance between negative and easel, what is greatest degree of enlargement that can be done with 10 in. lens? Guessing 4, D = 5 × 5 × 10 ÷ 4 = 62½ ins. = 5 ft. 2½ ins. The permissible number of times of enlargement is, therefore, very nearly 4.

Another method is to use the approximate formula

$$R \text{ (or r)} = \frac{D-2f}{f} \quad . \quad . \quad . \quad (25)$$

Subtract twice the focal length from the permissible distance between image and object, and divide by the focal length. This formula is near enough for most purposes if the enlargement or reduction figure is greater than 6.

Example (data as above) : 60 − 20 = 40. 40 ÷ 10 = 4.

G. E. B.

More Camera Smuggling.—More smuggling fines, to the value of over £650, were imposed at Dover on Saturday last. Jamura Sudo, giving an address at an hotel in London, was fined £87 for illegally importing binoculars, cameras, opera glasses, and carriage clocks when landing at Dover, and Louis Paul Hanosseur was fined £560 4s.

Selective Focussing in Cinema Work.—An example of the rapid progress in French film methods is afforded by a new picture, "Sibilla, the Dancer," shown privately in London last week. It was produced, the "Evening News" tells us, by Marcel L'Herbier, and contained so many novel ideas in screen interpretation of a story that the firm which is handling it in England thought it wisest to cut most of them out. The producer calls his film a "psychological picture," and by "picture" he means the photographic image. He says he is trying to achieve "an enlargement of the vocabulary of the cinematographic expression by the use of partial blurs, total blurs, and distorted vision." Thus in the film a scene which has been retained shows the dancer out of focus as she sits among other dancers in the cafe, who are perfectly clear. She is not present herself, because her mind is elsewhere, and when someone recalls her to the present she comes into sharp definition. Similarly, as her mind wanders again when she is dancing, the assembly in front of her is out of focus, to show that she only half realises that it is there.

Secret Told by the Camera.—Remarkable evidence was given at Wood Green last Saturday when Ralph Hammond and Percy Edk. Wood were charged on remand with breaking into houses and stealing property. A detective said that in a box belonging to Hammond he found some photographs of Hammond sitting in a room at Wood's house. The police had since taken photographs of the apartment, revealing identical "scenery." The room contained extensive plant for melting down and separating metal, and witness produced a muffle furnace which figured in the photographs. Attached to the furnace was an oxygen cylinder and rubber gas-piping, and the furnace was still quite hot when witness called. Both men were committed for trial.

Aeroplane Photographs of Oil Fields.—The "Scientific American" states that a British oil company is using two "flying boats" to survey the delta of the Orinoco River in Venezuela. It appears that oil-bearing lands in this part of the world are distinguished by the partial destruction of the vegetation, and it is believed that an aerial photographic survey of the region will afford a rapid method of both locating oil fields and of discovering the most suitable forest paths and waterways for an approach to the fields. An opening is cut in the boat bottom to allow the camera lens a view, and this hole is fitted with a water-tight manhole cover secured by a kind of breech-block action. The camera can be raised or lowered into position.

FORTHCOMING EXHIBITIONS.

November 23 to 26.—Rotherham Photographic Society. Particulars and entry forms from the Hon. Exhibition Secretary, Sydney G. Liversidge, "Orissa," Gerard Road, Rotherham.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tolleross, Glasgow.

1922.

January 21 to February 4. Partick Camera Club. Latest date for entries, January 30. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 11 to 25.—Scottish Photographic Salon. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

February 14 to 17.—Exeter Camera Club. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

Patent News.

Process patents applications and specifications—are treated in "Photo-Mechanical Notes."

Applications November 7 to 12 :—

MOUNTING.—No. 30,064. Mounting photographs. W. H. Collins.

COLOUR CINEMATOGRAPHY.—No. 30,207. Colour cinematography. F. W. Donisthorpe.

DRYING PRINTS.—No. 29,650. Drying machines for photographic prints. E. Graber.

CAMERAS.—No. 30,000. Photographic cameras. A. Hayward.

CERAMIC PHOTOGRAPHY.—No. 29,965. Photography upon ceramic ware, etc. F. A Hiorth and W. Spear.

PORTRAITS.—No. 30,069. Production of photographic portraits. G. Hoffman.

STEREOSCOPY.—No. 29,709. Stereoscopic phptography and optical projection. C. H. Piper.

CAMERAS.—No 29,548. Cameras. A. Pittman.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

FINDERS.—No. 147,107 (April 6, 1915). The present invention relates to the use and modification of a known arrangement, the collimator, as a finder for photographic cameras in a similar way as the collimator is used as a sighting device for firearms (see (*e.g.* Patent No. 17,429 of 1901). According to the invention a collimator is thus connected with the camera without there being disposed in front of the marks of the collimator any collective lenses, producing a real image of the landscape in the plane of the sighting marks. In its simplest form a collimator consists of a collective lens combined with a sighting mark (usually in the focus of the lens) and fulfils the purpose of presenting to an eye located behind the lens or to another optical system a virtual image of the sighting mark, lying at a certain, usually infinite distance. If such a collimator be combined with a photographic camera, a finder is obtained, by means of which the centre of the image to be photographed can be fixed.

The practical construction and further modification of such a finder may be carried out in the following two ways : In the first case the collimator is made as a half lens, so that the field of view is divided into two parts and an eye placed behind the collimator receives as to one half the pencils of light emerging from the collimator and as to the other half those coming from the object viewed ; in the second case the collimator has an entire lens and the observer employs both eyes, projecting the image of the system of marks presented to one eye in the field of view of the collimator, on to the objects lying in front of the other free-viewing eye.

In both cases the value of the finder may be considerably enhanced, by fixing, by means of marks or lines, in a plane approximately coinciding with the focal plane of the collimator lens angular dimensions, which bear a relation to the size of the image produced by the apparatus. As compared with the finder constructions in use hitherto, this has the advantage that the accurate limiting of the size of the image is effected on the object to be photographed itself, and that the image plane is seen, so to speak, in its natural size.

In the usual photographic cameras the lens is generally disposed so as to be displaceable perpendicularly to the optical axis, either only in one direction or in two directions perpendicular to one another. In order that, with such a displacement of the objective, the collimator finder may still bound the correct image field, it is necessary for one of its two component parts

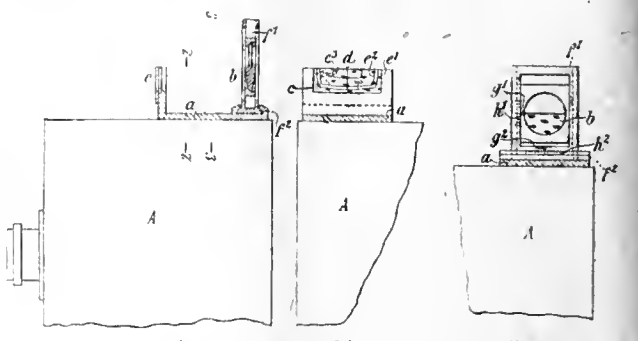


Fig. 1. Fig. 2. Fig. 3.

—lens or mark carrier—to be also displaced to an extent corresponding to the displacement of the objective perpendicularly to the sighting axis relatively to the other part. Hence, the two collimator parts will, corresponding to the manner in which the lens can be displaced, also be made displaceable relatively to one another either in one or two directions perpendicular to one another, the amount of the displacement being preferably read on suitable scales.

In the drawings the invention is illustrated by three constructional examples. Figs. 1 to 3 show a collimator having a half lens in combination with a camera A, the latter being indicated only in outline. Fig. 1 contains a longitudinal section, while figs 2 and 3 each contain a cross-section of the finder. On a bedplate marked *a*, by means of which the finder is fixed to the camera A, there is on one side a half lens *b* and on the other

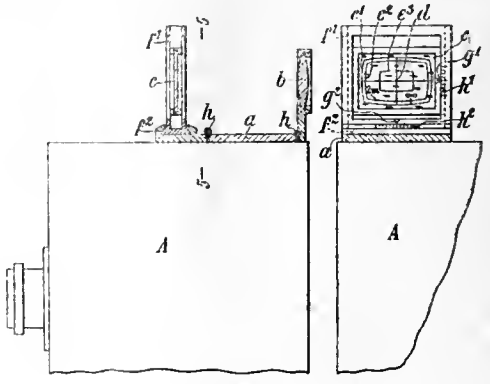


Fig 4. Fig. 5.

side a plane mark carrier *c*, which touches the focal plane of the lens. The mark carrier *c* contains besides a mark *d* fixing the sighting axis two framing lines e^1 and e^2 adjoining the straight bounding line between the free field of view and the field of view of the collimator and corresponding to half the size of the image of the camera used for the objective distances infinity and 2 metres, and also a smaller framing line e^3, which, assuming the camera lens to be symmetrical, corresponds to the angle covered by the back lens alone with an objective distance infinity. In view of the aberrations of the lens, the framing lines are drawn in such a manner that in the field of view of the collimator they appear as rectangles. The lens *b* can by means of two guides f^1 and f^2 be displaced relatively to the

sighting axis in two directions perpendicular to one another, for compensating a displacement of the objective relatively to the middle of the plate. The amount of the displacement in each case can be read off by means of two indices g^1 and g^2 and two corresponding scales h^1 and h^2.

Figs. 4 and 5 show in a similar manner by a longitudinal section (fig. 4) and a cross-section (fig. 5) a collimator finder with an entire lens, i.e., for use with both eyes. The separate parts have the same references as in figs. 1 to 3; the only difference being that the framing lines e^1, e^2 and e^3 now corre-

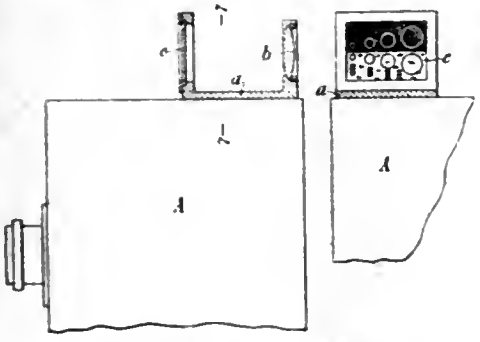


Fig. 6 Fig. 7.

spond in each case to the entire image. In this case the two guides f^1 and f^2 are fitted on the mark carrier c and the lens and the mark carrier can be laid over by means of hinges h.

Figs. 6 and 7 again show a collimator finder with an entire lens. The lens b of the collimator is in this case rigidly fixed to a bedplate a, also a mark carrier c. The frame of the mark carrier forms in this case the limit of the image field. The mark carrier is blackened in its upper half, while in its lower half it is transparent. In each half it is provided with a series of circles, which, getting smaller and smaller, correspond to a spherical balloon of a certain diameter at different distances. At each circle the corresponding distance is marked.—Firm of Carl Zeiss, Carl-Zeiss Strasse, Jena, Germany.

ONE-LENS STEREOSCOPIC PHOTOGRAPHY. No. 170,478 (September 18, 1920). The invention relates to an attachment for stereoscopic photography of the type of that described in Patent No. 21,406 of 1894 of Theodore Brown.

The device consists of a box or casing provided with an opening at the back around which an interchangeable clip or adapter is fixed for the purpose of clamping the device to the lens mount or to the shutter when the same is of the front lens type.

Inside the box and opposed to the opening two reflectors are mounted at an angle meeting on the centre line of the box camera. Two other reflectors are mounted on either side of the box.

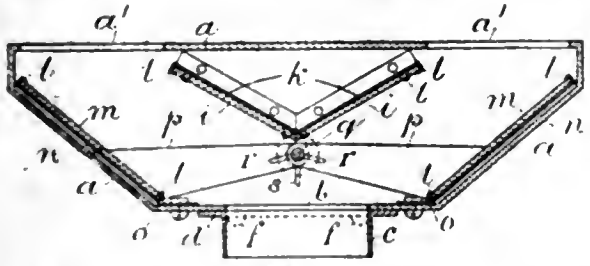


Fig. 1.

These reflectors are coupled together by means of a left and right-handed screw or by levers so that they may be pivoted to or from each other through similar angles.

Opposite these two reflectors the front of the box is left open.

The four reflectors are so arranged that the two right-hand reflectors project the rays from the object through the right-hand orifice in the box to the lens and thence to the left-hand half of the negative and the reverse as regards the left-hand reflectors.

By pivoting the two outside reflectors, objects near the camera can be reflected on to the respective centres of either half of the plate or negative.

As the right-hand reflectors form an image on the left-hand side of the plate and *vice versa* no reversing in printing is required.

The angular setting of the two outer reflectors determines the distance between the centres of the two projected images, the point of view of the images remaining the same so that a stereoscopic picture can be produced with an ordinary vest pocket camera, which picture may then be enlarged in the usual manner to the required stereoscopic size.

Fig. 1 is a longitudinal section of the attachment, fig. 2 is a plan, and fig. 3 is a rear view.

The attachment is constructed essentially after the following manner: A box a is provided in front with apertures a^1 and at its rear surface with an opening b through which the reflection of the object to be photographed passes to the lens and thence to the sensitive plate in the camera to form a picture in duplicate thereon.

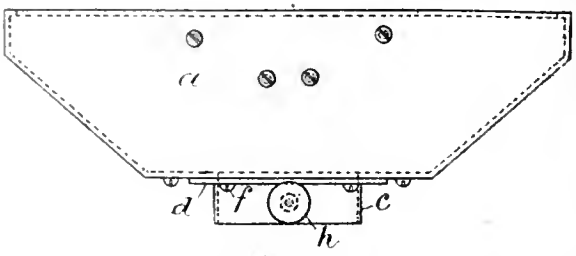


Fig. 2.

For fixing the attachment to the shutter or lens a lens-carrier adapter or interchangeable clip c is detachably fixed around the opening b.

The interior of the box a is furnished with a pair of mirrors or reflectors i set at an equal angle to each other, the apex of the angle thus described being oppositely disposed to the orifice b and in the axis of the lens. The reflectors i are carried in permanently fixed backings k which are provided integrally with bent over lugs l between which the mirrors are inserted and by which they are retained in their angular position. Two other mirrors or reflectors m are mounted within the casing a, each facing one of the mirrors i and are adjustable as to their angular relation to the mirrors i. The reflectors m are carried in backings n and are retained therein by bent over lugs l. The backings n are pivoted at o to the interior of the casing a and are coupled together either by means of a left and right-hand threaded screw and coupling rods or by levers p integrally formed with the backing as shown. The levers p are coupled together in the vertical axis of the device by means of a clamping pin q which passes through a slot r formed at the extremity of each lever. The clamping pin also passes through a slot s formed in the casing a and is furnished with a serrated clamping knob or button for the purpose of clamping the mirrors m at the desired angular

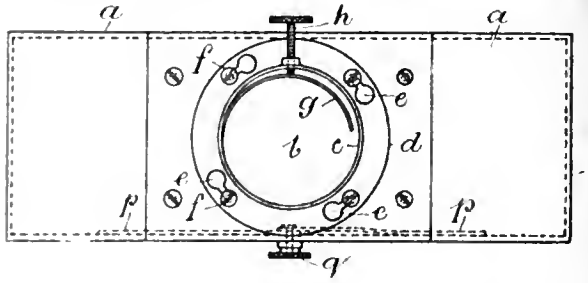


Fig. 3

relation to the opposing mirrors i for the purposes hereinafter detailed. The reflectors are so arranged that the opposing pair on the right hand side reflect the rays from the object being photographed through the right-hand orifice a^1 of the casing to the casing to the left-hand side of the plate or negative within the camera and the reverse as to the left-hand reflectors which obviates the necessity for reversing the pictures in the process of printing.

As the angular setting of the pivoted reflectors m determine the distance between the centres of the view of the two projected images, the point of view of the images remains the same, so that stereoscopic pictures can be produced on a small scale with even a vest pocket camera, which can afterwards be enlarged to the ordinary stereoscopic dimensions.—William Henry Boothman, 5, Princes Square, Bayswater, London, W.2.

New Apparatus.

OSGLIM ELECTRIC LAMPS.—An entirely new type of electric bulb has been introduced under this name by the General Electric Company, Magnet House, Kingsway, London, W.C.2. No filament is used, but a glass bulb of the usual shape contains two metal electrodes (anode and cathode) in an atmosphere of the rare gas Neon. Special features of the lamp are the great durability of the electrodes, which are of stout wire, and the very low current consumption, which is only 5 watts. The light given by the lamp is a dim illumination, quite sufficient for passages or dark portions of premises where it is necessary to keep some light constantly burning. Moreover, the peculiar distribution of the light gives exceedingly diffused illumination. The lamps are also supplied in a so-called "letter" pattern, the cathodes being shaped in the form of the various letters of the alphabet. Thus, by means of a few of the letter lamps any required illuminated sign may easily be made up. In the ordinary pattern the price of the lamp is 4s. 6d.; in the letter pattern 5s. The lamps are at present obtainable for voltages ranging either from 200 to 220, or from 221 to 250. It is also necessary to specify whether the current is direct or alternating. With direct current the lamp must be placed in the holder so that the charge passes in the correct direction, i.e., from the anode to the cathode. If inserted in the holder in the other position the lamp is in no way damaged but the maximum amount of light is not obtained.

New Books.

"Penrose's Annual" (The Process Year Book). Vol. 24. Edited by William Gamble. London: Lund, Humphries and Co., Ltd. 8s. net.

WE look each year to the "Process Year Book" for a record and demonstration of the progress which is being made in methods of photo-mechanical reproduction, and in other applications of photographic methods to the art of the printer. And Mr. William Gamble does not disappoint us in either of these respects. His review of process work is in a minor key, since there is little to record in the way of epoch-making introductions. In ordinary line, half-tone, and three-colour reproduction, practice continues to follow the customary lines; activity is chiefly shown in the surface printing processes, and more especially in photo-litho and offset printing. Rotary photogravure continues on its way, and the "Year Book" contains some excellent examples of colour work by this method.

We are interested in reading of the attempts which continue to be made in replacing type-setting by processes in which a lay-out of the required lettering is reproduced by photographic methods. Mr. Gamble directs attention in this connection to the patent, No. 7,097, of 1895, taken out by the late Mr. Friese-Greene for a process of this description. It affords another instance of Friese-Greene's inventive genius, but like other ideas from his fertile brain it failed to achieve financial success.

Contributors to the "Year Book" are comparatively few in number, but there are a number of articles, a fair proportion of which deal with new processes in which the writers are commercially interested. It would, we think, be well if any such interest were more explicitly stated at the head of the article than is done in some cases. But, after all, perhaps the chief value of the volume as a record of progress in process, is the collection of supplements illustrating the current standard of work in various processes. These form a section of the "Year Book," which fully maintains its interest. The specimens include up-to-date work in half-tone and three-colour, photogravure in monochrome and colour, and other methods of reproduction. It is perhaps of some significance that a careful examination of these plates shows that the colour reproductions, which appear most truthful, or are made for the illustration of scientific publications, are printed in four colours. Altogether the 1922 "Process Year Book" worthily takes its place with the many volumes which have preceded it.

THE WELLCOME EXPOSURE DIARY AND CALCULATOR.—The tireless compilers of the ever-popular Wellcome diary contrive each year to add some new and useful feature to this pocket volume. For the 1922 issue, which has just been published, the chief addition is an indication in the table of plate speeds of the development speed of each of the many makes and grades of plate and film which are specified. These are designated by letters running from A. to N., which symbols correspond with the times which must be allowed for development at various temperatures as set out in other tables in an earlier part of the book. In other words, Messrs. Burroughs Wellcome have taken a useful step towards making development as easy and certain a system as their calculator has made exposure. On another page also is a table giving the volume of developing solution required by the various tanks on the market for the development of plates and film. Another new feature is a chapter on selling photographs for reproduction, which contains the scale of fees adopted by the Professional Photographers' Association. The little book is so widely known among amateur photographers, and doubtless among many professionals also, that it is not necessary to recapitulate the many items of practical instruction which its pages contain. It should be mentioned that as in previous years three editions are issued, one for the Northern Hemisphere and Tropics; another for the Southern Hemisphere and Tropics, and a third for the United States.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, NOVEMBER 28.

Birmingham Photographic Art Club "Psychic Photography." F. Barlow
Bradford Phot. Soc. Members' Lantern Slide Night.
City of London and Cripplegate P.S. "Elementary Enlarging." J. J. Butler.
Dewsbury Phot. Soc. "Historic Homes of Yorkshire." Geo Hepworth.
Leeds Camera Club. "Lantern Slide Making."
Southampton Camera Club. "A Naturalist with a Camera." Dr. Bertram Stone.
South London P.S. "Winchelsea and Rye." Algernon Brooker.
Walthamstow & District P.S. "Correct Exposure." E. Willcocks.

TUESDAY, NOVEMBER 29.

R.P.S. "Photography and Mechanics: Facts and Possibilities." Colin M. Williamson, C.B.E.
Birmingham P.S. "Rome." T. Wallace Robinson.
Cambridge and Dist. Phot. Club. Summer Outings Prints.
Exeter Camera Club. 1920 "Amateur Photographer" Prize Prints.
Hackney P.S. "Architectural Photography." H. C. Beckett.
Leeds Phot. Soc. "Intensification and Reduction." A. S. Dean.
Morley Phot. Soc. "With Allenby Through Palestine." G. H. Jessop.
Tyneside P.S. "Trimming and Mounting." H. E. Galloway.

WEDNESDAY, NOVEMBER 30.

Accrington Camera Club. Whist Drive.
Borough Polytechnic P.S. 1st Lecturette Competition.
Catford Camera Club. "Bromoil." H. H. Featherstone.
Croydon Camera Club. Annual Dinner.
Dennistoun Amat. P.A. "Bromide Enlarging." W. S. Crocket. "Toning Bromide Prints." D. M'Intosh.
Forest Hill and Sydenham P.S. "Exposure and Development." C. H. Summers.
Halifax Scientific Society. "Flashlight Photography." J. P. Oakes.
Ilford Phot. Soc. "Some Gems of English Architecture." E. R. Buil.
Leicester and L'shire P.S. "Norwich and Wells Cathedrals." E. Pearson.
Partick C.C. "The Bromoil Process." John Thompson.
Rochdale Amateur P.S. "Enlarging." W. Lord.
South Shields Phot. Soc. Open Night.
South Suburban Phot. Soc. Lantern Lecture.

THURSDAY, DECEMBER 1.

Camera Club. "Women in Photography." Madame Yevonde.
Gateshead Camera Club. "Something Out of Nothing." J. Walton.
Hammersmith Hampshire House P.S. "Wonderlands of the Western World." J. Dudley Johnston.
North Middlesex P.S. Competitions—Prints and Slides, general.
Wimbledon and Dist. C.C. "Beauty Spots round London." A. H. Butterworth.

FRIDAY, DECEMBER 2.

R.P.S. Pictorial Group Meeting. "Ideals and Methods in Picture Making." M. O. Dell.

Rochdale Amateur P.S. "The Story of a Photograph with Two Lenses." A. Dordan Pyke.

Wombwell and Dist. P.S. "Wanderings in the West Riding of Yorkshire." W. Holmes.

SATURDAY, DECEMBER 3.

Edinburgh Phot. Soc. "Belgium: Its Towns and Battlefields." H. Skelton.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 22. The President, Dr. G. H. Rodman, in the chair.

Mr. A. C. Braham, of the Autotype Company, gave a demonstration of the latest developments and improvements in the Carbro process. He alluded briefly to the derivation of the process from Ozobrome. In Carbro, the pigment tissue is soaked in a solution of potass. bichromate, ferricyanide and bromide, allowed to remain for a short time in a bath containing acetic and hydrochloric acids and formaline, and then squeegeed in contact with a bromide print. After about 15 minutes the bromide is removed and the tissue (which now bears an invisible image of insolubilised gelatine) squeegeed to transfer paper. The original paper base of the tissue coating is then stripped off, and the picture developed in hot water, yielding a carbon or "Carbro" print.

Whilst giving an excellent demonstration of the process, in the course of which he made two prints, Mr. Braham first emphasised the importance of soaking the bromide print thoroughly. The temperature of the two baths for preparing the tissue should be from 60 deg. to 65 deg. F. The first bath (of bichromate, etc.) could be kept in use indefinitely, renewing it with fresh stock solution from time to time, but it should be strained through muslin before use. The tissue was soaked in it for about 3 minutes and then drained for about 15 seconds.

The time of immersion in the second (acid) bath provided the means of modifying the contrast in the Carbro print; the longer the time, the softer the print. A normal time for producing a print of the same contrast as the bromide was 20 seconds.

After squeegeeing the prepared tissue to the soaked bromide print, the pair were laid on glass and covered with grease-proof paper, thus obviating evaporation of the solution and absorption of it during the period of its action on the bromide. After removal of the bromide and transfer, the picture was developed at a rather lower temperature than customary in ordinary carbon printing.

While these processes were being carried out, Mr. Braham answered a string of questions. A print of gaslight paper never gave as good a Carbro print as one on bromide paper. He had not tried the suggestion of Dr. Slater Price, viz., of bleaching a gaslight print to a silver bromide image and re-developing before using it for the process. Different makes of bromide paper required different times of the tissue in the acid bath. On the other hand, different colours of tissue, with the exception of red chalk and olive green, required the same time in the acid bath.

He showed the results of provisional experiments made to prepare a retouching mixture which could be used on bromide prints employed in the process. He had mixed Indian ink and fish-glue with "silver" obtained by adding caustic soda to silver nitrate solution. The retouching marks reacted with the No. 1 preparing bath, and were reproduced in the Carbro print.

Mr. Braham had had no experience of the process in the making of oil prints. As regards quality of the Carbro prints, he was fully satisfied that it was equal to that obtained on light-sensitive tissue printed directly from negatives according to the regular carbon process.

On the proposition of the chairman, the very hearty thanks of the meeting were accorded to Mr. Braham.

CROYDON CAMERA CLUB.

In the opinion of the Croydonians nothing but good comes out of Richmond, and last week Mr. F. R. Newens found an excellent attendance when he arrived with a heavy box of slides to give a lantern lecture, entitled "Rambles with the Paget Colour Plate." Reassured by his previous visit, this time he came unarmed. Now, a short time ago the ground-floor caught fire and gutted the landlords' premises below. Being landlords, little in the way of sympathy would be expected on modern ethical principles, but real interest was aroused when it was found last week, and at the last moment, that some "repairing" electricians, before leaving, had effectively cut off the electric supply to the club, and in consequence the lantern would not be run. This put the secretary in a nice temper, and the "office boy," who pleasantly wished him "Good evening," immediately became conscious of the offence.

Everything, therefore, pointed to a fiasco, but to do the club justice rarely is it at a loss, whatever the contretemps. Mr. Newens was placed on his legs and chatted instructively and interestingly about procedures; the slides were taken as seen, and a brisk discussion brought a capital evening to a close.

It is not necessary to follow the lecturer through his clear exposition of the process, and only a few points raised need be summarised. Should a bit of grit or broken glass get in between the plate and taking screen, he said, this may be recognised by bars of colour appearing when attempting registration. Also, sometimes little pieces of the emulsion may stand up at the edges of the plate and prevent good contact with the taking screen. To avoid this, he runs a very sharp knife round to remove any protuberances. In some cases, instead of the orthodox filter he uses a Sanger Shepherd graduated one, and secures a nice blue sky, with good colour reproduction throughout, but this variation in procedure requires very great care.

During the war when at one time Paget plates were unobtainable, he substituted Ilford panchromatics, employing a film light yellow-green K ½ filter (who made it he could not say). The results were fairly good and exposures much reduced. It should not be overlooked, he added, that the Paget panchromatic and transparency emulsions are coated on glass specially picked for flatness, and if only for this reason substituting other plates is not to be recommended.

Inasmuch as both Messrs. Ilford & Wratten issue cards with each box of panchromatic plates, giving the ratio of sensitiveness to the three primaries, he deduced that a uniform ratio is impossible to attain, and, this being so, he suggested Messrs. Paget should stock a series of gelatine filters, and on request select one best fitted for any particular box of plates. For the serious worker this would be a great boon.

For estimating exposures he much prefers the tables of Messrs. Burroughs Wellcome to any tint-matching meter, and gives half as much again as the readings indicate. The weak point of the Paget plate is in the greens which are apt to be too blue. Full exposure usually corrects this tendency. Though occasionally, when sorely tried, he had muttered "somethings" about the Paget firm, yet it had accomplished much, and should be congratulated on the production of a product which must present many manufacturing difficulties.

In the discussion, Mr. Harpur said he invariably used the tables mentioned in his ordinary photographic work, and found them accurate under all conditions. He then passed on to a genial patchwork review of various matters, and dexterously included some shrewd blows at Mr. Salt. The latter, in acknowledging this attention, said that having regard to the long photographic experience of Mr. Harpur, the fact that he was still compelled to consult exposure tables on all occasions was extremely painful to hear—not only painful but pitiful. Many others contributed to the discussion on saner lines, and the proceedings terminated with a hearty vote of thanks to the lecturer.

GELATINE FIXATIVE FOR ENLARGEMENTS.—A French professional photographer, M. Bourland, of Périgueux, in "Le Photographe," remarks on the difficulty of using a solution of gelatine with the air-brush as a means of obtaining a fixative coating on worked-up enlargements, owing to the tendency of the solution to run into drops on the print. This defect, M. Bourland states, can be avoided by adding a proportion of alcohol to the gelatine solution. An equal volume of alcohol may be added to a 1 per cent. solution of gelatine if the latter is meanwhile kept warm on a water-bath, and the mixture constantly stirred whilst the alcohol is added in small quantities. The solution will then remain liquid after cooling.

News and Notes.

A PHOTOGRAPHER'S WILL.—Mr. Thomas White, a former Mayor of Lewisham, and photographer, left estate of the gross value of £1,364 5s., with net personalty of £230 5s.

THE MARRIAGE took place on Saturday last, November 19, at St. Nicholas Church, Chiswick, of Ernest W. Taylor, only son of Mr. and Mrs. J. Hay Taylor, of Palmer's Green, and the only grandson of the late J. Traill Taylor, to Winifred L. Collins, elder daughter of Mrs. Arthur Collins, of Netheravon Road, Chiswick.

D.50 DEVELOPER.—The Cooper Laboratory, Watford, is making a special offer to photographic dealers in connection with its D.50 developer. Until December 16 it offers to include with every order to the value of £1, and also with every order amounting additionally to £1, two 2-oz. bottles of D.50, each priced at 2s. 6d. It also offers in the same proportion one dozen special trial samples of D.50 for distribution among dealers' customers.

PENNSYLVANIA STATE COLLEGE.—We regret to hear that the laboratories of the Photographic Division of this College were destroyed by fire on October 28 as a result of an outbreak in another part of the building. Every piece of equipment was destroyed, although fortunately most of it was covered by insurance and can be replaced. A new research laboratory, which had been opened only on the morning of the fire, was also destroyed. It is feared that the apparatus in this laboratory cannot be replaced for a long time except by the assistance of other institutions. The director of the Photographic Division, Mr. Carrol B. Neblette, will have the sympathy of all those interested in photographic instruction, and, we hope, the help of those able to make good some of the loss which has been sustained.

INVENTION OF AERIAL CAMERAS.—Before the Royal Commission on Awards to Inventors last week, Lieut.-Col. J. T. C. Moore-Brabazon made a claim in respect of aircraft cameras. Mr. Carthew, for the claimant, said Col. Moore-Brabazon was a pioneer in aviation, and was also interested in photography, and early in 1915 he was appointed a wing photographic officer in France. In the early type of cameras the plates had to be changed singly after each exposure, this operation taking twenty or thirty seconds. Col. Moore-Brabazon conceived the idea of designing a camera which would automatically perform the necessary change of plate, and, at the same time, wind up the focal-plane shutter. A magazine containing eighteen plates was placed on the top of the camera, there being another fixed underneath into which the exposed plate dropped Col. Moore-Brabazon took his designs to Messrs. Thornton-Pickard, who made models, and the invention proved an enormous success The principle was adopted by the French and the Americans, and the Germans were at a great disadvantage because they never had anything like it. The plates could be changed in two or three seconds, enabling photographs of a continuous line of trenches to be taken as well as stereoscopic photographs. The claimant asked for an award of £10,000.

It was stated that Messrs. Thornton-Pickard had taken out a patent in connection with the invention, but that they made no claim as they considered they had been sufficiently remunerated under the contracts they had carried out.

At an adjourned hearing, Mr. R. Hesketh, formerly secretary of the Thornton-Pickard Manufacturing Company, gave evidence of the cost of the production of certain cameras, and the amount the Government were charged for them. The firm took out a patent for the "O" camera in August, 1915. Later witness had a conversation with Major Campbell, who was then officer in charge of the Air Department, dealing with photography. Major Campbell was very angry about it, and said the firm had no right to take out the patent, because the invention, if it belonged to anyone, belonged to Col. Moore-Brabazon.

Col. Moore-Brabazon said it might sound rather absurd, but when aerial photographs were originally taken they were not very welcome at headquarters. He added that later there was a cry for photographs, and there was a desire for a quicker way of taking them. It was then the idea for the invention occurred to him. Witness also spoke of his visit to England, and to the Thornton-Pickard Company, and gave a demonstration to the Court of his invention.

Asked why he did not write to the firm protesting against their taking out a patent, witness said he complained to Major Campbell.

Mr. Trever Watson, for the Crown, said he was satisfied to accept Col. Moore-Brabazon's evidence as being entirely correct, and there was no need to pursue the matter further. Explaining the attitude of the Treasury, Mr. Watson said they had a statement from Mr. Gray Pickard, in response to an inquiry, which stated categorically that the invention was Mr. Gray Pickard's. That being so, and the fact that Mr. Pickard was not called, it became the duty of the Crown to probe into the matter. Having heard the evidence, they were satisfied the letter had been written under a misapprehension, and they accepted what Col. Moore-Brabazon had said.

Mr. Justice Sargant said there was the greatest difficulty in giving a claimant an award in respect of an invention which had been fully paid for by the Government so far as the cameras had been used. What the Commission proposed to do was to adjourn the application for some considerable time, in order to give Col. Moore-Brabazon an opportunity of taking such proceedings as he might be advised

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

FOREIGN PHOTOGRAPHIC LENSES.

To the Editors.

Gentlemen,—The letter from Mr. K. C. Browning on "Foreign Photographic Lenses," in your issue of the 18th inst., is very interesting, but is far from being conclusive.

He simply takes one Goerz lens and compares it with one English lens, and also quotes the results of tests of an English telephoto lens.

It would be much more satisfactory if a number of lenses, say about a dozen, could be taken at random from each of the leading English and Continental makers, and tested at the N.P.L., and the results published. The results of the comparative tests of individual lenses are apt to be very misleading when making general comparisons.

I hold no brief for foreign lens makers, but I have a Goerz lens, purchased pre-war just in the ordinary way of business, and I have not yet seen another lens to equal it, although I have handled a great many since that time.

In recent years I have purchased a number of lenses from English makers, and the result of my experience goes to show that although makers of lenses, both English and foreign, are not backward in claiming what their lenses are supposed to do, yet they do not always take the necessary care to ensure that their lenses are up to the standard advertised before they are supplied to purchasers.

One illustration will suffice. I ordered a lens from an English maker for a ¼-plate camera, the front of which was provided with the usual vertical and cross movements. When ordering, I stipulated that the lens should be tested at the N.P.L., and that the Class A certificate should accompany it. This was arranged on the understanding that I paid the cost of testing, etc., and I agreed to do this.

In due course the lens arrived, without the certificate, and as the covering power did not seem satisfactory, I posted the lens to the N.P.L. for examination. I subsequently learned that the lens had been previously tested, but although it was advertised to cover a 5-in. × 4-in. plate at full aperture, intimation was sent by the

makers that it was only to be used on a ¼-plate, and it was therefore only tested for that size of plate.

The lens would not satisfactorily cover a ¼-plate unless stopped down to *f*/8, although the full aperture was *f*/4.5, and a Class A certificate for a 5-in. × 4-in. plate was not obtainable.

On communicating with the makers, I had considerable difficulty in getting another lens, and only did so after waiting several months, although this incident occurred during the past two years.

It has often been advised in the photographic Press that purchasers of high-class lenses should have them tested at the N.P.L. before accepting them, but photographers generally, and particularly amateurs, do not seem very willing to take such trouble.

The two principal requirements of a lens for the ordinary amateur are definition and covering power, and these are always guaranteed by the makers.

It appears to me that the solution of the whole difficulty is in the hands of the makers. If the makers are satisfied that their productions are equal to what is claimed for them, why not send all lenses above £2 or £3 in value to the N.P.L. for test, and issue a certificate with each lens given by that Institution, showing that, so far as definition and covering power are concerned, the lens will do all that the makers advertise for it. I feel quite sure that the purchasers would generally be quite prepared to defray the cost of the certificate, and, if this were done, a large number of lenses would require testing, and no doubt a simple certificate at a small cost could be obtained.

It is a most unpleasant business to write to lens manufacturers and tell them that the lenses supplied by them are not up to their advertised standard.

I believe that a great number of "would-be" photographers are discouraged through getting a bad lens to start, when they paid for a good one, and frequently give up photography in disgust, thinking that the trouble is with themselves.

If nothing but lenses up to advertised standards were issued, I feel sure there would be more photographic enthusiasts, and the whole trade would be benefited.

Perhaps other readers of your paper may have views on this subject, and it would be interesting to know how far the lens makers would be prepared to go in this direction, to prove without question the absolute superiority of the English-made lenses.

I attach my name and address, but shall be obliged if you will not publish it.—I am, Gentlemen,

Yours faithfully,

"AMATEUR."

November 21.

[A letter from Messrs. Peeling and Van Neck on this subject, received as we go to press, is held over until next week.—Eds., "B.J."]

A CONTRAST RATING FOR PRINTING PAPERS.

To the Editors.

Gentlemen,—May I trespass on your space to reply to Dr. Glover's criticism of the suggestion for a contrast rating for development papers? I cannot see that it is unlikely for a request for a similar degree of contrast to bring anything capable of giving similar results. On the contrary, I am in the practice of handling seven grades by three makers, and though they are very constant I find at times fluctuations in the vigour of most of them.

When dealing with thousands of negatives per day, and often against time, it is utterly impossible to measure the gamma of any of them; nevertheless, a change in the vigour of a paper that is used for a class of negatives is felt in the general quality of the output, and this is an important thing with business photography. As regards the different qualities of papers having the same contrast that is only to be expected. The same thing applies to plates—some having longer straight line periods of their curves—but it is no argument for dropping H. & D. numbers. Admittedly a contrast rating, or even a rough description, is not indispensable when making amateur studies. For this purpose I usually take a selection of papers and mess about till I get a result that pleases me, irrespective of the nature of the paper. I would just as soon use plates that were merely marked "Slow" or "Fast," not being tied to an experimental negative or two. Some of the most satisfactory results I have had have been quite unexpected in view of the class of materials used and the particular uses. But this is a very different thing to commercial practice where a standard result is expected almost mechanically.

When it is considered that yourselves, *The Photographic Dealer*, *American Photography*, Messrs. Criterion, Illingworth and Wellington and a number of professional printers have shown interest in the idea—though not all in absolute agreement—it is hard to see how it can be "fading into insignificance." Rather it is likely to fructify.

It is true that photographers can make their own charts to enable them to arrive at a correct idea of the papers' nature, but some order by the hundred gross, and we might prefer to know the degree of contrast before getting orders consigned or deliveries put into use.

Numerous photographers do not use soft Velox, and I fail to see how any paper could be set down as a standard for all others. They might all fluctuate slightly (with all due respect to makers).

Dr. Glover evidently is not *au fait* with the commercial atmosphere of photography, but, even so, our thanks are due to him for helping to bring this question into the daylight.—I am, yours sincerely,

J. R. HALL.

31, August Road, Liverpool, E. November 19, 1921.

To the Editors.

Gentlemen,—I am surprised that a gentleman of Dr. Glover's standing should waste his time on a letter of the kind that appeared in your issue of the 18th inst. His own arguments condemn him. He starts off by trying to prove that the method of contrast rating for bromide and gaslight papers suggested by Mr. Hall and myself is unscientific and unnecessary, and then calmly goes on to suggest a method for testing papers which at the very best can only be called 'rule of thumb." Granted that contrast numbers will not tell the printer all he wants to know about a paper, they are, nevertheless, likely to be extremely useful. No one would suggest for a moment the H. and D. numbers on plate boxes give a very precise idea as to the performance of any particular brand of plate, but they are not necessarily to be despised on that account, though possibly Dr. Glover would like to see those abolished and each operator left to work out his own salvation with only such names as "special rapid," "special sensitive," "extra speedy," etc., as a guide.

Dr. Glover talks very learnedly about characteristic curves and gamma infinity, and these things are quite right and proper in their proper place, which is the laboratory, but they have little practical value in the printing room; and even if the average assistant printer knew much about these things (and we all know that he does not as a rule), he would have little time to bother with them in the course of a day's work. I wonder if Dr. Glover has ever had to turn out two or three thousand prints a day, or has had the job of supervising a large staff of assistant printers—mostly unskilled girls? If so, he would appreciate even a small help towards the standardisation of materials.

I have no wish to appear personal, but at the same time there are times when I wish some of our learned theorists, whose labours in the research laboratory we thoroughly appreciate, would occasionally descend from their pedestals and look at things from the point of view of the man who has to get the work done.

It would be interesting to have the opinions of a few practical workers on the subject.—Yours faithfully,

H. TAYLOR.

—51, St Annes Road,
Chorlton cum-Hardy, Manchester,
November 21.

Commercial & Legal Intelligence.

ILFORD, LIMITED.—Messrs. Ilford, Ltd., have declared a dividend of 8 per cent. on the ordinary shares for the year ended October 31. The dividend for 1919-20 was the same.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C. F. Watkins.—"Le Photographe," 35, Boulevard St. Jacques, Paris XIVe

C. J.—There is no recognised proportion between the price charged for single portraits and that for groups. Perhaps the best indication we can give you as regards prices for groups is the schedule adopted by the Edinburgh Society of Professional Photographers.

H. A. Aylward.—Copper will stand a great deal of wear, but is liable to get into an unpleasantly corroded state unless more than ordinary care is taken to clean out the tank and wipe it dry when it is not in use. For quantity development of cut films, a well-made tank of hard wood, with or without lead lining is much preferable.

Van Ralty, Ltd.—Under the Shops Act the parts of a photographer's establishment usually open to the public must be closed to the public on the weekly half-holiday, but it has been held that portraits may be taken of sitters with whom appointments have been arranged previously. The distinction is that you must not have the shop open for any passer by to come in.

S. F.—The best thing you can do is first to remove the retouching medium with turps or ether, wash for a few minutes, and then soak the negative in a weak solution of soda carbonate, or ammonia. This will take away all the uranium intensification. If it is intended to re-intensify with uranium, the negative should be well washed and soaked for a few minutes in a weak solution of acetic acid before re-applying the uranium mixture.

M. T.—We suppose your query relates to English translations. In that case Dr. Eder's book has been out of print for many years. You might get a copy from Messrs. Foyle, 121-123, Charing Cross Road, W.C.2, or Messrs. Sotheran, 140, Strand, W.C.2. So far as we know the only book by Valenta on emulsions is on P.O.P. emulsions, but has not been translated into English. For this you should apply to W. Knapp, Halle a/S, Germany.

B. W.—We are interested in seeing the negative (returned). It is quite a normal uranium intensified negative. Evidently the rebate of portions of the negative had a veil over them, which accounts for the brownish deposit there. But if you had had a trace of hypo in the film you would have got an utterly useless result in consequence of patches. We think the negative has the normal uranium image, and we do not think you would make it any better by trying to clear it with sulphocyanide.

W. K.—Your proposed installation of six (1,000 c.p.?) half-watt lamps with a maximum height of 8 ft. to the filaments, would be quite practicable. The heat would not be unpleasant and the reflection from the ceiling would be rather an advantage than otherwise. Keep the ceiling white. It would be well to have, say, four of the lamps to raise and lower, as you would often want to use them for sitting figures and babies, as by this means you could halve your exposures. We should not recommend movable stands in a room only 14 ft. wide, as they would take up a lot of space and prevent your getting a front light for large groups. As far as the length of studio is concerned, 42 ft. is ample for any class of work. Have a black curtain lined with white behind the lamps and a thin muslin or cheese cloth on in front. Keep these at least 9 in. from the bulbs, or they may get scorched.

M. S.—Eighteen feet is rather too short for full-length figures, so that you will have to provide a short focus lens for these, say, one of 8½ inches focal length for cabinets, otherwise the size of room is quite suitable. It is quite impossible to give an estimate of the total cost of equipment, so much will depend upon the size of direct negatives you intend to work, also whether you buy new or second-hand apparatus. We find it more usual for beginners to allot the sum they can afford, and to do the best they can with it. We suggest that you could make a start with a whole-plate camera and use an enlarger for any large sizes. You should be able to get all that is really necessary for £100 to £150, excluding furniture, which, however, is not much used in modern work. If you intend to instal electric light the cost of lamps and wiring will be about from £25 to £50 in addition.

H. J. C.—The only practicable process for the purpose you name is collotype, but we are quite sure that the equipment and the time required to obtain competency in the process would make the cost of the reproductions greater than that which would be incurred in having them printed by a firm which does collotype for scientific purposes, or by making actual bromide prints. If you wish to do the work yourself we think bromides would be much the cheapest in the long run. Three-colour reproduction involves making half-tone blocks and requires a practical training, such as can be got at the L.C.C. School of Photo-Engraving, 6, Bolt Court, E.C., in all photo-mechanical processes. There is a text-book by W. T. Wilkinson, published by Messrs. Hamptons, Cursitor Street, W.C., entitled "Photo-Mechanical Processes," and priced at 4s. 6d., but no one expects to do very much in these methods only by self-instruction from books.

P. P. K.—The Zanot formula is for the toning of development prints; that is, bromide or gaslight, not for P.O.P. The "Artura" referred to is a development paper made by the Eastman Kodak Company in America, but so far as we know is not on sale in this country. The following is the formula for the "B.J." pyro soda:—

Make up two solutions according to the following formula:—

A.—Pyro	1 oz.	50 gms.
Soda sulphite, cryst.	8 ozs.	400 gms.
or anhydrous	4 ozs.	200 gms.
Potass. metabisulphite ...	1 oz.	50 gms
Water	60 ozs.	3,000 c.c.s.
B.—Soda carbonate, cryst. ...	12 ozs.	600 gms.
or anhydrous	4½ ozs.	225 gms.
Water	60 ozs.	3,000 c.c.s.

Mix A, 1 part; B, 1 part; water, 2 parts.

In making the A solution the sulphite and metabisulphite should be mixed together dry and put together into hot water When they are dissolved, the solution should preferably be brought to the boil and boiled for about a minute, after which the pyro is dissolved—when the solution is cooled. The boiling greatly improves the keeping qualities of the solution.

If preferred the sulphite and metabisulphite can be dissolved in only half the water and the necessity of heating or boiling so much solution thus avoided. The second half can be added cold and the pyro then dissolved.

The British Journal of Photography.

The Oldest Photographic Journal in the World.

PUBLISHED EVERY FRIDAY. ESTABLISHED 1854. PRICE FOURPENCE.

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Any Other Part of the World. { *One Year* ..... £1 3s. 10d. / *Six Months* ... 12s. 0d. / *Three Months* 6s. 0d.

IMPORTANT NOTICE TO READERS.—Until further notice agents will supply the "B. J." to order only, as the high price prevailing for everything in connection with newspaper production prohibits the distribution of surplus copies for chance sales. It is therefore necessary in order to ensure the regular delivery of the "B. J." to place an order definitely with a dealer, newsagent or bookstall clerk, or to send a subscription to the publishers.

Henry Greenwood & Co., Ltd., Proprietors and Publishers, 24, Wellington Street, London, W.C.2.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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Contents.

SUMMARY.

It is announced that the Photographic Fair at the Horticultural Hall next year will be held from May 1 to May 6. (P. 713.)

Mr. Arthur C. Brookes's intimation of his arrangements for the Fair contain the first particulars to be made public that the Professional Photographers' Association intend to hold next year's Congress in the early autumn. (P. 713.)

Particulars of his process of photo-sculpture, on which Mr. H. M. Edmonds will lecture at the R.P.S. next Tuesday, are given in a patent specification on page 718.

Mr. W. T. Wilkinson, in "Photo-Mechanical Notes," gives practical instructions and formulæ in the making of multiple negatives for photo-litho printing. (P. 716.)

Messrs. W. J. Smith and E. L. Turner describe a calculator for ascertaining the relative time of exposure, when photographing originals, according to the distance of the arc lamps and the angular position of the latter relatively to the copy-board. (P. 717.)

Mr. F. C. Tilney reviews the collection of portraits by D. O. Hill, Mrs. Cameron and Rejlander, which are being shown at the house of the Royal Photographic Society, together with some modern pictorial by a South African photographer, Mr. Elliott, of Cape Town. (P. 717.)

Formula for a developer, which is said to black prints yielding better sepia tones with hypo alum, is the subject of a paragraph on page 714.

The wide field which remains open for advertisement photographs of pictorial quality is emphasised by an account of the aims of an American professional who has made work of this kind his specialty for many leading advertisers. (P. 715.)

Some guidance to the less experienced in the business of studio portraiture, among the conflicting counsels of "art" and ordinary work, is given in the course of a leading article on page 714.

"COLOUR PHOTOGRAPHY" SUPPLEMENT.

In a contributed article, Mr. R. M. Fanstone describes his procedure in using the chromium intensifier for Autochromes. (P. 45.)

A description of a three-colour camera, recently designed by Mr. A. Roland Trist, is given by Mr. W. Penrose Gamble in "Penrose's Annual." (P. 48.)

Mr. E. J. Wall has disinterred an interesting account of the experiments made for Clerk Maxwell by Thomas Sutton, from which it is seen that Clerk Maxwell's process in practice was a four-colour one. (P. 47.)

The optical arrangement for a two-colour process of cinematography, invented by Giovanni Casieri, is described in a recent patent specification. (P. 46.)

The idea of illumination of the original by particular non-overlapping sections of the spectrum has been revived in a recent patent. (P. 47.)

Mr. F. E. Ives writes in reference to his priority in the invention of various processes and apparatus for colour photography. (P. 48.)

EX CATHEDRA.

The Fair, May 1 to 6

The prospectus, just issued by Mr. Arthur C. Brookes, informs us that the Photographic Fair will be held next year at the Horticultural Hall, from Monday, May 1 to Saturday, May 6. This is a period which is shorter by two days than that during which the Fair remained open in the spring of the present year, but the requirements of the Royal Horticultural Society for its own exhibitions are the reason for the shorter time which will be available next year. The Congress of the Photographic Dealers' Association will be held during the period of the Fair, and arrangements are being made by that body to make its Congress a much more important function than was the case this year, when the threatened general railway strike in support of the Miners' Federation played havoc with the carrying out of the programmes of all meetings falling about that time. It will, in fact, be remembered that this year's Fair opened on the very day when a general paralysing strike was at any rate probable. Better counsels, however, prevailed in the labour world, and the Fair, which had opened with such black prospects, proved an immense success, and, by the crowds of the public which thronged it from morning till night, justified the steady optimism of Mr. Arthur C. Brookes during the days preceding its opening.

* * *

—and the P.P.A.

But it will surely come as a great surprise to members of the Professional Photographers' Association to learn from the prospectus of the Fair that its Council has recently decided not to hold the Congress of members and the exhibition of professional portraiture at the Fair. Mr. Brookes, who must be fully informed of the change of arrangements, states that the early part of September next year has been decided upon for the holding of these functions. We have no further information from the Professional Photographers' Association in regard to this matter, beyond the brief intimation contained in the report of a meeting of the council held on November 11 last, which appears on another page, to the effect that as the year 1922 is the twenty-first anniversary of the foundation of the Association a special effort is to be made to make the Congress and exhibition an advance upon all previous ones, and that new features of up-to-date interest to professionals are to be introduced. It is further stated that after a lengthy discussion further consideration of schemes for this purpose have been deferred to a succeeding meeting. We must wait until a definite announcement is made before we can form a complete opinion upon the wisdom of the proposed break. From the meagre facts at present available it must, however, be supposed that the advantages attaching to an autumn Congress are very considerable indeed in order to justify abandon-

ment of those derived from association with the Fair. The opportunity of taking part in the Congress and of visiting the Fair by one single visit to London is a feature of the old arrangement, which, we think, was a very great element in the success of the former. Professional photographers will still wish to see the Fair, at which features of special interest to them will be provided, and it remains to be seen whether those in the Provinces will make a second visit to London during part of the holiday season. The P.P.A. should announce its revised programme without delay and should state if it is definitely committed to it.

* * *

Iodide and Hypo-Alum. Difficulty in getting satisfactory sepia tones with hypo-alum is one of the old-standing complaints which constantly reaches us. It would almost seem that many papers are now less amenable to this method of toning than was formerly the case. It may, therefore, be of interest to quote a formula for the developer of the black print which is found to facilitate the production of a good sepia tone in the hypo-alum. Writing in "Camera Craft," Mr. W. H. Emmet recommends the following:—Amidol, 25 grs.; soda sulphite, anhydrous, pure, 150 grs.; potass iodide, 10 per cent. solution, 40 drops; water, 10 ozs. This developer is used without bromide, and while it is recommended for Velox paper, the iodide is stated to have a certain effect which is favourable to the action of the toning mixture. We hear also that iodide, in the form of silver iodide, is being recommended as an addition to the hypo-alum toning solution itself, and thus it would seem that iodide, in one form or another, exerts a certain beneficial effect upon the process, although in what way this effect is produced we must confess that we are unable to say. A factor in the process, which is sometimes overlooked by those in difficulties, is the quality of the original negative. With negatives which are deficient in vigour it is difficult to obtain satisfactory hypo-alum tones by any modification of the original developer of the prints or of the toning bath itself.

SIMPLICITY IN PORTRAITURE.

There is no law written or unwritten to dictate to the photographer what style of work he shall issue, but in most cases he will find it more profitable, and in the end quite as pleasant, to ascertain the requirements of his customers and do his best to meet them. Naturally, these requirements vary to a very great extent in different localities and among different classes of customers, and what is acceptable in one case will not be so in another.

The young photographer who takes as his standard much of the exhibited work of those whom we may truly call photographic artists, a much ill-used term, will often be disappointed to find that quite meritorious work in what we may call the modern style is coldly received by the public, who, as a rule, come to him for a clearly-defined portrait and not the more or less artistic impression of the photographer. A word that is often dinned into one's ears is "clear," and this gives the key to success in the portraiture of average persons. As was pointed out by several correspondents a few weeks ago many successful photographers have displayed totally different classes of work in their showcases and the exhibitions, thereby showing their business acumen, but not all are so wise. We can recall the case of one very clever operator who had met with great success while carrying on the traditions of an old-established studio in the provinces, but who tired of the class of work which had yielded him more than a competence, and came to London determined to devote himself to artistic portraiture only. He had no society influence, which might have made him a success of the moment, and in a couple of years his means were exhausted and he had to retire into obscurity. His studio was taken by a man of equally good artistic ideas, but who studied the taste of his public, with the result that a very lucrative and ever-increasing business was created.

It is quite a mistake to imagine that first-class technical work cannot be allied to artistic feeling; that is to say, that reasonably sharp general definition and full exposure are not permissible in a good picture. An "old master" effect where a strongly-lighted face stands out of Stygian darkness may be pleasing to a trained eye, but it is not acceptable to the mother who wants a remembrance of her absent son, or the girl who wishes for what is popularly called a speaking likeness, for presentation to one who knows her features well. If any proof of this were needed we have only to look at the photographs of deceased friends which are brought to be copied or enlarged, and we shall find that, almost without exception, they are clear, softly-lighted pictures, often amateur snapshots, although there may be many more pretentious portraits extant. It may not be known to all photographers that there are many people who prefer to have their children and themselves photographed at the seaside "on account of the clearer light there." London is, we know, sometimes murky, but in this age of electric lighting it is never impossible to take a clear photograph.

Let it not be supposed that we counsel a return to hard negatives and glossy prints, although these still find favour in some industrial districts. Modern printing methods will give all the delicacy of the old albumen and chloride papers, with the added advantages of variety of surface and tone.

There is, however, no need for the photographer to stifle his instinct for producing striking and even bizarre effects, but he should indulge it as an amateur, that is to say, for his own pleasure, and not try to persuade his clients to have what they do not really care for. If a business in this class of work can be created—and some have done it—well and good, but it is desirable to keep it as a side line until a demand arises.

The use of soft-focus lenses places a great power in the hands of the discriminating worker, but it is a power that is easily abused, and it is wise to use only those in which the degree of softness can be controlled without affecting the exposure, so that a slight softening for small heads or a greater one for large work can be obtained without departing from the usual methods.

A very great aid in producing technically good results exists in the panchromatic plate, which should be more extensively used than it is for sitters whose hair and complexion cannot be rendered successfully with an ordinary or even an orthochromatic emulsion. With it, and a suitable filter, which need not more than double the exposure, a negative needing little retouching can be obtained, and the risk of losing the likeness reduced to the minimum.

The inartistic photographer is likely to rely too much upon retouching to make good his deficiencies, and great restraint is necessary in this direction. Careful attention should be given to the lighting so that harsh shadows are avoided, attention should be paid to the contours so that as little knife-work as possible is needed.

To sum up, the wants of the great bulk of sitters are a good likeness, a technically perfect photograph, and all the artistic skill that the photographer can put into his work.

THE PICTORIAL IN COMMERCIAL ADVERTISEMENT PHOTOGRAPHS.

[A professional maker of advertisement photographs, Mr. J. Wallace Pondelicek, contributes an interesting account of his aims in this field to a recent issue of "American Photography." He represents a type of photograph supplier which may be said to have originated in the United States, namely, one who applies all the taste and feeling and technical skill which enter into pictorial work to the making of photographs for use as advertisements in the magazines. In this aim to draw favourable attention to goods by making appropriate photographs which also attract by their instrinsic beauty, he is distinguished from the photographic illustrator. Little work, such as his, is as yet produced for advertisers in this country, and thus in the development of advertising along pictorial lines, a large field of business, in which the photographer should share, remains chiefly in the hands of the draughtsman.—Eds. "B.J."]

Just a few years ago photography was considered more or less a mechanical commercial medium, a means to secure a record of given subjects. That was several years ago. However, to-day, thanks to the infinite pains and study of persistent workers, photography has made fast and inspiring advances, and has won its place among the arts.

The painter expresses his mood in colour—warm colours for the high-keyed sunny effects, cold colours for more sombre work. In photography one has just one colour to work with, and that is the so-called black, which in itself being a cold colour, is rather difficult to work with.

To portray the atmosphere of a bright sunny day, the sensation of feeling, the registration of human personality and character, photography is a most sympathetic medium, within its limits: a knowledge of chemistry, optics and the posing and expression of subjects, also lighting, must be had. I have seen many wonderful examples of photographic work, truly some essaying the recall of shimmering gray and blue canvases of Corot and others the brilliance of the Spanish painter Zuloaga, and many others that possessed all the vibration of sunlight and quality of colour, really wonderful when considering that they were done in monochrome.

When photography entered the field of advertising, the artist had only a subject pictured in monochrome to make a direct appeal to the public with, and when we take into consideration certain things about the public, we can easily appreciate the advantage the painter had over the camera man with his illustrations in colour.

In the first place, the public will not reads ads., if it can help it. You no doubt have noticed in magazines just when you are reading the most interesting part of a story at the bottom of the page you find the words, "Continued on page 97," and after ploughing through the magazine, you find on page 97 a large four-column advertisement and one column of story and so on, until you have read the story through. You have gone on reading single columns on ten different pages and have seen several dozen ads. whether you wanted to or not. Some of them you read and some you passed up. The commonplace ones, if the story was not thus distributed, you probably would never look at in the back pages of the magazines. You must make the public read the ads., hit them between the eyes with your ad. If you are to make the public read, your story must be told quickly, in pictures, headlines and brief summaries.

Advertising illustrations to be truly successful, must reflect and radiate the individuality of the product and producer, must inspire confidence, must have a human appeal, and must conform to the rules of artistic composition. The public does not know composition, but it does know an appealing striking picture, whereas an illustration not well handled is passed up as commonplace and ordinary.

Advertising and advertising illustrations are essentially salesmanship on paper. It is the breaking down of sales resistance. You must illustrate to create a buying desire, and favourable mental impression in the minds of your public. Flat, lifeless phrases, generalities that talk and say nothing, are no more effective than the halting mutterings of a young salesman afraid of himself.

As a rule, you will notice that an advertiser has a follow-up system of advertising, a sort of continued story. His ad. this month has a direct connection with his ad. next month. These campaigns, known as national, are planned a year in advance and the illustrations bear the same technique or treatment throughout the year, and if done successfully, you will be looking for the next month's ad., and after seeing several you will investigate the product, and nine times out of ten you will buy in preference to some other similar article you have never heard of. Photographic illustrations, like advertising copy, must be brief and striking. The public wants something different. You cannot go into too much detail when making an illustration. You must leave something to the imagination of your reader, new ideas, new styles, new treatment and technique, always a striving for the attraction of the public. The elimination of detail and the presentation of the essential idea is based on the principle that suggestion is more powerful in the mind than actuality.

The public is made up of people, not types. The illustrator will reach his public oftener and more broadly if he ceases to look for the difference between people and turns his attention to likenesses, and so when you illustrate, do not be afraid to aim high. Think of the public as a body of potential buyers whose mentalities rate above the average, then when you aim high, your illustration has an appeal. It not only portrays an article, but is educational and tells an impressive story.

It is extraordinary to what an extent "mood" and atmosphere are determining factors in the effectiveness of an advertisement. In connection with an article like underwear for women, a consideration presents itself that you do not have to contend with when illustrating other commodities, that is proper presentation. There are difficulties connected with underwear that are not encountered with other articles of women's dress. It is a great deal more intimate than corsets and stockings. General reference to corsets or stockings will pass in almost any stratum of polite society, but reference to the individual articles of women's underwear, except the use of the general term, is universally frowned upon, therefore the presentation of underwear must have the atmosphere of delicacy and refinement. The mood can be delightfully gay and dashing or quiet, calm and thoughtful, yet the same atmosphere of refinement must surround both. The appeal must be broad and universal so "Everywoman" can find something interesting in it. The selection of a proper model is very important, one with refined features, also posing, lighting and handling of plate, and last of all, a different idea from what already has been done, to arrest attention.

Advertisement of gramophone records is another story. Here we have music, which in itself suggests a hundred and one ways of presenting it attractively. In this instance, I have put the spirit of the dance, joy and nature's beauty. Development and treatment of these subjects were done in high key with one thing in mind, to keep the illustration in a sunny, joyful mood.

The campaign for a milk company (Carnation milk) was based upon photographs of real, live, every-day human beings. The idea behind was the human interest appeal. To give

cohesion and maximum quantity of pulling power, the advertisements were planned in a series under the headline of the Carnation Typical American Family. As a result, the various characters were sought, Grandpa, Grandma, Father, Mother, Auntie, Sister, Sonny and the Grocer, alternating their appearance in the advertisements either posed in group or individually with proper surroundings, the object being to make these faces familiar all over America, each a fine attractive type, the kind you would like to meet in real life, the advertisement appearing under headings showing various activities of the family relating to the purpose and use of Carnation milk.

Goodyear tyre advertisements are others which I have made. They tell the story of where Goodyear tyres are used, illustrations showing the All-Weather Tread on Fifth Avenue, the Palisades, Michigan Boulevard, the American deserts, the Apache Trail, Arizona, the Grand Canyon, the Rockies, and a hundred others taken all over the country, always showing some either historical or memorable part of the country in the picture with the Goodyear tyre and All-Weather Tread tyre impression in the foreground, this style of advertisement not only showing the uses of the tyre in various parts of the country, but acquainting the public with the beauties of our country.

The field for photographic advertising illustrations is unlimited. The examples mentioned are some of the campaigns I handle. I have made illustrations for almost every possible article, from still lifes of shoes, jewellery, potatoes, to the most elaborate set-ups using models, stage scenery, etc. It will probably interest the reader to know that every illustration I have made, I have used one of my many Pinkham and Smith semi-achromatic lenses. With a lens of this type you have every possible mood and feeling at command. You can create atmosphere that is impossible with a corrected lens. With proper handling you have at your command a lens you can almost talk to. I use an orthochromatic plate with or without filters, just as occasion may present itself. Very seldom do I find it necessary to use a panchromatic. For all of my outdoor work I use a K-2 and K-3 filter both at the same time. This enables me to use my lens at a wider opening, giving me fine colour values and more control on exposure, exposure being approximately $\frac{1}{2}$ second at $f/6.5$ on bright sunny days. The developer is the old standard pyro in tray, using about half the carbonate specified in formula and adding carbonate dependent upon the mood and atmosphere you are working for; more carbonate for high-keyed sunny effects and less for those of more sombre or softer quality.

A great deal could be written about advertising illustrations, but the summary would be good natural posing, attractive lighting, practical handling of lens and plate, forceful, brief, well-composed pictures, appealing to the human interest.

To make an illustration is one thing—to fit it into a story is another, to do both requires skill, creative ability and imagination. Whether an illustration is made to express vivid action or still life, in either case it must speak louder than words.

J. Wallace Pondelicek.

"Props" for Naturalist Photographers.—A representative of the "Daily Chronicle" has been having a talk with Mr. W. Clarkson about the making of property animals for pantomimes, and we quote the following note from a report of the interview: —Not all the works of the property masters are made for stage purposes. Life-size leopards, lions, tigers, ostriches and giraffes have been ordered by big game hunters and bioscope firms for use in the jungles. "We make them hollow to hold two men," said Mr. Clarkson, "and there is a hole in front of the breast for the camera, and two holes for rifles. The camera man inside the dummy tiger works in front, and he is guarded by the man behind inside, who controls the rifle triggers. A ring of burning material is put round the dummy animals when placed in the jungle, in order to stop the real animals from scenting the human beings inside them."

Photo-Mechanical Notes.

Multiple Negatives for Photo-Lithography.

In making up a printing plate for an offset machine, of small units, the necessary number can be obtained by repeated exposures on the sensitised plate; laying the negative each time upon register marks, corresponding with marks placed on the copy for the purpose, and shielding the extra surface of plate from light-action during each printing down.

This method answers well when the units are large and the multiple printing does not exceed eight, but when small labels, stamps, etc., where the completed print does not exceed 6 x 4 ins., are to be done, then a step and repeat machine is required, especially for fine colour work.

When the units are larger, multiple negatives may be built up of negatives made upon Transferotype paper, trimming to exact size, and transferring the requisite quantity to a large sheet of glass, giving a large negative made up of a number of smaller ones.

First of all, make from the original a negative the exact size of the unit, or label, required. From this negative, make a positive by contact, and from this positive make the requisite quantity of small negatives or prints upon Transferotype paper to fill up the printing plate.

The copy negative is best made by the wet collodion process, the contact positive upon a process dry plate, developed with the following hydroquinone developer:—

No. 1.—Hydroquinone	.....	180 grs.
Potass. metabisulphite	.....	$\frac{1}{2}$ oz.
Citric acid	.....	60 grs
Potass. bromide	.....	60 grs.
Water	.....	20 ozs.
No. 2.—Caustic soda	.....	180 grs.
Water	.....	20 ozs.

For use, take equal parts of No. 1 and No. 2. Fix in:—

Hypo	.....	6 ozs.
Water	.....	20 ozs.

This developer is also used for developing the negative prints made upon the Transferotype paper.

The transparent positive may be fixed in an acid hypo bath, but the Transferotype negative prints must be fixed in plain and freshly-mixed hyposulphite of soda.

Care must be taken all through the process that the lines are clear glass in the case of the negatives, and in the positive that the lines are quite dense, and the other parts quite free from veil.

The negative prints made under the positive must have all the characteristics of a good line negative, viz., the lines quite white, and the ground perfectly black. Using a contrasty Transferotype paper, giving it the proper exposure, and developing with the formula given above there will be no difficulty on this point.

The negative prints when dry should be trimmed exactly to size, allowing in this for a slight expansion when again wetted.

This fact of expansion when wet, inherent to all paper prints, suggests that unless some means are adopted to prevent any expansion, the use of paper for making negatives for colour work is not practicable. This is quite true, but for ordinary black and white labels, etc., this expansion is quite negligible.

Fortunately the trouble can be obviated quite easily by soaking the paper in clean water until limp, then squeegeeing down upon a sheet of glass that has been previously thoroughly cleaned and polished with French chalk, or what is perhaps better, first smeared with vaseline, polished off, then dusted with French chalk and polished until this is quite polished off. Once this is done the plate will be usable quite a dozen times without re-polishing; even then only a French chalk polish is necessary.

The sensitive Transferotype paper, wetted till limp, is then squeegeed into contact with the glass, and dried (in the dark-room, of course, and also the soaking and mounting on the glass must be dark-room operations). When dry, the paper is stripped off the plate and cut up into sizes for printing upon. Paper dried as above is at its full stretch as regards both dimensions, and cannot expand any more either way, so that small negatives made upon such stretched paper may be relied upon to give good register.

The prints being made and trimmed to size are next wetted until quite limp. They are then assembled upon a sheet of British plate-glass which has been previously coated with :—

Gelatine	2 ozs.
Water	20 ozs.
Potass. bichromate (saturated solution) ...	1 dr.

Filter before use, and coat whilst warm. The glass plate is scrubbed, and well washed, and then coated with the above solution, drained, and dried in full daylight.

When the prints are assembled (having plenty of water on the plate, which is best laid flat), place a sheet of rubber cloth all over the prints and squeegee down lightly. Remove the rubber cloth, and carefully examine the prints, and by the aid of set square, T square, and straight edge, coax by slight touches all the prints into exact positions. Again cover with rubber cloth, and squeegee as hard as possible. Keeping the rubber cloth in position, erect the glass plate, and finally examine the negatives. If any are displaced, the remedy is easy; they are still movable sideways, may be removed bodily, re-wetted and replaced. After the final squeegee, place a sheet of glass upon the rubber cloth and leave under that pressure for an hour. Next immerse the plate in water at a temperature of about 110 deg. F., and in a few minutes the paper backings may be lifted off. Now gently lave the water over the negatives so as to get rid of superfluous gelatine, wash for a few minutes in cold water, drain and put away to dry. After draining 10 to 15 minutes, examine the films, and if there are any tears, remove them by dabbing gently with a damp chamois or with fluffless blotting paper.

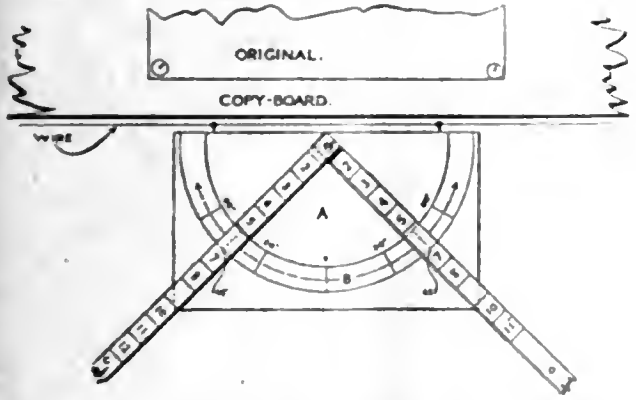
For poster work, enlargements can be made any size up to 60 x 40 upon this paper, and the print transferred to a glass plate for printing down upon metal.

The plates upon which these prints have been transferred can be made available for other negatives by soaking in an acid pickle, then washed and re-coated with the bichromated gelatine. W. T. Wilkinson.

Exposure in Systematic Process Negative Making.

An important item when determining the exposure in systematic negative making is the distance and angle of the lamps from the original. There are two optical laws to be considered when calculating the different exposures with varying light distances and angles, 1st light varies inversely as the square of the distance, and 2nd intensity of illumination varies directly as the cosine of the angle of incidence of the light to the surface being illuminated. These are not always understood and appreciated, but they play an important part in systematic work.

The writers have devised a simple apparatus for determining the angle and the distance of the lamps from the copy, and which is



in use at the L.C.C. School of Photo-Engraving. The sketch illustrates this apparatus. The base-board A has a radial scale B marked out to 30 deg., 45 deg., and 60 deg., the arms C and D are marked out in inches, and swing on a pivot E round B.

For convenience the side where the arms meet can be hinged to the copy-board in such a way that the point E may be brought to the middle of the copy, the device hanging down when not in use, the illustration shows the method adopted for the purpose mentioned. To set the angle, and to fix the distance of the lamps from the original, the apparatus is raised to a horizontal position, and E brought to the middle of the original when the distance and angle of the lamps can be set. The lesser or additional exposure for a known exposure when varying light-angle and distance is shown approximately in the table, or can be calculated by the following formula :—

$$\text{New exposure} = \left(\frac{\text{new distance}}{\text{old distance}}\right)^2 \times \text{exposure at old distance} \div \text{by cosine of angle of incidence.}$$

The following is the manner of using the table, which is calculated for use with two enclosed arc lamps on a 200-volt circuit, each lamp taking 10 amps. An exposure is 2 min. at 18 ins., and it is required to know the increase of exposure when the lamp distance is extended to 24 ins., the lamp angle being 60 deg. Opposite new distance of lamps look for factor under 60 deg., i.e., 2.85, multiply known exposure by this factor, $2 \times 2.85 = 5.7$ the required new exposure. If the distance is to be reduced the known exposure is divided by the factor.

Lamp distance.	30°	45°	60°
18 in.	1.00	1.23	1.78
20 „	1.23	1.52	2.15
22 „	1.49	1.84	2.60
24 „	1.78	2.20	3.10
26 „	2.09	2.60	3.64
28 „	2.42	2.87	4.20
30 „	2.79	3.42	4.66

If distance be 24 in. at 30 deg., and it is required to know increased exposure for 28 in. at 60 deg., take reading for 24 in. under 30 deg. = 1.78, and reading for 28 in. under 60 deg. = 4.2. Subtract 1.78 from 4.2 = 2.32, which is the factor for multiplying known exposure at 24 in. to obtain approximate exposure for 28 in. at 60 deg.—W. J. Smith and E. L. Turner.

Exhibitions.

THE "OLD MASTERS" OF PHOTOGRAPHY AT THE R.P.S.

Photographic old masters who may claim to be "primitives" are very few. The Royal Photographic Society should know, if anyone should, all there is to know about the artistic history of their subject: but their efforts have resulted in a collection that is made up chiefly of works by D. O. Hill, half-a-dozen by Mrs. Cameron, and seven by Rejlander. There must be other old masters, however. I once saw a collection of remarkable architectural works by a contemporary of Hill. His name I forget, but it would be a worthy quest to rescue such works from the obscurity of the distancing past.

The collection of Hill's work necessarily includes many duplicates, because collectors who lend prints are disposed to stipulate that their collection shall not be broken up. This prevents selection of examples, with the consequence that the visitor sees some of the portraits two or three times over. Perhaps this is no disadvantage. Comparison between specimens is made easier by this condition. There is certainly something perennially fresh in Hill's work, and I am disposed to think that its undying charm lies in the simple naturalism of its presentment. There is, of course, an attraction to some in the old-world style of its sitters; but that alone would not make Hill famous. Indeed, there are not a few portraits here that would certainly suffer the scoffs of the modern young person of either sex, from a point of view of subject-matter. But the worst of the "guys," the most "soppy" of the divines have the strength and dignity of simple truth. The prints are straight records, unaided by the artistic after-treatment which would be accorded them were they the products of to-day; and it is this obviousness of frank naturalism that takes us back to their time, placing us, in mind, beside the sitter. As a result we sympathise. We feel with the old beetle-browed ones; we understand the psychology of the demure, smooth-haired maidens.

All these prints have quality, sometimes of a rare beauty. Two

little landscapes, or rather town scenes, are rich in it. How far this quality is an accidental and happy result of the technical processes and how far it may have been schemed for is hard to determine. A statement was recently made that Hill's part stopped short of exposure and print production. That, at any rate, would still account for the vigorous and beautiful effects of frank light and shade, to which much of the quality is due. That the posing and lighting are the work of a painter is obvious almost everywhere, because they are at once conventional and beautiful. Some of the groups of figures are most ingeniously arranged.

There is nothing of this sort about Mrs. Cameron's work, except in the case of the Herchel, which is certainly an inspiration. The difference between her work and Hill's is that Hill's, if produced to-day, would command respect, whilst the other would be negligible.

Rejlander seems also to be in enjoyment of an over-estimated reputation. It is good work, but it does not reach across the years as Hill's does.

To hang with these things of a past day the admirable prints of Mr. T. Elliott, of Cape Town, is a good plan. The shock is rather severe, but it wakes one up to the fact that what was the source of beauty in early photography is still potent. Actual sunshine, which revealed all Hill's modelling, gives Mr. Elliott his theme. The white walls of somewhat fantastic buildings, upon which the parallel rays catch every inequality add their shadows as a contribution to the quality of the whole. One seldom sees buildings, skies and verdure in such perfect accord in camera pictures. In one or two cases tone values, and colour values, too, seem to be as dead true as it is possible to get them. The result is the charm of natural beauty.

F. C. TILNEY.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, November 14 to 19.

FINDERS.—No. 30,606. Finders for photographic apparatus. G. Arndt.

ENLARGING APPARATUS.—No. 30,454. Photographic enlarging or projecting apparatus. D. O. Bremner.

PHOTOGRAPHY.—No. 30,385. Photography. W. Carroll.

CAMERAS.—No. 30,760. Cameras. Crown Cork and Seal Co.

MIRRORS.—No. 30,394. Mirrors for projector lamps. F. Krupp Akt.-Ges.

MIRRORS.—No. 30,432. Mirrors for projector lamps. F. Krupp Akt.-Ges.

LAMPS.—No. 30,433. Projector lamps. F. Krupp Akt.-Ges.

ARC LAMPS.—No. 30,434. Arc lamps for projection. F. Krupp Akt.-Ges.

CINEMATOGRAPHY.—No. 30,431. Fire-protecting devices in cinematographic projecting appartus. F. Krupp Akt.-Ges.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

COLOUR PHOTOGRAPHY.—No. 166,028 (June 4, 1920). The invention consists in a process for the production of photographic negatives for colour printing or other purposes, consisting in dispersing a source of light into the form of a spectrum and photographing the object successively upon a plurality of negatives, the object being illuminated for each negative by a selected portion of the spectrum, and the selected portions of the spectrum being mutually exclusive.—Adrian Bernard Klein, 32, The Pryors, East Heath Road, Hampstead, London, N.W.3. (Further details of the specification are given on another page in the "Colour Photography" Supplement).

COLOUR CINEMATOGRAPHY.—No. 147,767 (September 10, 1918). The photographs are taken a pair at a time by a pair of lenses having their axes parallel. Two glass plates are arranged parallel to each other, each in front of one of the lenses, the first plate being a transparent and the second an opaque reflector. Successive pairs of pictures are taken alternately through two pairs of colour filters.—Giovanni Casieri, 17, Via Fibonacci, Pisa, Italy. (Further details of the specification are given on another page in the "Colour Photography" Supplement.)

PHOTO-SCULPTURE.—No. 170,685 (July 30, 1920). The invention relates to improvements in the production or reproduction of a copy of a three-dimensional figure in relief or in intaglio, by which a graphic record of a three-dimensional figure is obtained on a plane surface and is used in the production of a pattern, which pattern is then employed to actuate and control the movements of a graving tool in a carving machine. The graving tool cuts the block of material on which the copy is to be made, and the movements of which are co-ordinated with those of the graving tool.

The invention relates to the known method of producing the pattern by projecting a design on to the figure, photographing the figure with the projected design and from the negative preparing a pattern to be employed in a carving machine.

If a transparency, say a lantern plate, bearing a design be placed in an optical projector normal to the optical axis of the lens and the design be projected, as ordinarily, on to a

Fig. 3.

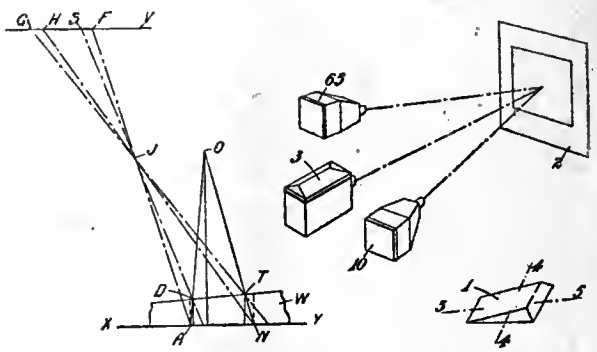


Fig. 1.

Fig. 2.

screen X Y (fig. 1) normal to the axis of projection, an undistorted image of the design, differing in scale but in no other respect geometrically, will be cast on the screen. If the projected image of the design be photographed in a camera on a sensitive plate V parallel to the screen X Y through a lens of sufficient covering power and having its optical axis parallel to that of the projector lens, a photograph of the projected image will be obtained, which is changed in scale only. If a three-dimensional figure W (shown in fig. 1 as an irregularly shaped figure and in horizontal section) be substituted for, or placed against, the screen X Y and the design be projected thereon, the projected image of the design will be distorted or displaced wholly or in part, the displacement of any point in the design being a function of, and substantially proportional to, the distance by which the point it covers on the figure W is removed from the

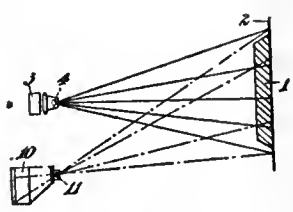


Fig. 4.

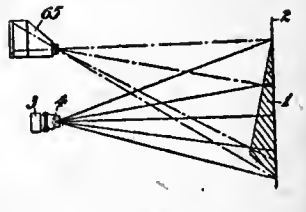


Fig. 5.

point it would have covered on the screen X Y. If the camera be placed with the incident nodal point J of its lens in line with the incident nodal point O of the projector lens adjacent the figure, and the line joining these points parallel with the screen X Y, all points of the projected image that are displaced will be recorded on the plate V as displaced in a direction parallel to one another and to the line joining the nodal points J O.

In order that the principles of the invention may be clearly understood, let only two points of the design on may be clearly understood, let only two points of the design on the transparency be considered, and let A and N indicate the positions the projected images of these points would occupy on

the screen. A photograph of the projected image points A and N will be registered on the plate V at the points F and H respectively. When the figure W is placed against the screen X Y the images of the two points of the design will be projected on the figure W at D and T respectively, and photographs of the projected and displaced image points D T will be recorded on the sensitive plate V at S and G respectively. The distances A D and N T are measures along the rays O T N, O D A of the actual displacement of the image points from the screen and the distances S F and G H are measures of the apparent displacement of such points as registered on the plate V. The distance S F is a function of the distance A D and the distance G H, a function of the distance N T, and G H bears to N T substantially the same ratio as S F bears to A D. All points on the figure W at an exactly equal distance from the screen undergo an equal apparent displacement—that is, the ratio of apparent displacement for such points is a constant.

The foregoing explanation is true in all cases. In those cases in which the depth of the figure increases relatively to the distance between the projector lens and screen, the departure of the resulting bas-relief from true form will become greater and greater. It follows from what has been said that if the image of a line be thrown by the projector on the figure W and the image be photographed, the position on the sensitive plate the undisplaced image of the line would occupy is ascertainable and a graphic record is obtained, on which is defined a line every point in which is distant from an ascertainable point on the plate according to a ratio that is substantially a constant for every point on the surface of the figure and its corresponding point on the screen, and the displacement on the plate is in a direction parallel with the line joining the incident nodal points of the projector and camera lenses.

The foregoing relationships are involved in the production of a graphic record on a plane surface of a three-dimensional figure, and the method employed consists in projecting a design, preferably of lineal form, on to the figure, and it may be on to a plane

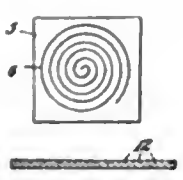


Fig. 6.

Fig. 8.

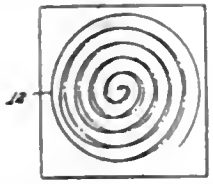


Fig. 7.

surface either before, simultaneously with, or after the projection of the design on to the figure, photographing the figure and the projected image of the design, and from the negative preparing a pattern of the distorted or displaced design to control the movements of a graving tool of a carving machine. The characteristic feature of the method is that the camera is placed with the incident nodal point of its lens in the nodal plane of the projector lens adjacent the figure. The pattern may be an engraving or photograph when optical control of the graving tool is employed, and in such case the control is effected by causing the cross hairs of a microscope mounted on the graving tool carrier to follow the distorted line of the design. When mechanical control is employed the pattern is a grooved plate with which a member on the graving tool carrier engages. The term "nodal plane" means a plane normal to the optical axis of the lens and passing through the nodal point.

Apparatus for carrying out the method set forth in the preceding paragraph comprises an optical projector having a well-corrected lens, a transparency to be placed in the projector and having the design thereon, a plane surface on which the design is first projected for focussing and which is removable in whole or in part, and a camera also having a well-corrected lens and positioned with the incident nodal point of its lens in the nodal plane of the projector lens adjacent the plane surface.

The design is preferably lineal, but may be otherwise, so long as it is such that the pattern, when placed in the carving machine, can have imparted to it a movement which is identical with the undistorted form of the design. For example, if the design be an arithmetical spiral, and such a design is preferred, the pattern is moved in the carving machine in suchwise that every point thereof moves in a spiral path. A design consisting of a grid constituted of equally spaced and parallel straight lines is suitable, but in the following description, a design consisting of an arithmetical spiral is assumed to be employed, though the invention is not limited to such a design.

Fig 2 is a perspective view of a three-dimensional figure, of which a copy in relief is to be produced.

Fig. 3 is a perspective view of the units employed assembled in proper relationship for the obtaining of a photograph from which a pattern is to be made.

Figs. 4 and 5 are views at right angles, with the object shown in fig. 2 placed against the screen.

Fig. 6 is a view of a transparency, such as a lantern plate, with the design of an arithmetical spiral thereon.

Fig. 7 is a view of the pattern used in the graving machine for producing a copy in relief of the object shown in fig. 2, and

Fig 8 is a sectional view of fig. 7.

The object 1 (fig. 2) is placed against the screen 2, and is supported in any convenient manner. The optical projector 3 is placed in position with the optical axis of its lens 4 normal to the screen 2. A transparency 5 (fig. 6) having defined thereon an arithmetical spiral 6 is placed in the usual manner in the projector 3 so that the design may be thrown on to the object 1. It is desirable that the field illuminated by the projector should be so large that a portion of the image of the design is thrown on to the screen 2 itself, as in such case assistance is rendered to the adjustment of the pattern in the carving machine. The image of the design being projected on the object, and preferably on a portion of the screen, a photograph is taken of the image as it appears on the object and screen by a camera 10 located so that the nodal point of its lens 11 is in the nodal plane of the projector lens 4. It is preferable, though not essential, that the optical axis of the camera lens be parallel with that of the projector lens. In many cases it is preferable to point the optical axis of the camera lens at about the centre of the figure to be photographed; when this is done the resulting negative must be placed in an enlarging lantern and a corrected copy obtained by tilting the enlarging screen in manner well understood. A photograph having been taken and the sensitive plate subjected to the usual photographic developing operations, a pattern is made from the negative. The pattern is preferably made by line photo-engraving, though other processes to this end may be employed. When the pattern is made by line photo-engraving, the displaced or distorted spiral is defined by means of a groove 12. Figs. 7 and 8 show a pattern, on which is defined, by means of a groove 12, the displaced and distorted spiral.

The method of producing or reproducing a copy of a three-dimensional figure from a pattern prepared from a graphic record on a plane surface and which pattern is also all in one plane, consists in imparting movement to the pattern identical with the undistorted shape of the design, utilising the movement of the pattern to import rectilineal movement to a graving tool and in a plane parallel with that of the pattern, and imparting movement to the material to be cut or carved identical with the undistorted form of the design, for example, in the case of a spiral design, the movement would be compound, and comprises a rotary movement on an axis parallel with the plane of movement of the graving tool and a rectilineal movement at right angles to its rotational movement. The axis of rotation of the carrier is coincident with the graving tool at the time when the pattern is at the centre point of its spiral movement.

The specification also describes the mechanical details of the carving machine.—Howard Maurice Edmunds, Moulsecombe Place, Brighton.

The following complete specifications are open to public inspection before acceptance:—

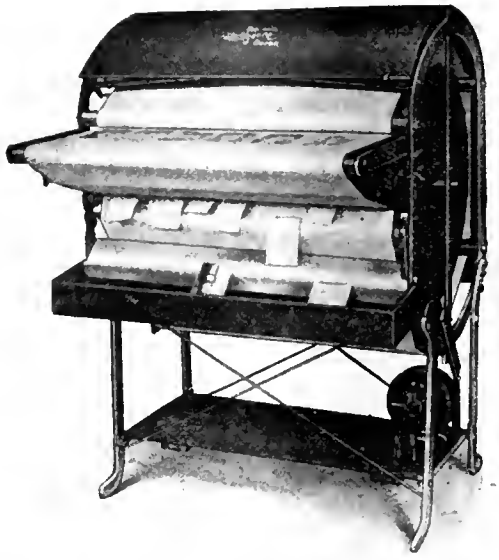
Cinematography.—No. 171,373. Machine for treating photographic moving picture films. Sen-Jacq Film Print Co.

The Most Popular of Hobbies. — Our contemporary, "Hobbies," deals with nearly every kind of hobby under the sun, though it is run mainly in the interests of fretworkers. A few weeks ago its editor asked his readers to send a postcard—there was, in fact, a competition with prizes—saying which were their favourite "pages" in the paper, but omitting fretwork, which is the weekly's mainstay. The result of the voting, announced this week, is (1) Photography, (2) Toymaking, (3) Stamp Collecting, (4) Carpentry. "Hobbies," it may be remarked, has run a photographic page weekly for about twenty-five years, and we are pleased to learn of its popularity. For the past sixteen years the page has been written, and is still being written, by Mr. P. R. Salmon.

New Apparatus.

The Hodgson Rapid Print Dryer. Made by the Hodgson Manufacturing Co., 2, Gerrard Place, Shaftesbury Avenue, London, W.1.

Of late years the rotary type of machine for drying prints by artificial heat has come largely into use and a number of patterns of this apparatus have come upon the market, all, so far as we know, of American make. A machine for this purpose of British manufacture is, therefore, of special interest, and particularly so when it can be emphatically said that it is of excellent design and workmanship. The apparatus, for which Messrs. Sichel and Samuelson, 52, Bunhill Row, London, E.C.1, are agents, is the design of Mr. Frank Hodgson, a professional maker of prints and enlargements, by whom the machine has been developed for his own requirements in handling large numbers of prints. As shown in the photograph, the apparatus is essentially of



the familiar type in which endless bands of fabric are led round an internally heated metal drum. The prints are carried between folds of the fabric, and during the passage of these latter round the heated drum, which occupies four minutes, are deprived of their adhering moisture. At a demonstration we saw prints taken straight from the wash water, dried in this manner by passage through the machine.

The apparatus is strongly made of a wrought-iron framework and has a steel gas-heated drum. The canvas bands can be easily removed for washing, simply by unscrewing four screws. The machine occupies a floor space of 34 x 26 inches, and is 4 ft. in height, so that it will be seen that it takes up comparatively little space in a photographer's establishment. It may be obtained for operation by hand at the price of £26 10s., but the preferable model is that fitted with electrical drive of the drum at the price of £37 10s. The motor supplied for this purpose is for continuous current. If alternating current has to be used an additional charge of £2 10s. has to be made. At the cost of a further £2 10s. the apparatus can be supplied with electrical instead of gas heating of the drum. As will be seen from the photograph, the prints are very readily fed in by laying them face up on a horizontal portion of the rotating web. After drying they are delivered on the same side of the machine and fall into a trough arranged to receive them.

There can be no doubt of the practical advantages of drying in this way. Prints are protected from dust during drying and are obtained with a very slight amount of curl. As delivered from the machine, they are in the best condition for insertion in folders without further mounting. For dry-mounting, we think it is to be recommended that they should be allowed to remain in a warm and dry place for some short time in order to become absolutely bone dry. Both for the output of a studio and for the business of developing and printing from amatenrs' negatives the Hodgson machine is a most efficient and valuable piece of equipment.

The apparatus is obtainable either from the makers or from Messrs. Sichel and Samuelson, and may be seen in working at the premises of both.

New Books.

The Great White South. By Herbert G. Ponting. London: Duckworth and Co. 30s. net.

In his cinematograph lectures on the Scott Antarctic Expedition, Mr. Ponting, by the superlative quality of his photographic and cinematographic work, brought the South Polar regions on to the lecture platform. In this book he has brought them to the fireside. It is not essentially the story of Scott's heroic journey to the South Pole, which has been told in the volume, "Scott's Last Expedition," in which chief use has been made of Captain Scott's journals and the records of his colleagues. But it is a profuse account, by an observer, of the main incidents of the expedition and of the geography and natural history of the desolate Antarctic regions. "Great God," wrote Scott in his journal, "this is an awful place and terrible enough for us to have laboured to it without the reward of priority." That was an entry in his diary on the day after reaching the Pole and discovering there the tent of the five Norwegians who had reached it a month before. Mr. Ponting's narrative, while it does justice to the extraordinary beauty of some aspects of the Antarctic scenery and to the interest of the animal life in those regions, does not neglect to underline the terrific sufferings which the explorers had to undergo, sufferings which culminated in the tragic death of Scott and his companions on their return journey 11 miles from a depot where they could have got food and warmth.

But the book will be studied with keen enjoyment for its most complete account of the life of the expedition and for its very numerous illustrations. There are nearly 200 of these, with few exceptions from Mr. Ponting's photographs, which are the most eloquent tribute to his artistic and technical skill as a photographer under outdoor conditions such as no other man has been called upon to endure. Quite apart from the absorbing interest of the story which the photographs tell, the book is to be signalised as the most important proof of the immense value of photography in exploration which has hitherto been forthcoming. From this standpoint, photographers especially will congratulate Mr. Ponting upon his authorship and upon the completion of so notable a work in the literature of exploration.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, DECEMBER 5.

Accrington C.C. Exhibition of Folio of Leicester Phot. Soc.
Birmingham Photographic Art Club. "Highways and Byways of Shakespeare Land." W. A. Clark.
Bowes Park and District P.S. Lecturette Competition.
Bradford Phot. Soc. "The Flora and Fauna of the Scilly Isles." G. A. Booth.
Dewsbury Phot. Soc. "A Chat on Pictorial Landscape." H. G. Grainger.
Forest Hill and Sydenham P.S. Print and Lantern Slide Competition.
Glasgow & W. of Scot. Amateur P.A. "Photo-micrography." D. B. Duncanson.
Kidderminster and Dist. P.S. "Harvington Hall." Dr. E. E. B. Landon.
Leeds C.C. "Photography on Tour." Fred. J. Seaman.
Rochdale Amateur Phot. Soc. "Paget Colour Photography." A. Benson Ray.
Southampton Camera Club. "How a Reflex Camera is Made." W. Butcher & Sons.
South London P.S. "Switzerland." Capt. J. H. Jennings.
Wallasey Amateur P.S. "Collected Notes on Pictorial Composition." John R. Charlton.
Walthamstow & Dist. P.S. "A Review of the Exhibition." Bertram Cox.

TUESDAY, DECEMBER 6.

R.P.S. "A New Mode of Producing Sculptures by the Aid of Photography." Howard M. Edmonds.
Belfast C.P.A. Camera Club. "Multiple Mounting." W. J. Rankin.
Birmingham P.S. "One Man" Collection, by Mr. F. Judge.
Cambridge Photographic Club. "Contact Printing and Enlarging on Vitegas." Demonstration by Mr. Brewster, of Messrs. Kosmos Photographics, Ltd.
Exeter Camera Club. "Æsthetics of Pictorial Photography." A. W. Walburn.
Hackney Phot. Soc. Individual Treatment of a given Negative, by twelve Members.
Leeds P.S. The "Amateur Photographer" Prize Lantern Slides.
Morley Phot. Soc. Whist Drive.
Nottingham Phot. Soc. "With a Pocket Camera in Egypt." Messrs. Bridger and Russell.
Nelson Phot. Soc. "English Architecture." W. Cowperthwaite.
South Shields P.S. "Trimming and Mounting Prints." Harold S. Becke.
Tyneside P.S. "Simple Dry Mounting." C. F. Pope.

WEDNESDAY, DECEMBER 7.

Accrington C.C. "Picture Making by the Bromide Process with the use of the Iodine Spirit Reducer." T. H. Greenall.
Croydon Camera Club. "Contact Printing and Enlarging on Vitegas." C. J. Gooch.
Dennistoun Amat. P.A. Visit to Partick C.C.
Edinburgh Phot. Soc. "Elementary Chemistry as applied to Photography." J. Hislop.
Halifax Scientific Society. "How a Reflex Camera is Made." Butcher & Sons, Ltd.
Ilford P.S. "Some Points in Picture Making." B. C. Wickison.
Leicester and L'shire P.S. "How to Make Gaslight Prints and Lantern Slides." O. W. Seville.
Partick Camera Club. "Some Wonderful Applications of Photography." T. S. Baird.
South Suburban Phot. Soc. "Beginners' Bunglings." M. C. Luck.
Tunbridge Wells Amat. P.A. R.P. Portfolio of "Oil" and "Bromoil" Prints.

THURSDAY, DECEMBER 8.

Camera Club, The. "The Intricacies of the Silent Drama and its Making." Capt. Harry Lambart.
Gateshead Camera Club. "Slide and Stereoscopic Views." Dr Anderson.
Hammersmith Hampshire House P.S. "Chemical Methods in Photography, Weights and Measures, Solutions and the Sulphites." C. M. Thomas, M.A.
Nelson Phot. Soc Inter-Club Prints.
North Middlesex P.S. "Elementary Methods of Bromide Enlarging." S. A. Thomas.
Optical Society. Ordinary Meeting.
Wimbledon & Dist. C.C. "Simple Picture Making." R. H. Lawton.

FRIDAY, DECEMBER 9.

Wombwell and Dist. P.S. Beginners' Night.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, November 29, the president, Dr G. H. Hedman, in the chair.

Mr. Colin M. Williamson, in reading a paper on "Photography and Mechanics; Facts and Possibilities," dealt with photographic apparatus which came within the province of the mechanician, viz., that for cinematography and aerial photography. In referring to cinematograph apparatus, he dealt with cameras of distinctive design, and particularly with those having a self-contained motor for moving the film. The Aeroscope, air-driven, as now manufactured, was, he said, a very satisfactory instrument, and was being used on the Shackleton expedition. He also described the Sept camera, which took film for an 18-seconds picture on the screen. Though the time was short, a great deal could be got into a film of this length, and the camera was used in part for taking pictures for the "Pathé Gazette." It was driven by clockwork, and Mr. Williamson thought that spring motors could be made for actuating much longer lengths of film than at present if clockwork makers set themselves to reduce weight. The lecturer dealt also with high-speed cinematographs, and described some of the models which had been produced.

Turning to aerial cameras, he dwelt upon the alternatives of films and plates, and showed the construction of the automatic air-propelled camera designed by him for the Royal Air Force and used in the East in 1916. He explained the latest model of camera made to the requirements of the R.A.C., electrically operated, and giving records on each plate of altitude, compass bearings, and other required readings.

Mr. Williamson ventured on a forecast of the aerial military photography of the future from an aeroplane without human pilot, in which all the operations of manœuvre, as well as those of the photographic equipment, would be controlled by wireless from a distant land station. He thought that there was a reasonable probability of such a system being realised.

The automatic development of cinematograph film was also illustrated by photographs of a plant in which film continuously passed through developing, fixing, toning, and washing solutions contained in long, vertical tubes, and thence through drying tubes to the re-winders. He said it was remarkable that in America, where the film industry had made such strides, development continued to be chiefly done by the less efficient manual handling in tanks.

A brisk discussion followed in which Messrs. E. W. Mellor, A. C. Banfield, Jennings, King, Pereira, and Colin Bennett took part, and, on the proposition of the chairman, a hearty vote of thanks was accorded to the lecturer.

CROYDON CAMERA CLUB.

Quite a little drama was enacted prior to last week's meeting, which Mr. Sellors was booked to fill with one of his infallible systems which occasionally go wrong. Unfortunately he fell victim to a chill, but bethought himself of an old friend of the club—Mr. Luboshez, who agreed to lecture with the greatest pleasure, provided this country held him on the date.

Shortly prior to such date the gifted, ever resourceful and slightly erratic Kodak genius crosses a corridor and invades the Kingsway sanctum of Mr. T. Bell, the advertisement manager, and explains he is due at Croydon and in Sweden simultaneously, and is obliged to favour the latter for business reasons. Would Mr. Bell kindly undertake Croydon in his place? "You go to blazes!" says Mr. Bell. Later, Mr. Wratten, located above, receives the same visitor with the same tale, a bag is banged down on the table, and an intimation given that a complete lecture is within, all piping hot for Croydon on the morrow, and exit the artist speedily, looking Mr. Bell up in transit to the street to say things have been nicely arranged. "Accept my blessing, and close the door after you," says the relieved Mr. Bell. Meanwhile, the occupant of the room above has opened the bag and discovered the MS. to be pre-war and written in German, and, much perturbed, he descends to implore the help of Mr. Bell. Cordial agreement as to the character and probable future of the absent one assuages their feelings, but does not save the situation, which, however, is eventually met.

A large and extremely interesting collection of splendid prints from the foremost studios of America and the Continent was the outcome, with Mr. Wratten as introducer to the lecturer, Mr. Bell. The former contented himself with a recital of the foregoing drama, with a forcible character sketch of the villain of the piece.

Mr. Bell added his quota, defining Mr. Luboshez as a remarkable being who was never at any one time at any one spot, but always approaching or receding from it. For years, he said, he had been collecting examples of the best workers abroad, and the prints on the walls had never before been publicly shown. He then passed on to an instructive and critical review of the exhibits, pointing out how the various photographers had developed on different lines following their varying ideals of the beautiful. For instance, one emphasised "tone," another "light and shade," whilst many found their greatest pleasure in the rendering of "beauty of line." It was fortunate for Art that this was so, for it would be but a poor thing if all were possessed of the same ideal. Personally, he regarded "tone" as paramount, and nothing could altogether atone for its absence.

A discussion followed the lecture, in which many took part. The president, Mr. John Keane, only expressed the opinion of all when, in proposing a vote of thanks, he said that the evening had been of outstanding interest, and would long be remembered. Thanks were also due to the "Elusive Pimpernel of Photography" for indirectly being the cause of it.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held at 35, Russell Square, W.C., on Friday, November 11, 1921. Present: Messrs. Adams, Basil, Chase, Corbett, Ellis, Gray, Haines, Hana, Lambert, St. George, Speaight, Spink, Wakefield, Swan Watson (president), Wedlake, and Wheeler, and Lang Sims (secretary). Apologies for absence were read from Messrs. Frank Brown, Chapman, Dickinson, Illingworth, Read, and Turner.

Arising out of the minutes, Mr. Speaight mentioned that a copy of the rules of the Great Western Railway had been procured, and this distinctly stated that cameras or photographic apparatus up

to 60 or 80 lbs. could be carried by the passenger without any extra charge.

Mr. Corbett reported that he had interviewed the appropriate authority of the London County Council with regard to the storage of celluloid films, and had been informed that the Home Office was framing new legislation on the subject. Mr. Corbe't promised to take further steps in the matter, and report progress.

Certain members brought forward forms of indenture and particulars as to apprenticeship, as promised at the last meeting, and others promised to send forms to the secretary. The secretary was requested to look through the forms and the particulars generally, and to report on them at the next meeting.

Mr. Speaight (hon. treasurer) reported that, at the request of the Finance Committee, he had sent a personal and registered letter to a number of members who were two years and more in arrear with their subscriptions, and had asked for payment by that evening (the 11th). The result was that 24 had paid up, there had been 24 resignations, and eight letters had been returned with the intimation that the addressee was not known.

It was agreed that at the next Council meeting the list of all the defaulters should be read and their names struck off.

Mr. Hana thought that the Finance Committee should bear in mind the advantage of nominal strength, and that every possible consideration should be given to those who requested time to pay.

Mr. Speaight said that this was the policy of the Finance Committee.

The secretary read the report of the combined Congress, Finance, and Exhibition Committees, with the recommendation "That as the year 1922 would be the 21st anniversary of the foundation of the Association, a special effort be made to make the forthcoming Congress and Exhibition an advance upon all previous ones, and that new features of up-to-date interest to the profession be introduced."

Various schemes were put forward, and, after a lengthy discussion, further consideration was deferred until the next Council meeting.

It was agreed that the special general meeting, to be called to obtain further powers to make the Association a limited liability company, should be called for the date of the next Council meeting, December 9, at 6.30 p.m. The secretary raised the question of whether he was to send the notice of the meeting to those members, already referred to, whose subscriptions were two years and more in arrear, and who had not replied to the personal letter addressed to them. It was decided that no notice should be sent in such cases.

The solicitor attended in order to secure the signatures of members for the registration documents. He also said that the Companies' Registrar took exception to one of the object clauses, which ran: "To promote and carry on schemes for the insurance of professional photographers." An acceptable form was, "To procure from insurance companies advantageous terms for the members," and this was approved.

The solicitor raised the question of a registered office, and suggested that it might be the office of the auditors. The firm of Norton Slade and Co., of 9, Old Jewry Chambers, had been suggested, and that they should be appointed until the next annual general meeting. He thought that this firm would be willing to allow their offices to be used for this purpose.

On a proposition from the chair, it was agreed unanimously that Messrs. Norton Slade and Co. be appointed auditors until the next annual general meeting, at a fee of £10 10s.

The chairman said that the term of office for which Mr. Lang Sims was appointed came to an end on December 31, and it was necessary to decide what should be done during the first months of next year.

Mr. Haines proposed, and Mr. Wakefield seconded, that, in view of the expiration of Mr. Lang Sims' year of office as secretary, he be asked to continue in that office until the general meeting of the registered Association in April, 1922.

This was agreed to unanimously.

Mr. Lang Sims said he would do as the Council wished.

The secretary reported a number of new members from Nigeria, obtained through the medium of "Houghtons' Professional Bulletin." It was agreed that they be accepted.

A letter was read from the Hewittic Electrical Co. suggesting that the Council should set up a committee to test various systems of artificial light, with a view to fixing eventually on a comparative standard lighting. After Mr. Adams and others had spoken on the subject, Mr. St. George formally proposed that a committee be appointed to consider this matter, and this was agreed to unanimously, and the following were appointed:—Messrs. Marcus Adams (convener), Angus Basil, Gordon Chase, Alexander Corbett, George Hana, Herbert Lambert, R. N. Speaight, and Wakefield, with power to add to their number.

The secretary read a letter from an ex-service man who held a Ministry of Labour certificate and desired training for photography. It was decided to write to him, pointing out that no adequate training in photography could be given in the time stipulated.

Mr. Speaight proposed a vote of thanks to the president for his attendance. Mr. Swan Watson had travelled all the previous night from Scotland, and was about to make the return journey that same evening.

The vote of thanks was accorded with hearty applause.

Mr. Swan Watson, in reply, said that if he could do anything for the Association he was always glad to do it, though he often felt that the long distance which separated him from London made him of necessity an indifferent president.

The Council meeting then concluded, after a session of 3¾ hours.

Glasgow and West of Scotland Society of Professional Photographers.—A very successful smoking concert was held in the Lansdowne Restaurant on Wednesday, November 23. The president occupied the chair, and there was an attendance of between 40 and 50 members and friends present. An excellent programme was submitted, the talent of the artistes being of exceptional merit. During the evening the president, on behalf of the members, presented Mr. Romney, jun., the retiring secretary, with a wallet of notes, and, in a few remarks, expressed the Society's indebtedness to Mr. Romney for the conscientious and very efficient way he had carried out the duties of hon. secretary and treasurer. At the close of a very enjoyable evening, Mr. Fairbairn, after thanking the chairman for presiding, proposed a vote of thanks to the artistes for their services, and the meeting concluded with the singing of Auld Lang Syne.

Commercial & Legal Intelligence.

Legal Notices.—A second and final dividend of 2s. in the £ has been made in the case of Charles Walter Bendel, fine art dealer, 34, Darlington Street, Wolverhampton. The dividend is obtainable at the Official Receiver's Office, 30, Lichfield Street, Wolverhampton.

Ilford, Limited.—The net profit of Ilford, Limited, for the year ended October 31 was £41,552, and £10,929 was brought forward, making £52,481 for appropriation. The directors have transferred £4,000 to reserve fund, and written £6,000 off goodwill; and a dividend of 8 per cent. is recommended on the ordinary shares for the year, leaving £6,281 to be carried forward.

Aldershot Photographer's Affairs.—At the offices of the Official Receiver, Russell Square, W.C., on Wednesday last, the first meeting of creditors was held of Frederick George Hookway Gould, of 19, Station Road, Aldershot, photographer, against whom a receiving order was made on November 10, 1921, on the debtor's own petition. The statement of affairs showed liabilities expected to rank for dividend amounting to £482 7s. 1d., and the assets were all absorbed by preferential claims. The causes of failure, as stated by debtor, were lack of custom caused by the absence of troops, thereby reducing turnover by more than 50 per cent., and moneys unaccounted for (£55) by two employees. The Official Receiver's observations on the case were to the effect that the debtor, in 1906, commenced business without capital as a photographer, at 19, Station Road, Aldershot. Since the troops left Aldershot in 1918 his business has declined, and in March, 1921, his creditors began to press him for payment, and that five creditors for £157 issued legal processes against him. On October 6, 1921, he held a meeting of his creditors, and offered to pay £30 down and £5 per month until 20s. in the £ had been paid, but his principal creditor refused to agree, and the offer was not proceeded with. The unsecured indebtedness includes £75 to the debtor's wife for money lent in 1912, £110 to his daughter for money lent in 1918-1920, and £295 7s. 1d. to trade creditors. The estate was left in the hands of the Official Receiver.

News and Notes.

THE "QUEST" PHOTOGRAPHER.—We understand that Mr. Jack Ross, the cinematographer, was chosen for the Shackleton Expedition to take the place of Mr. J. C. Bee Mason, who had to return owing to ill-health. Mr. Ross, who sailed last week, is a South African.

FACES FROM A "NEW ANGLE."—A writer in one of last Sunday's papers states that some of the portraits made by Sir William Orpen can be described as "living portraits," and that he owes his success as a portraitist to his characteristic habit of looking at familiar faces from a new angle.

POULTRY PHOTOGRAPHS.—Messrs. Meatmaco, proprietors of a food for poultry and other live stock, are offering cash prizes to the value of £100 for the eight best photographs of birds fed with Meatmaco. Particulars and entry form of the competition may be obtained on application to the firm at Eves Place, Borough High Street, London, S.E.1.

THE CLUB PHOTOGRAPHER, in its issue of December, presents contributions by members of the Plymouth Photographic Society—on flashlight, night, aerial and Press photography. Among the general contributions are notes on Bromoil transfer by James Rowatt, and on soft-focus lenses by Henry M. Holland. Our energetic contemporary is published at 9, Eberle Street, Liverpool, price 3d. monthly.

PHOTO-MICROGRAPHY OF PAINTS.—In the current issue (November, 1921) of the "Journal of the Franklin Institute" is a detailed contribution by Henry Green, of the Research Laboratory of the New Jersey Zinc Company, describing the means adopted for determining the size of the particles in paints and in rubber pigments by a photo-micrographic method. On other pages of the same issue the technics of electric welding are profusely illustrated by photo-micrographs. As we have occasionally pointed out, a thorough acquaintance with practical photo-micrography is one of the qualifications of a works photographer which is rapidly becoming of greater importance. Nowadays it is almost always observable that a piece of industrial research, carried out for the purpose of improving a manufacturing process, depends largely upon the services of the photo-micrographer

Correspondence.

**** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

**** We do not undertake responsibility for the opinions expressed by our correspondents.*

FOREIGN PHOTOGRAPHIC LENSES.

To the Editors.

Gentlemen,—We have read Mr. Browning's letter in your issue of November 18. As we represent the firm of Goerz in Great Britain we hope you will give us the opportunity of adding one or two points which, perhaps inadvertently, were omitted by Mr Browning, and the absence of which might lead to wrong conclusions.

We think that it is possible to construe the letter so as to give the impression that the Goerz lens mentioned was a pre-war article, purchased comparatively recently from Goerz's agency. This is not the case, as the number referred to, viz., 118,054, was manufactured some time between June, 1901, and April, 1904. This fact can easily be verified because information in our possession shows that the 100,000th Goerz lens was made in March, 1901, and all series III Goerz lenses made after April, 1904, were engraved with the word "Dagor," and bore higher factory numbers. In these circumstances it would seem that the lens in question is over seventeen years old, and that many things may have happened to it since then to upset its corrections and performance, and that it is being compared with lenses which have been manufactured within the last two years. It is not usual, when making comparisons, to choose one instrument, which presumably has been subject to many years wear and tear, and the others almost new from the makers

We do not impugn in the slightest degree the accuracy of the N.P.L. certificate, but we do think it is a wise policy to be fair, even to one's bitterest enemy, and that material facts should be disclosed. We venture to suggest that had the lens been tested when new the result would have been entirely satisfactory.

We might further mention that in the past not one, but many dozens of Goerz lenses have passed the National Physical Laboratory tests perfectly satisfactorily, and that we have before us, at the moment of writing, one such certificate which is at least equal to the other two mentioned by your correspondent.

We say this without in any way reflecting upon the other lenses mentioned, which are known to be quite good.—Yours faithfully,

For PEELING & VAN NECK, LTD.,
R. E. Peeling, Director.

4 to 6, Holborn Circus, London, E.C.1.
November 22.

To the Editors.

Gentlemen,—Having read with interest Mr. K. C. Browning's letter, "Foreign Photographic Lenses," in your issue of the 18th, and the letter in your issue of the 25th, above the nom de plume "Amateur," we take the liberty of encroaching on your valuable space to say that we, as among the largest manufacturers of photographic and cinematographic lenses in this country, have consistently advertised for years past that we are prepared to forward any Dallmeyer lens on seven days' free trial in order that prospective customers may make a comparative test, or if desired, forward to an authority, such as the National Physical Laboratory, for test and full report. We have no record of any photographic or cinematographic lens being so forwarded and rejected.

We recently at the request of the Secretary of the Royal Geographical Society despatched certain photographic lenses of the anastigmat and telephoto types to the National Physical Laboratory for comparative tests against other makes of lenses (country of origin unknown to ourselves). All lenses were passed, and were duly purchased and used by the Mount Everest Expedition of the Royal Geographical Society in conjunction with the Alpine Club.

With regard to the suggestions that all lenses over a certain value should be sent as a matter of course to the National Physical Laboratory, while we recommended the above course in a competitive test of such importance, we find that in general customers are satisfied with our workshop tests, and we hesitate to add the cost of a National test except where specially desired.

The case cited by "Amateur" does not refer to a lens of our manufacture.—Yours faithfully,

J. H. DALLMEYER, LTD.

Carlton House, 11b, Regent Street, S.W.1.
November 26.

A CONTRAST RATING FOR BROMIDE PAPERS.

To the Editors.

Gentlemen,—I have read the letters of Messrs. Hall and Taylor in your issue last week very carefully and I have failed to find any data which will enable them to establish their claim, namely, that the publication by the manufacturer of the exposure range or scale of the printing paper, under the title of contrast rating or degree of vigour, will place in the hands of the photographer information which will be a safe guide to the character of the finished print. They have asserted that the publication of this one item will indicate to the photographer not only what the "contrast" of the print will be, but that it will enable him to repeat that contrast upon another paper similarly rated. I tried to point out in my letter in your issue of November 18 that the exposure range of a paper was but one item among many which collectively determine the character of the finished print, and that we should require to be furnished by the paper manufacturer with several other measurements in order to be sure of obtaining successive batches of paper possessing similar printing properties. Having given reasons based upon the experimental evidence known to me, my opinion must necessarily remain unaltered in the absence of equally cogent reasons to the contrary. The statements in my previous letter admit of "practical" verification. It is a simple fact that *two printing papers of equal exposure range can yield two totally different prints from the same negative.*

The complexities of tone reproduction and the several measurable factors in any one printing paper which by their combined action determine the tones produced have received the attention of research workers to a considerable extent during the last few years. The

following references will be helpful to those who wish to become familiar with the subject :—

(1) "Relation between Photographic Negatives and their Positives." Hurter and Driffield. Memorial volume, p. 163.

(2) "The Sensitometry of Photographic Papers" (communication from the Eastman Research Laboratory to the Proceedings of the R.P.S.). Mees, Nutting and Jones. "B. J.," January 1, 8, 15, 1915. "Photographic Journal," December, 1914.

(3) "Tone Reproduction and its Limitations." F. F. Renwick "Photographic Journal," 1916, p. 222, and "B. J.," December 15. 22 and 29, 1916.

(4) "The Fundamental Law for the True Rendering of Contrast" (communication from the British Photographic Research Association). Porter and Slade. "B. J.," August 15, 1919.

(5) "The Theory of Tone Reproduction, with a Graphic Method for the Solution of Problems." L. A. Jones. "Journal" of the Franklin Institute, July, 1920.

The list is by no means exhaustive, but it is sufficient for our present purpose.—Yours very truly, B. T. J. GLOVER.

Sunnymere, Birkenhead Road,
Meols, Cheshire.
November 26.

To the Editors.

Gentlemen,—Having occasion to investigate the speed of bromide papers, tests of a number of different brands of paper were made by means of a Warnerke sensitometer.

Much to my surprise I found that the printing range of bromide papers did not necessarily bear any relationship to the speed of the papers. For example, a rapid paper requiring an exposure of one unit to produce the darkest black might show a printing range of fourteen blocks of the sensitometer, while another paper requiring an exposure of seven units would show a printing range of sixteen blocks.

This is quite contrary to the experience of those writers with whose works I am familiar, and seems to me to deserve investigation. I have made printing range plus speed tests of about twelve different makes of paper, and find that Wellington Cream Crayon, while by no means a fast paper, has the longest printing range.

Would it not be possible to persuade makers of bromide papers to stamp each brand of paper with a number showing the printing range obtained by means of a recognised standard step sensitometer?—Yours faithfully,

A. KNAPP.

25, Barrack Street, Perth, Western Australia.
October 26.

THE PAGET PROCESS OF COLOUR PHOTOGRAPHY.

To the Editors.

Gentlemen,—We have read in your issue of November 25 the report of the meeting of the Croydon Camera Club, at which Mr. Newens gave a lecture entitled "Rambles with the Paget Colour Plate." In this report it was argued that because Messrs. Ilford and Wratten both issued with their panchromatic plates a card showing the ratio of sensitiveness of the plates to each primary colour, the Paget Company should issue a series of filters suitable for their colour process, and should state with each batch of negative plates which of these filters should be used for the particular batch of plates. The reason this is totally unnecessary with the Paget colour negative plate is because the ratio of sensitiveness to the three primaries is absolutely constant in every batch of these plates issued.

Furthermore, the Paget colour negative plate is manufactured solely for use with the Paget colour process, and is as much an essential as the taking screen itself. The plate is not intended for the same uses for which other brands of panchromatic plates are made. If this ratio were not constant, the Paget colour process would either be most unsatisfactory, or else some suggestion, such as made above, would have to be adopted. Even so, it would be extremely unlikely that a sufficient number of filters could be issued which would adequately meet all variations of sensitiveness in the negative plate.

We consider also that if there was the necessity for such a large range of filters, the impracticability of selection would be so great as to render the process impossible. The fact that the ratio of sensitiveness of Messrs. Ilford's or Wratten's plates is not constant, thereby entailing the issue of a ratio card, proves that these plates are not suitable for the Paget colour process, and we feel sure that both Messrs. Ilford and Wratten would be the first to endorse this statement. We hope that this will show that no panchromatic plate, however good it may be for the correct reproduction of colour in monochrome or three-colour half-tone work, suitable for use with the Paget colour process, except that which is made especially for the process by the Paget Company.—Yours faithfully, PAGET PRIZE PLATE CO.

Watford, Herts,
November 28.

To the Editors.

Gentlemen,—With reference to the notice you so kindly gave of my talk on the Paget colour process at the Croydon Camera Club in last week's "B.J.," may I correct one or two slight but rather important errors therein?

1. The Sanger Shepherd graduated filter was used *in addition to*, and not "instead of" the orthodox Paget filter;

2. The roughened edges of the negative emulsion is removed with a sharp knife before the transparency is made from it, and not before placing it with the taking screen in the dark slide though I might have amplified this point and suggested doing likewise to the lantern slide before registration with viewing screen; and

3. The suggested filters to be available for serious workers should be for "any particular *batch*," not "box" of plates.

I do not suggest that the "B.J." report was inaccurate, the slip may well have been mine, for, as you were good enough to point out, the failure of the electric light rather threw me upon my own resources, and I was obliged to "carry on" without previous preparation or notes of any kind.—Yours truly,

FRANK R. NEWENS.

50, Elmwood Road, Chiswick, W.

Answers to Correspondents.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

C J. RUSSELL.—The sitter is entirely within his rights in objecting to the display of the portrait in the window. As owner of the copyright no one else but him has the right to print from the negative, or exhibit such prints without his permission.

A. E. T.—Although the D.50 solution contains free sulphurous acid, this latter is neutralised when the stock solution is compounded with the soda carbonate of the formula, and, therefore, it is just as correct as with any other developer to use an acid fixing bath for arresting development.

F. W.—Several roll films may be developed at one time in a vertical tank of depth a little greater than the full length of the films which are held in the developer by clips attached to rods laid across the top of the tank, and are kept free from one another by being weighted at the bottom end. Films are commonly developed in this manner by those undertaking the development and printing of amateurs' film negatives.

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Contents.

SUMMARY.

The 1922 "B.J Almanac" will be published throughout the United Kingdom on Monday next, December 12.

At a recent meeting of the South Suburban Photographic Society, the president, Mr. P. R. Salmon, delivered an address on the modern history and manipulation of self-toning papers. He traced the introduction of self-toning papers in this country, and presented, in a compact form, a large amount of practical experience in the use of the many makes of self-toning paper at present on the market. (P. 730.)

In a contributed article Thermit gives working instructions in the making of warm-tone prints by direct development with pyro soda. The developer recommended has a further usefulness for the production of a P.O.P. tone when used as a re-developer of bleached bromide or gaslight prints. (P. 727.)

In a recent paper before the Royal Photographic Society, Mr. Olaf Bloch showed the advantage, as regards evenness of development, of applying the developer by a velvet-covered roller. (P. 729.)

Dr. S. E. Sheppard, in a further paper, which deals with the effect of iron impurities on the action of the persulphate reducer, finds that the acidity of the reducer greatly affects the influence of minute traces of iron. It would seem that if the reducer is acidified, as directed by MM. Lumière and Seyewetz, the irregularity which may be caused by impurities in commercial persulphates is counterbalanced. (P. 726.)

Mr. Lang Sims, secretary of the Professional Photographers' Association, announces that the 1922 Congress will be held in Princes Gallery, Piccadilly, London, W., in September next. (P. 739.)

Mr. Ernest A. Dench describes a number of schemes of window dressing employed by portrait photographers in the United States and Canada. (P. 728.)

In a leading article we draw attention to the almost hopeless state of confusion which prevails as regards copyright in China, particularly as regards infringement by nationals of various countries. (P. 726.)

In reference to the use of Transferotype paper for negative making, Messrs. Pictorial Machinery, Ltd., inform us that they supply an extra contrasty Transferotype paper specially made for them by the Kodak Company, and yielding, when developed, etc., as they direct, negatives of wet-plate character. (P. 738.)

M. Jules Carpentier, whose death has recently taken place, was a pioneer in France of the ultra-small camera and the designer of a number of refined models and of accessory apparatus. (P. 726.)

Particulars are given in a patent specification of a hand-camera folding to extreme slimness. (P. 734.)

Movement of the solution, whilst plates are being developed in a tank, is one of the chief preventives of markings. (P. 726.)

Dr. Traube has patented further improvements in his dye-toning process, providing great transparency of the dye-toned images. (P. 734.)

EX CATHEDRA.

The 1922 Almanac.

The 1922 volume of the "British Journal Photographic Almanac" will be published on Monday next, December 12. As in previous years, our publisher's arrangements have been carried out so that the book shall be on sale simultaneously throughout the United Kingdom on that day. Dispatches to the Provinces are, of course, made in advance on the strict understanding that the book is not offered for sale until the appointed day of publication. Dealers are requested particularly to observe this condition of supply. Within the London area distribution takes place, in some cases, on the day of publication, and, while our publishers endeavour to secure rapid delivery on that day, it is obviously impossible for deliveries to be simultaneous; but dealers are informed that supplies leave the headquarters of our binders at 8 a.m., and are circulated with all possible expedition. As in the case of the last two years, the price of the Almanac in paper binding is 2s., in cloth binding 3s. If supplied by post these prices are respectively 2s. 9d. and 3s. 9d.

* * *

The Photographic Journal.

A word may be said by way of drawing the attention of readers who are not members of the Royal Photographic Society to the Society's "Journal," which has just completed its first annual volume subsequent to the appointment of the new secretary, Mr. H. H. Blacklock, in January last. During this period the "Journal," which previously had appeared at somewhat irregular intervals, has been published with clockwork regularity on the first of each month, with the exception of October, when its place is taken by the catalogue of the Exhibition. Commendable discretion has been exercised in curtailing those parts of its contents which are of more ephemeral interest, such as the reports of lectures on travel and similar subjects. While these discourses are of interest when heard to the accompaniment of their lantern illustrations, they lose much of their value in print, and the Society has been wise in allocating a smaller proportion of its space to reports of them. This policy has rendered possible a correspondingly greater assignment of space to the technical and scientific papers and communications which the Society has received during the year, largely through the medium of its Scientific and Technical Group. Thus at the end of the year we find the pages of the "Photographic Journal" to contain communications relating to scientific and technical advances in photography, many of which are not to be found elsewhere, and where also the reader is able to study the discussions which have followed them. The "Journal" is supplied to non-members of the Society at the price of 35s., but, as the annual subscription is only two guineas, most people will take the course of obtaining it as members of the Society.

Developing Tanks. Tank development seems to be gaining steadily in favour among all classes of photographers, who are doubtless becoming more fully alive to the advantages of this system, and failures, in the form of streaks, uneven action of the developer, stains, etc., seem to be far less common than formerly. One point, however, may be noted in this connection, since it is one which often is not realised until the worker is forcibly reminded of its necessity by a batch of unevenly developed negatives. We refer to the necessity of agitating the developer in some way several times during the period of development. In the case of the smaller tanks the best way is to take them up bodily and rock them backwards and forwards several times. Larger or heavier tanks may have the plate racks lifted up and down several times, this movement serving the same purpose. Some tanks upon the market are fitted with a means of keeping the solution agitated, though there seems room for improvement in this direction. One photographer that we know has a rubber bulb fitted to the top of a brass tube which runs down and enters the tank at the bottom, with the result that gentle pressure of the bulb causes air to enter the tank at the bottom and agitates the developer very effectively. This is the plan adopted by one of the best-known makers of amateurs' film tanks upon the market, and the principle might be more widely employed.

* * *

A Pioneer of the Small Camera. By the death of M. Jules Carpentier there passes away an eminent French mechanician to whom must be ascribed the development on the manufacturing side of the ultra-portable cameras of the present day. M. Carpentier was an engineer by training and profession, who afterwards took up the manufacture of electrical instruments of precision. Following an old interest in photography—he was a collaborator with Cros in three-colour work—the year 1890 witnessed his design of a camera of about the present vest-pocket size, taking twelve plates in an ingenious changing box, and providing for the focussing of objects up to within seven yards. Subsequently, M. Carpentier extended the number of models and applied the same fine mechanical workmanship, which characterised the cameras, to the making of a fixed-focus enlarger by which the production of large prints was rendered as easy as contact printing. He extended this idea into an enlarger of variable extension for different degrees of enlargement, and later into one in which the convergence of lines, due to tilting of the camera, were automatically corrected in making the enlargement. He was also a designer of instruments for setting the lens in the most accurate position of focus on hand-cameras, and also for measuring the speed of shutters. Apparently, the peculiar square pyramidical form of camera, which has remained popular in France as the "jumelle," was his original design. Many other scientific instruments for photography were made by him, among them the cinematograph apparatus designed by M. Louis Lumière in the year 1895, which was the first efficient equipment for the making and taking of animated photographs.

* * *

The Persulphate Reducer. Dr. S. E. Sheppard communicates from the Eastman Research Laboratory to the December issue of the "Photographic Journal" a lengthy paper on the inexhaustible subject of the theory of the persulphate reducer. No useful practical purpose would be served in endeavouring to present an abstract of the whole communication, but reference may be briefly made to that part of it which relates to the effect of small quantities of iron salts, such as may occur as impurities in commercial samples of persulphate, upon the action of the reducer. A year or two ago ("B.J.," July 12, 1918, pp. 314-315) Dr. Sheppard, in a short paper, ascribed the activity of the persulphate reducer to the presence of minute traces of iron salts. This view was actively contested by MM. Lumière and Seyewetz in a paper which we published in our issue of March 4, 1921, pp. 124-125, where it was stated, as the result of further experiment, that iron salts were without effect, provided that the persulphate solution was of the required degree of acidity. MM. Lumière and Seyewetz prescribed that the reducing solution should contain from 0.25 to 0.50 per cent. of sulphuric acid. Dr. Sheppard, in his last paper, now shows that the accelerating effect of iron salts on the persulphate reducer varies very greatly with the acidity of the solution. He states that their action is definite when quantitatively measured in a solution containing 0.25 per cent. of sulphuric acid, but imperceptible in one containing 0.50 per cent. of sulphuric acid. So on this point we appear to have reached substantial agreement between him and MM. Lumière and Seyewetz. Other factors appear to be concerned—Dr. Sheppard discusses them freely—but the practical conclusion seems to be that if you add to the working persulphate solution a proportion of sulphuric acid, which may be as much as ½ per cent.—that is to say, about one or two drops of the strong acid per oz.—the varying effects of impurities are counterbalanced—at any rate, sufficiently for ordinary purposes.

COPYRIGHT LAW IN CHINA.

The law of copyright, as our readers know, has its obscurities in this country, but its state here, or even throughout Europe, is of crystal clearness compared with that which prevails at the present time in China. The importance of copyright law in China may appear somewhat remote at a first glance; that is to say, until it is realised what enormous markets await commercial development in that country. The Chinese Ambassador in London, Dr. Wellington Koo, in a recent address to Chinese students, quoted figures showing the tenfold and hundredfold increase of American trade in China, chiefly in metals and engineering goods. In any trade, in countries where there is competition by Oriental merchants, facilities for the adequate protection of copyright in designs, trade literature, and other pictorial accessories to the sale of goods, play a by no means unimportant part in the way of restricting the passing off of inferior articles as those of manufactures of repute. It is therefore of interest to obtain some insight into the present state of copyright law in China, and so we take the opportunity of putting into an abridged form an analysis of the question which has been prepared by the Associated Chambers of Commerce in Shanghai and Hongkong.* The question is of extraordinary complexity, since it involves not merely legislation as regards copyright, but also the judicial powers exercised within Chinese territory by the authorities of the various countries having a finger in the pie of Chinese government. Thus, the conditions vary according, as, for example, the infringer of a copyright may be of Chinese, Japanese, American or British nationality.

It appears that China has some kind of copyright law, promulgated in 1910, renewed in 1915, and supplemented in 1916. But this law does not give protection to British

* British Chamber of Commerce Journal (Shanghai), New Series, No. 30, October, 1921, pp. 330-333.

subjects, or to any other foreigners, except in so far as the countries to which they belong have made reciprocal arrangements with China. America has entered into such arrangement to a limited extent, but Great Britain has not done so, and therefore at the present time a British subject in China is without the power to prosecute a Chinese subject for infringement of copyright. Apparently, a remedy for this state of things is a very complicated business, involving considerations of international law and treaties. A reciprocal arrangement, together with improvement of the Chinese copyright law, would improve matters so far as infringement by Chinese subjects is concerned. But that would be only a very partial remedy, because it would provide no means of taking action against Japanese infringers, for the reason that China has no jurisdiction over Japanese subjects in the country, actions against whom are heard in Japanese courts. By a reciprocal arrangement between England and Japan, infringements taking place in Japan can obtain a remedy, but under the terms of the Anglo-Japanese commercial treaty that remedy does not apply to Japanese subjects in China. The conclusion from this is that for adequate protection of British copyrights in China it is first of all necessary to obtain an Anglo-Chinese treaty on the subject (which would provide protection against infringements by Chinese) and also to obtain agreement of all the Powers having treaties with China to China's copyright law. But even the latter arrangement, if it could be successfully carried out, would still leave vital judicial difficulties unsolved.

The question is further complicated by the uncertainties which prevail in regard to the question whether British subjects have a legal remedy, under the 1911 Copyright Act, in respect to infringement in China by other British subjects. The provisions of the 1911 Act itself offer a copious field of argument for international lawyers. Although in some respects the Crown has the same jurisdiction in China as it would have in conquered or ceded territory, yet it is not possible to say that the rights conferred in this country upon a British subject under the 1911 Copyright Act are conferred upon British subjects in China, and it therefore follows that the reproduction in China of a British copyright work by some other British national is not an infringement of any right. Moreover, such Orders in Council which have been applied to Chinese territory apparently do not provide for the application of the whole of the Copyright Act, but only of the penal provisions. Cases have been heard in the British Courts of China which have been decided in accordance with this view. The general conclusion which is reached by the Associated Chambers of Commerce, as regards this branch of the subject, is that it cannot be definitely maintained that the Copyright Act applies between British subjects in China. It will thus be seen that firms having a present or future interest in the Chinese market will be well advised to link themselves with the larger commercial organisations whose business it is to watch developments in these directions and to use their influence for obtaining even some partial improvement on the confusion which exists at the present time.

WARM-TONE PRINTS DIRECT.

When one considers the undoubted popularity of warm black prints on development papers, it seems strange that the principle which is exploited to produce this class of print has never been commonly extended.

The papers used by professionals for this work are almost exclusively of the kind known as "slow development." Not a very good name, considering that ordinary bromide paper under normal conditions usually takes longer to develop. I have heard these papers also called "chloro-bromo," but would not like to say that the term was appropriate to all such papers. For the present purpose I will keep to "slow development."

But slow-development emulsions are not the only ones capable of giving colours direct. Warm blacks, sepias, and even reds can be obtained in the same way from many grades and kinds of developing papers. The use of bromides and gaslights for this work, and the extension of the process to the production of vandyke brown and red chalk, have been restricted to amateurs and experimenters up to now. The process is simple enough though, and the results obtainable can be all that the most fastidious would wish for.

The principle of the method I am going to describe depends on vigour, the vigour of the negative and the vigour of the paper. The developer is a pyro formula specially designed for the process, viz:—

Soda sulphite (cryst.)	.....	1 oz.
Potass. metabisulphite	.....	20 grs.
Pyro.	.....	60 grs.
Potass. brom.	.....	60 grs.
Soda carbonate (cryst.)	.....	1 oz.
Water	.....	20 ozs.

Made in one solution, this developer must be used soon after making up; for keeping purposes, it is necessary to divide the water and dissolve the carbonate separately. An elaboration which is useful when first trying the process is to dissolve the bromide separately also in about ½ oz. of the water and to add it tentatively to the rest while making trial prints, as some combinations of negative and paper may not require the full amount.

The grade of paper, whether it be bromide, gaslight or slow development, must be selected in respect to two considerations. These are, the contrast of the negative and the final colour of the print. Vigorous papers are best for general use, but the more contrasty the negative is, the less is the essential vigour of the paper, while the warmer or redder the desired tone is, the greater the necessity for vigour in the paper, the ideal combination for a red chalk being a hold negative and a vigorous gaslight paper.

Given our negatives and papers, and having made up a quantity of developer, we proceed in this fashion. Should a negative be weak, whatever the colour desired, we take our most contrasty grade of paper; but if the negative is hard, and the desired tone not very far removed from black, a soft or normal grade of paper will be better. Exposure must be great. There is no case of "development to finality," nor, without experiment and calculation, can a system of time or factorial development be used. As I have been content up to now with inspection, I cannot give any figures for the more systematic methods. It can be taken for granted, however, that in every case exposure must be what would in any other process be excessive. For tones of a warm black or dark brown nature slight over-exposure may be sufficient. For warm browns and reds much greater exposure is required, quite a range of colours being possible with the same combination of negative, paper and developer, merely by altering the exposure. There is a limit, however, and should the four factors not agree, disagreeable tones will result. These bad tones usually point to want of vigour somewhere, and can be obviated by using a more vigorous paper. When conditions

are ideal a print will reach its correct depth and correct colour simultaneously, when it must be snatched out of the solution and plunged into an acid fixing bath. Under-exposed (for this particular purpose) prints will not reach anything like a warm tone, though they can be developed to a good black, as a rule. Over-exposed prints are apt to be muddy and of a nondescript colour at the best. Between the two there is a much longer range than exists with any orthodox system of print making.

The appearance of prints made in this way has a different significance to that of those made in any other development process. Good prints look just right when they are lifted out of the developer for removal to the fixing bath, though some allowance has to be made for the yellow illumination which falsifies colours seen by it. As very strong yellow light is safe with most papers under the peculiar conditions, this falsification can be balanced somewhat by using increased illumination to inspect by. On immersion in the fixing bath a change takes place in the strength and colour of the print, the change being slight with warm black prints and marked in the case of red or brown prints. So great is the change with brick-red tones that a printer might be excused for scrapping the prints and the process forthwith, but it is only necessary for the prints to wash and dry to regain their full strength and colour.

The pyro formula given above has a further use. As a re-developer for bleached bromide or gaslight prints it yields a tone that cannot be very well got in any other way on these papers. It is the colour known to expert printers of P.O.P. and called by the public—we are told—"the real photo colour." Bleaching can be done the same way as for sulphide toning, and any recognised bleaching formula used.

The permanence of prints which have been developed or re-developed to brown or red has been questioned. As the image consists of nothing but pure silver, there is no reason to suppose it to be impermanent. The only difference between the coloured image and a black and white one is that it is deposited in a different way, and consists of finer particles. The stability of the two deposits can be practically tested by taking a forced black and white print, and a brown or red one made in the above manner, and treating them with a reducer or bleacher. It will be seen that the deeper lying black deposit resists action better and longer, which leads to the supposition that the coloured images are the more delicate. Therefore care must be taken not to leave hypo or alum in the gelatine of the prints when putting to dry, or they will "fade" more rapidly than black and whites would. In other respects the coloured deposits are practically as permanent as other silver images, and it would be straining at a gnat to neglect the process on grounds of possible instability.

The coloured image has a physical, or perhaps colloidal, peculiarity, however, being subject to change under the influence of great heat. Care has to be taken therefore if dry-mounting these prints.

THERMIT.

THE STUDIO PHOTOGRAPHER'S RESTRICTED DISPLAY FACILITIES.

THE studio photographer's window display facilities are generally restricted in scope. If he maintains an upstairs establishment his display consists of a window case in the doorway.

It is with these restricted display facilities in mind that the following notes on unusual displays have been compiled:—

L. H. Merry, Hollis, Me., devoted a display to children's pictures. The principal object of attraction was the wax figure of a baby, who sat on a fur rug while playing with her dolls and other playthings. At the opposite side was a tripod camera, focussed in the direction of the child. The central window location contained two cabinet photographs. The first picture showed the child, as in the setting described, playing with her toys, while the contrasting picture revealed the youngster in a straight and stiff-like pose. Backing up the exhibit was the following card:—

"You want your kiddies to look happy. Bring them in and we'll make them happy."

Flagg and Plummer, Lewiston, Me., also appealed to grown-ups via the juvenile route. Charming photographs of adorable looking children were grouped on the floor over billows of pink satin. A card announced that:—

"Your children are just as cute as these. Give us an opportunity to prove it."

Longs, Photographic Studio, Seattle, Wash., displayed a row of baby pictures. There were seven such photographs in all and in graduating sizes. The unique feature was that the seven pictures were all of the same baby. The miniatures and enlargements were flanked in the middle by the original picture. A sign inquired:—

"What do you think of our baby show?"

Kosch, White Plains, N.Y., laid a number of unframed photographs at regular distances apart on the green crepe paper-covered window floor. Each picture was covered over with a small sheet of glass of the same size as the photograph. This served to attract attention to the photographs.

The Scottish Studio, Montreal, Canada, stimulated business by an offer which was given publicity on a sign outside their second-storey window. The sign read:—

"Children between 1 and 5 photographed free by appointment."

The idea, of course, was that doting parents would not be satisfied with one free photograph, but would require probably several dozen copies in order to satisfy the demands of relatives and friends.

Steele, Saskatoon, Sask., Canada, inserted a convincingly-worded framed showcard in his outside window case. The announcement ran:—

"The children won't stay little long. Have them photographed at Steele's Studio."

The photographs exhibited in the window case consisted of two photographs of the same child at different times. There were several such examples, captioned like this:—

"Age 17 months—age 3 years. Barbara Haining."

McDermid, Edmonton, Alta., Canada, devoted the space in his window case to pictures of juvenile birthday parties. On a card appeared the invitation as below:—

"Bring your children for birthday pictures."

Mrs. Mason, Moose Jaw, Sask., Canada, closes her studio during the dull summer months while she takes a well-earned vacation. She gets her patrons in the habit of deferring their sitting by the following appeal:—

"NOTICE.—This studio will be closed until the first week in October.

"WAIT.—We will be back with new ideas and renewed energy."

The Harper Studio, Medicine Hat, Alta., Canada, is a liberal user of newspaper advertising, an effective example of which is given below:—

"The making of high class portraits is not a mere chance
Nor can the art be learned in a few years.

Anyone with a little practice can make photographs of a kind, but to make portraits that give you the true rendering of flesh tones and character takes a lifetime of continual study."

Miss Tawdry, Calgary, Alta., Canada, imparted local interest to her window case by exhibiting the photograph of the first prize winner in the local kitten show. "How adorable," "Isn't he cute," were some of the comments from passers-by.

Stocks, Penticton, B.C., Canada, took advantage of a local autumn exhibition by offering to take a free picture of every baby entered in the baby clinic at the Penticton Exhibition.

The Regal Art Photo Studio, Vancouver, B.C. inaugurated a title contest, in connection with which prizes of free sittings were offered. All the contestant had to do was to apply an appropriate title for a large picture exhibited in the window case. The subject was that of two dogs with an air of expectancy on their faces.

F. L. Hackney, Vancouver, imparted an autumnal touch to his window case by placing therein a bronze vase filled with yellow chrysanthemums. Portraits lined the walls, with the following card at the centre:—

"You are now educated to the high standard of a Hackney portrait. But do you realise how reasonable the price may be?"

ERNEST A. DENCH.

THE UNIFORM DEVELOPMENT OF DRY PLATES.

(A Paper read before the Royal Photographic Society.)

It is well known that development is essentially a diffusion phenomenon, and that in consequence it is not easy to secure a uniform density over even a small area since development is most efficient at the edges of the plates as the amount of reaction product of development tends to accumulate towards the centre of the dish. Unless the plate is both

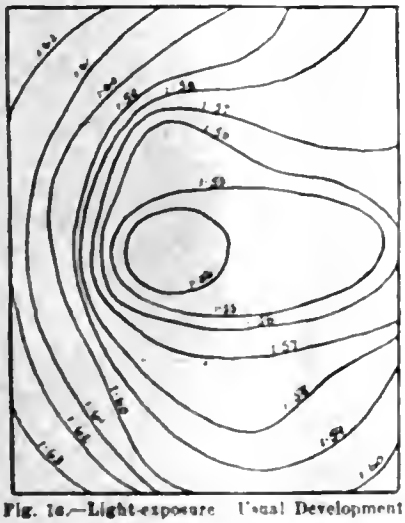

Fig. 1a.—Light-exposure: Usual Development

evenly coated and evenly dried, these defects also give rise to irregularities in the developed density. Cailler[1] has given some data which show how serious are the departures from uniformity. Various methods have been devised to overcome this trouble,[2] and some which have yielded good results in their originator's hands have not been so successful in the hands of others. With light-exposures very slow rocking of the plate successively in four directions at right angles to each other, uncovering half the plate at each rocking, gives fairly good results.[3] With X-ray exposures the latent image does not lie principally near the surface, but is distributed through the depth of the emulsion, and irregular rocking has been recommended.[4] In carrying out some work on the behaviour of plates to X-rays[5] it was found that the variable results obtained were due to irregularity of development, and experiments led to the adoption of a method of rolling development which enabled consistent results to be obtained.

In order to illustrate the problem the following experiments have been made. Sheets of patent plate, 15 by 11¼ cm., were heavily coated with ordinary and X-ray emulsions, and, after setting on a level slab, dried in a special cupboard arranged to give the most even drying it was possible to obtain. Those coated with ordinary emulsion were light-fogged, using a small light-source at a distance of 250 cm., and those coated with X-ray emulsion fogged by X-rays, using a small stop and working 180 cm. from the tube. The plates were thoroughly soaked in water before development. In each case one plate was developed by the rocking method (irregular in the case of the X-ray plate) and one by the rolling method. The plates were ruled off into squares, the densities of each square carefully measured and the isopaques plotted out.

Fig. 1 shows the results in the case of the light-exposed plate. It will be seen that with the usual method of development a region of greater density prevails round the edges of the plate, falling away towards the centre, sometimes complicated by other irregularities. This is due to the greater concentration of soluble bromide, set free in development, in the central portion of the plate which the usual methods of development fail to remove with sufficient rapidity. The use

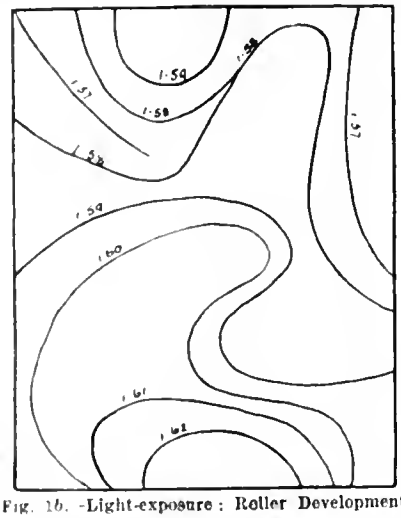

Fig. 1b.—Light-exposure: Roller Development.

of a developer containing large quantities of bromide overcomes this trouble, but such a developer is not at all suitable for most sensitometric work. The range of densities in the rocked plate is considerably larger than in the roller-developed plate, where it will be seen that the density distribution is of a far more satisfactory character.

Fig. 2 illustrates a similar pair of X-ray exposures. Here

1. Cailler, "Phot. Journal," *55*, p. 242.
2. Sheppard and Mees, "Investigations on the Theory of the Photographic Process," p. 34.
3. Renwick, "Phot. Journal," *52*, p. 254.
4. Wilsey, "Am. Journal of Roentgenology, 1921," *8*, p. 328.
5. Bloch and Renwick, "Trans. Faraday Society," *15*, Part 2, 1919.

the rocked plate exhibits the same characteristics as in the case of Fig. 1, whilst the roller-developed plate gives a more rational density distribution, the wedge-shaped gradient indicating lack of uniformity in the coating, the coating thickness rising across the plate diagonally.

The details of the method are as follows. The rubber cover-

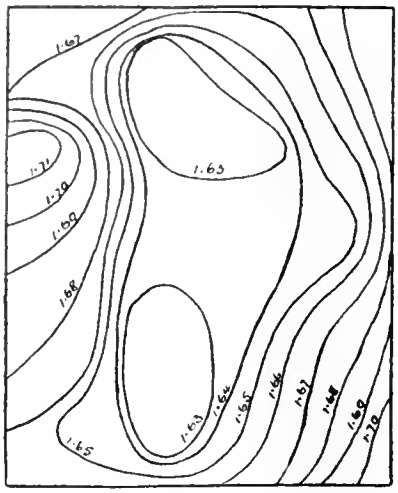

Fig. 2*a*.—X-ray Exposure: **Usual Development.**

ing of an ordinary roller squeegee (rather wider than the plate to be dealt with) is removed and the wooden cylindrical core covered with a strip of heavy pile velvet which is wound spirally around it. The velvet is secured by small brads, care being taken to see that the heads of these are quite at the bottom of the velvet. After the roller has been well soaked in some of the developer the rest is poured over the plate in the usual way, and slow and steady rolling over the surface of the plate commenced at once and continued until development is completed. No pressure must be used, and the roller should be alternately passed across the face of the plate in two directions at right angles to each other. The roller assists in the removal of exhausted developer from the upper surface of the plate and helps to apply fresh developer in its place, thus tending to equalise the concentration over the whole plate area.

The control of temperature is not so easy as with those methods of development which permit the use of a thermostat, and it will be found advisable to work at the temperature of the dark room. The work here described was conducted at 18.5 deg. C. In the case of emulsions, where the gelatine is at all soft, care must be taken that the developer is not warm enough to so soften the film that it becomes abraded by the rolling process.

In conclusion it may be said that the method affords an easy means of securing more uniform development than can be obtained by the ordinary methods in those cases when great accuracy is desirable. My best thanks are due to Messrs.

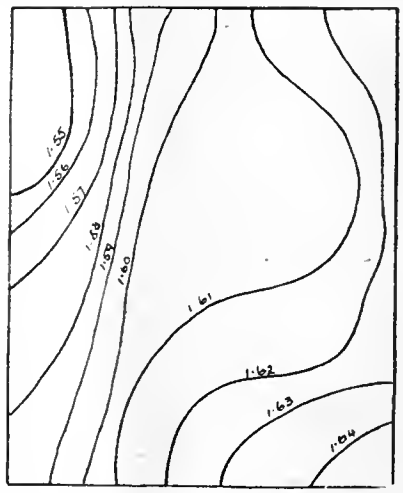

Fig. 2*b*.—X-ray Exposure: **Roller Development.**

Ilford, Ltd., in whose laboratories these experiments have been conducted, and to Mr. F. F. Renwick for his advice and interest in the work.

OLAF BLOCH, F.I.C.

THE MODERN HISTORY AND MANIPULATION OF SELF-TONING PAPERS.

[The following paper formed the presidential address delivered by Mr. P. R. Salmon recently before the South Suburban Photographic Society. It will be seen that after a brief sketch of the commercial origin of self-toning paper the communication brings together a great deal of practical information of the working of the many self-toning papers at present on the market and on their characteristic effects.—EDS., "B.J."]

WHEN I consented to prepare some notes on the history and working of self-toning papers I had little idea of the big task I had set myself. The number of different brands at present on the market—there are no fewer than fourteen now "going strong"—is greater than I thought, while the brief historical part took longer to compile than I bargained for.

I am not aware of the existence of any information on the modern history of self-toning papers, and I trust my efforts to prepare one may be some service. The paucity of references concerning the subject is, I think, mainly due to the rather scant notice taken of self-toning paper during the first few years of its existence, also to the "quietness" of its coming. It had not the "boosting" that some processes, notably Bromoil, enjoyed later on. Another point is that self-toning paper came with—or very shortly after—gaslight paper, and it was the latter that attracted the attention of photographers, self-toning paper at its coming being looked upon as being suitable only for amateur photographers, who twenty-two years ago were not so numerous as they are to-day.

What few references there are to self-toning paper in the literature of twenty years or so ago are hidden away in odd corners, or are too insignificant for indexing. One has therefore to rely largely upon one's memory, or wade through all the available journals, in order to supply all the links of the chain. Happily my memory is said to be good, and I distinctly remember the coming of the first self-toning papers of the collodion variety, but I must confess that during my searches in the journals I came across many items about self-toning papers and names of defunct brands that I had forgotten. It is therefore quite possible that I have missed some important facts; if I have, I have no doubt that someone will correct me.

Self-toning paper, however, did not originate in Germany, as the average photographer believes it to have done. Self-toning papers—of the modern variety at any rate—were "born" in America. I do not propose to discuss the much-debated question as to who was the real inventor of the paper. A Mr. D. Bachrach claims the honour (see "British Journal of Photography," April 20, 1906), but as Mr. E. J. Wall rightly pointed out ("B.J.," October 9, 1908, and April 8, 1921) there were others before him. The late Mr. John Spiller did something to bring about a self-toning paper.

In order to simplify matters, I do not propose to deal at any great length with the work of the early experimenters, or the many

varieties of sensitive paper that led to the making of collodion or gelatine self-toning papers of the perfect quality we have to-day. When mentioning early efforts I refer, of course, to plain salted and other papers—notably Ilford matt P.O.P. (1894) and Griffin's "Carbona" (1903), which gave excellent reddish brown tones when printed deep enough and afterwards fixed in plain hypo solution. This plan of finishing ordinary matt P.O.P. was at one time very popular, but one hears little of it to-day. Some studios made a specialty of such prints.

Mention may also be made of Rivet's self-toning paper, because it was, I believe, the first paper to be advertised as "self-toning"; it was an albumen paper, and quite different from the more modern self-toning papers. It was made at Willesden and appeared early in 1886, vanishing in 1900 when collodion self-toning paper was getting a footing in this country. Rivet's paper had to be very deeply printed; it was afterwards fixed in a plain hypo solution, washed, and then dried by placing between sheets of clean blotting paper and ironing with a hot flat iron until quite dry. The final tone was governed partly by the quality of the negative, and maybe a few other things, but most of all was it influenced by the amount of heat applied, a good "laundry-hot" iron giving the print a very pleasing purple tone, but sad to relate, the rich heat-given tone too often disappeared in a very short time. The paper, nevertheless, had many advocates, and was for a time a big success, an "improved" grade of it appearing in 1893. It was very popular among amateurs.

A remnant of this process of toning by heat remains to-day, for, as many no doubt know, the tone of prints on modern self-toning papers—particularly collodion—may often be enriched by placing the wet or dried print between sheets of clean blotting paper and ironing with a hot flat iron. This "dodge" is sometimes said to be a secret one and quite new, but it is in fact a very old one, known and practised in the early days of gelatine and collodion papers. Dr. R. A. Reiss, of Lausanne, investigated the question of the influence of temperature on tone very fully in 1900, and a summary of his experiments (which appeared originally in the "Photographische Chronik") may be found on page 963 of the "B.J. Almanac" for 1901. Self-toning papers are not mentioned in the experiments, only ordinary gelatine and collodion P.O.P., but the action of heat on self-toning papers may be said to be precisely the same.

To Mr. O. Sichel, of Bunhill Row, E.C., must be given the credit of first introducing a collodion self-toning paper of the modern type into this country. It came from America, and the first official or editorial notice of it appeared in the "B.J." dated November 4, 1898. This notice reads: "Some specimen prints on a new self-toning paper, which is being introduced by Messrs. Sichel and Co., have been submitted to us. The series of effects include glossy (resembling ordinary collodio chloride), sepia and platinum. The paper prints and tones simultaneously, and all the results are of excellent quality. A paper with such admirable characteristics should be widely welcomed." It will be noticed that the term "prints and tones simultaneously" was used, it being a common one at the time, as it was customary to combine printing and toning rather than toning and fixing. I have an idea, though I may be wrong, that this term was used by dealers because of the great outcry then prevailing against the use of the combined toning and fixing bath for ordinary P.O.P.

Messrs. Sichel's announcement of the paper was followed by one from Mr. Moult, who sold a "Kalos" self-toning (December, 1898), by Houghton's, who had an "Aura" brand (June, 1899), and also by Fallowfield. As instructions for the using of these papers were the same I think we may assume that Mr. Sichel was the distributor of the paper. This paper, as I have said, came from America, where it was manufactured, I am told, under a patent taken out by Schoenfelder and Kelly, of New York, and in our own Patent Office I have found three American specifications—two dated May 26, 1896, and one September 29, 1896—by the two workers named.

I do not propose to deal at any great length with the making of self-toning papers. Those photographers who are curious, and have a knowledge of chemistry, should refer to the "B.J. Almanac" for 1898, where on page 832 they will find one of Schoenfelder's patent specifications—the original formula, I believe.

A later specification (1903) is that of M. Bauer's, who was associated in some way with the first American self-toning paper (1896). The basis of the emulsion was fulminating gold, together with chloride and silver nitrate, citric acid, and glycerine dissolved in collodion. A report of the period (see "Photography," 1903, page 613) says of this patent: "A solution is made of 45 grs. silver nitrate, 45 minims of glycerine, in 150 minims of alcohol, which is added to 4 ozs. of collodion containing 3½ per cent. of soluble pyroxyline. To make the fulminating gold solution, take gold chloride 3 gr.; ammonia solution containing 26 per cent., 1 minim; lithium chloride or other soluble chloride, 3 grs.; to this is added a solution of citric acid 15 grs. in 1 drm. of alcohol, and then 15 minims of castor oil in 1 drm. of alcohol. Gelatine may be substituted for collodion, when, of course, water is the solvent instead of alcohol." Such is the emulsion for paper to be finished by means of salt and hypo solutions, or hypo alone. Similar formulæ appear to have been common at the time.

Self-toning paper, as we know, caught on, and Mr. Sichel's had a good run of several years. In course of time, however, the American manufacturers were unable to obtain raw materials for the making of the paper—owing, I am told, to the action of a rival firm—and rather than let a good thing die the patentees came over to this country, at the invitation of Mr. Sichel, for the purpose of arranging for the manufacture of the paper here. They were successful, for arrangements were made with the well-known Paget firm, of Watford, and on July 5, 1901, the "B.J." chronicled the advent of the "Paget" self-toning paper. The well-known house of Paget thus became the first British manufacturers of a "real" self-toning paper, a paper that has held its own and is still to be found in the front rank. Whether the original paper was made according to the American inventor's formulæ, or represented further improvements by the Paget firm, I do not know, but I imagine the latter.

Photographic experts then began to "sit up and take notice," and in the summary appearing in the "B.J. Almanac," 1902 (penned a few weeks after the introduction of the Paget paper) we get for the first time, I believe, an "Almanac" mention of self-toning paper and the progress it was making, and in the same volume (page 901) will be found a patent of "an improved self-acting toning paper" taken out (in 1899) by Herr Raethel. There is also in this volume an announcement of a new self-toning paper made by Dr. J. H. Smith, of Zurich, but I cannot find any advertisement of the British make.

Paget's self toning paper was very soon followed by others, but those that followed quickly needed a preliminary bath of sulphocyanide with or without the addition of alum; chief of these were the Ilford "Kalona" (September, 1902), Barnet (May, 1903), Wellington (June, 1903), and Imperial (1904), all of which have now given place to improved makes calling for more simple treatment. I will, however, deal with all makes in a rough chronological order, giving a brief summary of the working instructions, and what, in my opinion, are the best tones and the special features of the papers.

Paget—Collodion. Introduced July, 1901. Varieties now made: Glossy, smooth white, matt white, smooth cream and matt cream. For warm brown tones wash for 10 minutes and fix for 10 minutes in water 20 ozs., hypo 3 ozs. For colder tones use preliminary salt bath (2 ozs. to the pint) for 5 minutes, and fix in the usual hypo bath. For even colder tones use a stronger salt bath and warm up to 80 deg. F. For general work I prefer the smooth white fixed without salting, but for the most artistic effects I prefer the cream matt fixed without salting. The sepia tones are particularly rich, very even, and easy to repeat. Manipulation more simple than some papers, but variation of tones (freak tones) perhaps not so great. The Paget "Simplex" is a gelatine self-toning paper of excellent quality. It was introduced in February, 1906, and I have used large quantities of it, but I omitted it from my recent experiments being under the erroneous impression that it had been withdrawn; it is, however, still being made. Red to purple tones are easily obtainable by simply varying the strength of the hypo solution—40 per cent. for cold tones, 10 to 15 per cent. for sepia, and 2½ to 7½ per cent. for red and brown.

Imperial. The modern "Intona" gelatine self-toning paper was introduced in February, 1910, to take the place of "Kalona." The latter was put on the market in September, 1902, and it needed a sulphocyanide and alum bath before fixing. The present-day "Intona" is made in glossy mauve, carbon surface, and matt white. No preliminary washing required, fix from 5 to 10 minutes in water 20 ozs., hypo 6 ozs. Allow 1 oz. of fixing solution for each half-plate print. Excellent warm tones may be obtained on the carbon and matt surfaces by adding 20 grs. of sodium carbonate to the pint of fixing solution. I prefer the glossy paper fixed for 8 minutes in a 40 per cent. hypo solution. The tones closely approach those obtainable on P.O.P. when toned with gold in the usual way and the paper glazes well. The carbon surface is par-

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ticularly good. In December, 1909, the Ilford Co. introduced a very good collodion self-toning paper named "Hyptona," a very popular brand, but now temporarily suspended because of the difficulty of obtaining suitable raw materials.

LETO.—This company's "Seltona" collodion self-toning paper was introduced in April, 1903, when it quickly forced its way into the front rank. It is now made in antique white and cream, matt smooth white and cream, glossy, and with tinted surfaces—cream, grey, blue and green—the latter being known as Tintona. For sepia and brown tones wash in plain water and fix in hypo 2 ozs. to the pint. For dark brown, purple and blueish tones immerse in a preliminary salt bath (2 ozs. to the pint) without previous washing, for 5 to 10 minutes, according to tone required, then fix as usual. I like best for general work the matt smooth and the antique white, both salted. For the most artistic effects I prefer the cream Tintona platinum toned, and the antique white and cream fixed without salting. An excellent all-round paper, perfect in all respects. It is, I believe, largely used with the platinum toner, and in these days of expensive platinum it may interest users of it to know that platinum-like tones may be obtained by using a saturated solution of salt in place of the usual 2 ozs. to the pint solution, and then fixing as usual. But should real platinum be preferred, in spite of its expensiveness, instructions for use are given in each packet of paper. The paper is also a good one for giving two-coloured effects, simply by the local application of the salting solution, the parts treated with salt being of a cold tone, while those touched by hypo alone become a rich brown. The most effective results—particularly in portraiture—are obtainable by this method of double toning.

RAJAR.—The Rajar "Autona" paper appeared in March or April, 1903. It is a collodion paper made in glossy, matt smooth and rough, and cream smooth and rough. For dark brown tones no preliminary washing in required; simply fix for 10 minutes in water 20 ozs., hypo 3 ozs. For light brown tones wash for 5 minutes in plain water and fix as above, but for cold tones use a salt bath (2 ozs. to the pint) before fixing. I prefer the smooth matt fixed (without first washing) in plain hypo. A very good all round paper; the glossy not being so highly glazed as most collodion papers, but, nevertheless, a good one. The paper is very easily manipulated.

BARNET.—Elliott and Sons, of Barnet, introduced a gelatine self-toning paper known as "Kiplo" in the spring of 1903, one needing a preliminary sulpho-cyanide bath. The more perfect and simple paper named "Bar-tona" was placed on the market in March, 1921. It is also a gelatine paper, glossy and matt. No preliminary washing required. Three different strengths of hypo solution are recommended for varying the tones—4, 6 and 8 ozs. to the pint—warm, "plum," and cold tones being obtainable. One ounce of solution for each half-plate print is advised, and at a temperature of 65 deg. F. The best tones, in my opinion, are those given by the glossy paper toned for 10 minutes in water 20 ozs., hypo 6 ozs. A good all-round paper and one very easy to work. The glossy paper gives very fine results from ghostly and very weak negatives, it being one of the best papers I have met with for very thin negatives.

KODAK.—The Kodak gelatine self-toning "Solio" paper appeared here in May, 1903, and is now made in glossy, matt and velvet. No preliminary washing required. Tones may be varied considerably. The ordinary simple hypo bath (3 ozs. to the pint) may be used for brown tones, or preliminary baths of sulphocyanide (20 grs to the pint), or salt (1 oz. to the pint) may be employed in colder tones. The glossy paper gives a very fine purple tone when salted, and this I prefer. The sepia tones on the matt and velvet by use of hypo alone are also particularly good. The salt bath makes a surprising difference in the tones. A good all round paper, with remarkable freedom from double tones, and one very easy to work. Takes an exceptionally good glaze. Kodak once had a good collodion self-toning paper, but this, I believe, is suspended. I used large quantities of it about ten years ago, and liked it very much. A 12½ per cent. hypo solution was used, and a large variety of tones were possible, they being governed by the usual plain hypo solutions and the salt bath, with a fixing of 10 minutes.

WELLINGTON.—A Wellington gelatine self-toning paper needing a sulpho cyanide bath was introduced in June, 1903, and a hypo only brand later. The latter required washing in plain water for 5 minutes, it was then toned in a hypo solution (6 ozs. to the pint), to which was added 30 grs. of soda bicarbonate. Fixing was carried on until the desired tone was reached, which did not take less than 8 minutes at a temperature not less than 60 deg. F. The darker the printing, and the longer the immersion, the colder the tone. Very pleasing tones were obtainable, those on glossy paper being particularly rich. The Wellington collodion paper is one of the latest, it being introduced in March, 1921. It is made in matt, glossy and cream chamois. For sepia tones wash for 3 minutes in plain water and fix in a hypo solution, 2 ozs. to the pint. For dark brown or purple tones wash as above, place in a salt solution (2 ozs. to the pint) for from 5 to 10 minutes, rinse and fix in hypo as above. The longer the immersion in the hypo solution the colder the tone, but longer than 15 minutes fixing not advisable. I like best the sepia tones on the matt paper, and the purple tones on the glossy, obtained according to the instructions. A very good all-round paper, and one specially suitable for very dense and flat negatives; it gives—when properly used—the most surprising results from faulty negatives. The tones in all cases are, I think, better if a pinch of soda bicarbonate is dissolved in the hypo solution.

IMPERIAL.—The first Imperial gelatine self-toning paper appeared in January, 1904, and it needed a preliminary sulpho-cyanide bath. The present-day make, which is more simple to use, was introduced in February, 1914. The makers supply a very carefully compiled table giving the many tones obtainable (sepia to warm purple) with various strengths of hypo, and times of immersion. No preliminary washing required. My favourite tone is obtained on the glossy paper by fixing for 10 minutes in water 20 ozs., hypo 6 ozs. Too long immersion in the fixer is apt to give a greenish tinge to the lighter tones. A good all-round paper and one easy to use, thanks to the excellent table compiled by the makers. Made in glossy and matt, the former giving a good "professional" tone and glazing beautifully.

ILLINGWORTH.—This firm's gelatine self-toning paper was introduced in the summer of 1904 under the name of "Zigo"; in 1910 the name was changed to "Enitone" for the home and Colonial trade; for European, South American and non-English-speaking countries the name "Zigo" was and is still retained. No washing before fixing. Fix in water 20 ozs., hypo 6 ozs. The longer the immersion the colder the tone, but never fix for less than 5 minutes. In my hands the best tones are obtained by fixing for 10 minutes in a slightly weaker hypo bath (5 ozs. to the pint). Never use hypo stronger than 6 ozs. to the pint. A very large variety of tones is obtainable with one strength of hypo, but difficult to get a set exactly alike unless an eye is kept on the temperature, on the strength of the bath, and time of immersion. The glossy paper gives exceptionally fine purple tones, while the sepias obtainable on the matt and satin surfaces are above the average. The paper is made in glossy, matt, and satin.

GRIFFIN.—This firm's gelatine paper, named "Goldona," was introduced in March, 1906. Originally there was only one variety, variations in tone being obtained by the use of hypo, sulphocyanide and aluminium chloride baths. The common plan of using the original "Goldona" was to immerse for 15 minutes in a 20 per cent. hypo solution for warm tones, or from 10 to 15 minutes in a 40 per cent. hypo solution for cold tones. It is now made in three varieties—green label for red or warm tones, mauve label for purple and cold tones, and brown label for sepia and brown tones; the latter is made of a matt white surface only, while the other two varieties are supplied in glossy, matt, and satin surfaces. Although so many tones are obtainable on this paper the manipulations are extremely simple. One must, however, keep closely to the makers' instructions, and be careful about depth of printing, temperature, and strength of the hypo solution. For brown and sepia tones the prints (without previous washing) are fixed in water 20 ozs., hypo 2 ozs. for 10 minutes at a temperature of 60 deg. F. For the mauve label paper (for cold tones) a stronger hypo solution (8 ozs. to the pint) is recommended. The chocolate tones obtainable on the green label (warm tone) paper are of great beauty, and show up nicely on the satin surface. It is most important to print deeply. A splendid all-round paper giving a wide range of good "professional" tones.

CRITERION.—A gelatine paper known as "Estona," introduced in May, 1906. Three surfaces, glossy matt and silky. No preliminary washing required. Fix in hypo solution, 5 or 6 ozs. to the pint, and when the desired tone is obtained rinse in slightly salted water to arrest toning action. The best results, in my opinion, are those obtainable on the silky paper by toning for 10 minutes in water 20 ozs., hypo 5 ozs. The silky surface is very pleasing, and the rich reddish brown tones most effective. This paper loses very little density during fixing. Only enough hypo solution to cover the prints should be used, as too much hypo is apt to give washed-out tones.

...—The "Yto" gelatine paper made by this firm was ... on the market in July, 1906. It is now made in several ... glossy, matt, carbon white and cream. No preliminary ... or salt baths required. Brown tones are obtained by ... in a hypo solution (4 ozs. to the pint) for from 8 to 12 ..., and at a temperature of 60 deg. F. For purple tones use ... solution 6 ozs. to the pint, and mix with the new bath an ... quantity of a once-used bath. The carbon white and the ... are excellent surfaces for all-round work, but for the most ... effects the cream carbon is my favourite—the latter toned ... brown, and the glossy and white carbon to purple. This ... is easy to use, but care must be taken to have the tempera... not below 60 deg., and not to under-print or over-tone.

...AMER.—This Belgian-made paper is a collodion made in ..., matt, and cream. It was introduced in June, 1912, and ...ended during the war, but is with us again. It is first ... for 5 minutes, then fixed for from 10 to 15 minutes in a ... of hypo, 2 ozs. to the pint, this treatment giving good ... tones. Slightly warmer tones may be obtained by using ... 1½ ozs. of hypo to the pint, and an even weaker solution has ... advocated, but is not advisable. In the weaker solution ... 1½ ozs.) fixing should not be for less than 12 minutes. For ... browns and purples use a preliminary salt bath (2 ozs. to the ...), and even this salt bath may, if desired, be dispensed with ... using a 20 per cent. solution of hypo. Fixing should never be ... longer than 15 minutes. I like best the matt paper toned in ... 20 ozs., hypo 2 ozs., for 15 minutes. A very good all-round ..., giving pleasing sepia tones.

...ch are the official instructions for using the papers, with a ... remarks of my own added. There are, at the same time, a ... general hints that may be given, as such hints apply to all ...

Always follow the makers' instructions very closely, as only by ... can one get the best results and repeat a tone. Although ... solution of any strength will give a tone—or, say, a result—... not likely to be the best the paper will produce. It is not ... to play about and ring the changes with self-toning papers ... fixing baths as one may play with plates and developers.

The final tone of the print is governed very largely by the depth ... printing, and great care is necessary if tones are to be repeated. ... papers require deeper printing than collodion, they losing ... in the hypo bath.

The hypo fixing baths must always be distinctly alkaline and ... acid. Present-day hypo is not yet quite up to the pre-war ..., and it is advisable to add a pinch of soda carbonate, ..., or a few drops of liquid ammonia to a hypo bath ... order to ensure alkalinity. Some makers wisely recommend this. ... dissatisfied with the present-day crystal hypo—some of ... I understand has been returned to makers because it refused ... fix plates—I took to using Johnson's anhydrous hypo, one part ... which equals 1½ parts of crystals.

Never leave any self-toning paper in contact with a negative for ... great length of time. It stains negatives worse than ordinary ...O.P.

Do not attempt to fix too many prints in one lot of hypo, or use ... solution than is really necessary. The best results are ... obtained—if one has the patience—by fixing each print singly in ... enough solution to cover it. Too much solution gives poor ... and washed out effects.

Glossy gelatine papers, if salted, give tones most like gold-toned ...O.P. If salting is not desired, the next best thing is to print ... and fix longer, or use a stronger hypo bath.

Four prints—gelatine glossy and matt, and collodion glossy and ...—purposely mounted with improper mountant on impure ..., showed that the gelatine matt faded the quickest: the ... collodion lasted the longest.

Most gelatine matt papers are apt to give rather muddy prints ... the negatives are not plucky. Collodion papers give the most ... prints from flat negatives.

Self-toned pictures made from mercury-ammonia intensified ... are likely to fade very quickly.

Unused papers always discolour very quickly, but such discolora... may be ignored, as it usually disappears in the hypo bath.

Always blot or wipe off superfluous water from collodion prints ... the final washing, and dry quickly in a good draught, or in ... warm room—never dry prints between blotting paper under ..., as is sometimes advised. The quicker collodion prints are ... the better they are likely to be. Slow drying under pressure ... cause markings.

Immerse all self-toning papers in hypo or salt solutions evenly, quickly and thoroughly, so as to ensure even tones. Parts allowed to get behind in the toning will never catch up.

Two collodion postcards, glossy and matt, printed in 1903, have been hanging exposed to smoke, gas, and chemical fumes for eighteen years. The glossy picture has faded badly, but the matt picture remains as perfect as when made. Glossy collodions in an album faded before the matt surfaces, though made at the same time and given the same treatment.

All things being equal, glossy gelatines are the "trickiest" to work and to repeat tones; matt collodion the easiest.

Unless makers advise to the contrary a hypo bath of a temperature between 60 and 65 deg. F. will be found to give the best results.

Salt for salt baths should be of the common or kitchen variety, not specially prepared table salts, some of the latter are most unsuitable. Be particularly careful to note whether the paper is to be washed in plain water before immersing in the hypo bath, this washing or non-washing is important.

Thoroughly fixing is essential if permanency is a consideration. If a fixing bath lightens a print too much, simply print deeper to allow for the reduction. Some gelatine papers need very deep printing.

If a purple or a dark brown tone is aimed at and cannot be secured—the tones being too red—the defect is probably due to powdery hypo crystals, indicating the presence of soda sulphite, which prevents toning. If hypo crystals are covered with powder, wash off the latter before weighing out and dissolving.

Efforts to "help" toning by adding a drop or two of gold chloride solution to the hypo bath have not been found satisfactory. The most curious results have been obtained. If the papers are properly used such "help" is not required, even if it were possible.

The complaint one hears the most frequently about collodion papers is that of curling during manipulation. This defect may be minimised—in some cases entirely overcome—by not putting more than half-an-inch of water, salt or hypo solution, when first wetting the dry print, and putting the latter in face downwards. Once the pictures are wetted there will be little or no tendency to curl.

If the lighter tones of a gelatine picture are greenish it is a sign of over-fixing or the use of an old hypo solution; if the tones are too red either the fixing bath is too weak, or the prints have not been in it long enough.

Cracked or scalded collodion prints are caused by too quick or rough washing, and allowing them to double up and crease when in the solutions or washing water.

P. R. SALMON.

FORTHCOMING EXHIBITIONS.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 11 to 25.—Scottish Photographic Salon. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

February 14 to 17.—Exeter Camera Club. Latest date for entries, January 30. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

A CONTINENTAL PHOTOGRAPHIC DIRECTORY.—Our confrère, M. Paul Montel, of "La Revue Française de Photographie," has in preparation a directory of photographers and photographic dealers and manufacturers in France, Belgium and Switzerland, which is to be issued in February next as "L'Indicateur de l'Industrie Photographique." The volume will also contain a list of trade marks and names relating to photographic goods. Entries, both free and to be paid for, may be inserted in the volume, the latter according to a tariff obtainable on application to M. Montel, 35, Boulevard St. Jacques, Paris XIVe.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, November 21 to 26 :—

COLOUR PICTURES.—No. 31,406. Process for converting silver prints into colour pictures. Akt.-Ges. für Anilin-Fabrikation.

CUTTING DEVICE.—No. 31,512. Device for composing and clamping photographic prints, etc., for cutting circles, etc. A. E. E. Barneveld.

CAMERAS.—No. 31,017. Photographic cameras. R. Longbottom.

FOCAL-PLANE SHUTTERS.—No. 31,441. Focal-plane shutters for photographic cameras. A. G. Pickard and Thornton-Pickard Manufacturing Co., Ltd.

CINEMATOGRAPHY.—No. 31,723. Cinématograph film. F. N. Cowdy.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

FOLDING CAMERAS.—No. 171,024. (October 6, 1920.)—The object of the invention is to produce a camera which, when folded, is (having regard to its capacity when open for use) abnormally thin and hence more portable. The result is secured by special and new arrangement of the struts of the lens front. These struts are connected at the upper ends to the sides of the lens front by pivot hinges, and at the other ends or feet are preferably connected together by a cross rod. They can swing on the pivot hinges on the sides of the front so that if turned upwards the rods will lie approximately along the sides of, and the cross rod (if any) above, the lens front, and when turned down they will come into the required position on the opened front of the camera to give support to the carrier. On the lower ends or feet the struts travel in guides on the front of the camera so that the closing or opening of the front of the camera lifts the rods to the upturned position, or brings them down to the supporting position. Hinged to the bottom of the lens front is a flat metal member, which also slides in guides (preferably the aforesaid guides) in the front of the camera, and which determines the

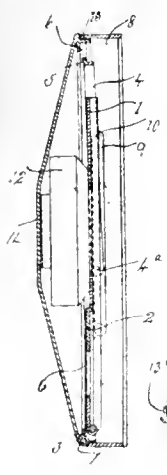


Fig. 1.

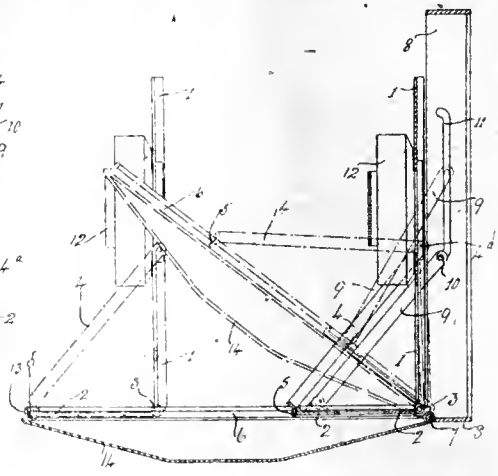


Fig. 2.

position of the struts in relation to the lens front when arranged for use. This member always slides in and follows the plane of the guides, when the camera is open lying along the front, and folding up with the front when the camera is closed. The struts, when the camera is open and the lens front pulled forward ready for use, are rigidly clamped in the required position by being held between a stop and the flat metal member.

By means of this arrangement the lens front, together with its struts, when the camera is closed, only takes up space corresponding to the thickness of the lens-front itself. This admits of a reduction of the structural depth of the camera itself, inasmuch as space need only be provided further in the front of the camera for the lens and its attendant apparatus, and the required space for this is secured by making the front of the camera bowl shaped, producing a very suitable outside shape of the camera to fit easily into a pocket.

In the drawings an example of the invention is shown. Fig. 1 is a section of the closed camera, Fig. 2 a lateral elevation and part section of the open camera in various positions.

The lens front 1 is connected by a pin joint 3 with the flat metal member 2, which is mounted in a slide guide 6 in the front. The lens-front struts 4 are connected by pin joints 4a to the sides of the lens front, and the feet 5 of the struts rest in the slide guide 6, which is provided with a stop 13. The front 14 (of bowl shape) is connected by means of the joint 7 with the camera body 8. The struts 9 (which are of usual design) rest with their free ends 10 in slide guides 11.

The mode of operation of the arrangement is briefly as follows :—

On opening the camera (fig. 2 dotted lines) first of all the front 14 with the guides 6 turning on the pivot 7 assume the position in relation to the camera case shown in fig. 2, the stay 9 moving at its free end 10 in the guide 11 and determining such position and holding the front and the guides 6 rigid in relation to the body 8 and the guides 6 at right angles to the lens front.

The movement of the slide 6 causes the flat member 2 (which moves in the slide 6) to move on its pivot 3 to the position shown in fig. 2, and at the same time causes the stay 4 moving on its pivot 4 to assume the position shown in fig. 2, the feet 5 of the struts 4 sliding back in the guide 6 until they strike against the flat member 2.

If then the lens front 1 is drawn out of the camera body, the flat member 2 slips forward in the guide 6 and pushes in front of it the cross rod and the feet 5 of the steadying rods 4 until the feet and cross rod strike against the stop 13. In this final position (fig. 2, double dash lines) the feet 5 are clamped fast between the flat member 2 and the stop 13, and the camera is ready for use.

On folding up the camera the lens front is first of all pushed back and the front 14 then moved upwards. Then, as may be seen from the drawing, the feet 5 slip in their guides and in this way come to lie at the side of the upper part of the lens front when the camera is folded, while the flat member is folded up into the vertical position as shown in fig. 1.

The bowl-shape form of the front 14, as already mentioned, is made possible by this arrangement of struts, and, as shown by the drawing, it presents a camera corresponding to the cross-section of a pocket.—Bruno Leonard Lion, 18, Ashbourne Avenue, London, N.W.1, for Paul Guthe, Dresden.

COPPER MORDANT DYE TONING.—No. 163,337. (December 3, 1918.) The invention relates to a modification of that described in Patent No. 147,005. ("B. J.," June 3, 1921, p. 328, and "Colour Photography" Supplement, June 3, 1921, p. 23.)

In the usual copper toning the silver picture is converted into a copper image by using about equal parts of solutions of copper sulphate and potassium ferri-cyanide of 10 per cent. strength and about 10 times the weight of either of potassium citrate. Such a bath consists, for example, of 15 parts of copper sulphate, 115 parts of potassium citrate, and 13 parts of potassium ferricyanide, all in solution of 10 per cent. strength. The picture obtained after dyeing is particularly suitable for viewing by daylight and for portraits, because, in consequence of a more or less strong turbidity and opacity of the deposit, the picture has an enhanced artistic value.

For projection transparencies, however, a matt picture is not always suitable. By the improvement of this invention pictures are obtained which are highly transparent and appear on the screen in brightest possible colour. The improvement consists in using both the copper compound and the potassium ferricyanide solution in substantially smaller proportion than in the usual toning bath, while retaining the normal proportion of potassium citrate. The proportion of copper compound and potassium ferricyanide is reduced to from $\frac{1}{4}$ to $\frac{1}{3}$ of the usual proportion, but may not amount to half the usual proportion. The picture obtained with such a toning bath appears quite different from that obtained with the normal bath. It has a varnished appearance, although no varnish has been used, and is very transparent, with powerful colour effect. Its production follows the usual lines.

The transparency of the coloured copper picture can be still

further increased, so that it cannot be distinguished from a pure dyestuff picture, by using more potassium ferricyanide than copper, the foregoing limits being observed.—Dr. Arthur Traube, 12, Rauchstrasse, Munich.

The following complete specifications are open to public inspection before acceptance :—

FINDERS.—No. 171,695. Finders for photographic apparatus. G. Arndt.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

CORADON.—No. 419,165. Chemical preparations for photographic purposes and photographic films. Farbenfabriken vorm. Friedr. Bayer & Co., Leverkusen, near Cologne-on-the-Rhine, Germany, manufacturers October 4, 1921.

FILMDEX.—No. 418,354. Philosophical instruments, scientific instruments and apparatus for teaching. André Louis Stouvenaut, Royston, Portsmouth Road, Thames Ditton, Surrey, cinematographer; and Hedley Frank Glover Smith, 6, Stanley Gardens, Cricklewood, London N.W.2, cinematographer September 6, 1921.

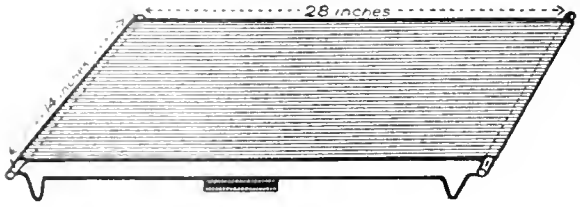
KATANOL.—No. 419,040. Chemical substances used in manufactures, photography or philosophical research and anti-corrosives. Farbenfabriken vorm. Friedr. Bayer & Co., Leverkusen, near Cologne-on-the-Rhine, Germany, manufacturers September 30, 1921.

M.S. (DEVICE.)—No. 419,470. Chemical substances used in manufactures, photography or philosophical research and anti-corrosives. Murphy & Son, Ltd., "The Cedars," Sheen Lane, Mortlake, London, S.W.14, technical chemists. October 12, 1921

New Apparatus.

ENSIGN PLATE GRIPS.—Messrs. Houghtons, Ltd., 88/89 High Holborn, London, W.C.1, have just introduced a wire holder or grip for negatives, which allows of the negative being hung from a line, or any narrow rod, when drying or being washed. The drawing clearly shows the form of this little accessory, which is an exceedingly good and practical device. The spring grip is made of stout galvanised wire, provided with a rubber covering at the two places (shown black in the drawing) where it comes in contact with the opposite edges of the negative. The spring of the wire, in conjunction with the friction of the rubber, thus gives a firm hold of the negative. There is a very great deal to be said for suspending negatives in this way when drying. When using the ordinary drying racks access of air to the gelatine surfaces is extremely restricted, whilst by standing negatives on a shelf to dry there is ample opportunity for dust to creep on to the emulsion film, and in any case the edge of the negative on which the latter rests is a very long time in becoming perfectly dry. Moreover, the clips allow of negatives being suspended in a vessel of water for washing, in which circumstances an ample current of water can be brought in contact with them. The grips are supplied in five sizes, at the following prices per packet of 12 :—3½ x 2½ inch 2s. 6d.; quarter-plate, 3s.; postcard, 3s 6d.; half-plate, 4s.; and whole-plate, 5s.

A COLLAPSIBLE DRYING FRAME.—Messrs. Houghtons send us a collapsible drying frame just placed upon the market by them for the convenience of amateur makers of prints. As shown in the diagram the frame consists of two pairs of stiff wire struts, each of which forms a side support for a length of muslin attached to a pair of wooden rollers. The two elements of each pair of supports are united by thrusting them into a short length of bent iron plate, seen midway in the diagram. When fully extended the area available for the laying down of prints is 28 x 14 inches, whilst, when folded, the device packs loosely into an envelope measuring 15 x 4 inches.



New Materials.

PRINT-FINISHING PENCILS.—Messrs. Jonathan Fallowfield send us a set of pencils, specially prepared for retouching of matt or satin surface prints in black, brown, grey or sepia. The pencils provide a ready means of spotting and touching prints of a considerable range of colours; in fact, among the four colours of lead which are provided it will be found that any print which is produced in the ordinary way can be satisfactorily matched. The pencils are supplied at the retail price of 6d. each, or 5s. 6d. per dozen.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

SUNDAY, DECEMBER 11.

United Stereoscopic Society. "A Loon in London." W. L. F. Wastell.

MONDAY, DECEMBER 12.

Bradford Photographic Society. Demonstrations by Members.
City of London and Cripplegate P.S. Invitation Evening. "Ely Cathedral." H. W. Fincham.
Dewsbury P.S. "Lantern Slide Making." H. Potter.
Kidderminster and Dist. P.S. "How a Reflex Camera is Made." Messrs. Butcher.
Leeds Camera Club. "Poetry and Nature." S. Greenwood.
Southampton Camera Club. "Through the Grecian Archipelago." W. Butcher and Sons.
Wallasey Amateur Phot. Soc. One-Man Exhibition. C. Mackford Hamilton.
Walthamstow and Dist. P.S. "Simple Rules of Pictorial Composition." S. Bridgen.

TUESDAY, DECEMBER 13.

Royal Phot. Soc. "Potassium Persulphate as a Reducer," Dr. G. I. Higson; "Action of Soluble Iodides and Cyanides on the Photographic Emulsion," Dr. S. E. Sheppard; "An Improvement in the Goldberg Wedge," F. C. Toy.
Belfast C.P.A. Camera Club. "By the Bonnie Banks o' Loch Lomond." D. J. Hogg.
Birmingham P.S. "Bromoil." W. Bell (Criterion, Ltd.).
Cambridge Photographic Club. "Protective Resemblance of some British Lepidoptera." C. B. Coulson. "Flower Photography." L. J. Jarman "A Visit to a Coal Mine." W. Tams.
Dewsbury Amateur Phot. Assoc. Whist Drive.
Exeter C.C. "Stereoscopic Photography." T. W. W. Melhuish.
Hackney P.S. "Devon, Glorious Devon." F. G. Emler.
Leeds P.S. "Historic Homes of Yorkshire." G. Hepworth.
Manchester A.P.S. "Photographic Arithmetic." F. Fielding.
Morley P.S. "Lantern Slide Making." R. Spence.
Nelson P.S. "A Holiday in Ireland." P. Crabtree.
South Shields P.S. "The Mediæval Craftsmen." Wm. Maitland.
Stalybridge Phot. Soc. "How a Reflex Camera is Made." W. Butcher and Sons.

WEDNESDAY, DECEMBER 14.

Accrington Camera Club. Surplus Sale.
Borough Polytechnic P.S. "Norman Architecture." F. E. Lyne.
Catford Camera Club. Members' Queries and Criticisms.
Croydon Camera Club. "Portraiture with a Portable Light." C. P. Crewther.
Dennistoun Amateur Phot. Assoc. "Finishing and Mounting the Prints." A. T. Edgeley.
Forest Hill and Sydenham P.S. "Printing." H. G. Fleck.
Halifax Scientific Soc. "Photo-micrography." O. S Barraclough.
Ilford Photographic Society. Annual Dinner.
Partick C.C. "A.P. and P." Prize Lantern Slides.
Photo-micrographic Society. "Some Observations on the Corethra Larva." S. C. Akehurst.
Rochdale Amateur Phot. Soc. "Tramps with a Camera through Western France." T. H. Greenall.
South Suburban P.S. "The Pyrenees." M. O. Dell.

THURSDAY, DECEMBER 15.

Camera Club, The. "The Action of Dyes in Colour Sensitizing and Desensitizing Dry Plates." F. F. Renwick.
Gateshead Camera Club. "Enlarging." R. Chalmers.
Hammersmith Hampshire House P.S. "Kew in Colour." W. E. Lambert.
North Middlesex Phot. Soc. "Picture Making in Northern Italy." G. H. Dannatt.
Wimbledon and Dist. C.C. "A.P. and P." Prize Slides.

FRIDAY DECEMBER 16.

Wombwell P.S. Y.P.U. Exhibition Prints

SATURDAY, DECEMBER 17.

Partick Camera Club. Whist Drive.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, December 6, the president, Dr. G. H. Rodman, in the chair.

Mr. Howard M. Edmunds delivered a lecture on a new mode of producing sculptures by means of photography. The opto-mathematical principles of the process which he had invented are by no means easy of explanation, even with the aid of blackboard diagrams and lantern illustrations. The patent specification published last week provides an outline of the method, which consists in projecting upon the face of the sitter a fine spiral pattern and photographing the sitter so illuminated under optical conditions such that the admission node of the camera lens is in the emergent nodal plane of the projection lens. In these circumstances a negative is obtained in which deformation of the spiral design is a measure of the degree of relief in the spatial object photographed. A print from the negative forms the means of controlling, through a visual manual adjustment, the operation of a fine high-speed drill working in the material to be carved. It is caused to rotate slowly, a microscope mounted vertically above it being constantly moved, so as to keep its cross-threads continuously upon the continuous spiral line. The microscope is mounted upon a mechanical system by which its movements are conveyed to a drill working to and fro perpendicularly to the material to be carved. Such, in very rough outline, is the process which Mr. Edmunds has developed with great mathematical and mechanical ingenuity. His description naturally evoked a great many questions, which were answered by Mr. Edmunds, to whom, on the proposition of the chairman, the hearty thanks of the meeting were accorded.

LANCASHIRE SOCIETY OF MASTER PHOTOGRAPHERS.

The first ordinary meeting of the committee appointed under the reorganisation scheme was held at the Society's office, 39, Blackfriars Street, Manchester, on Wednesday, November 30. There was a large attendance of members, and the meeting was presided over by Mr. Arthur Winter, the president, who was congratulated by those present on his recent wedding.

The hon. treasurer submitted his statement, and in doing so informed the committee that a large number of members had not taken the trouble to reply to his communications. After a very lengthy discussion on this point, it was unanimously decided that the president be asked to send a final letter to these members, pointing out to them the expense incurred by the numerous applications for the payment of subscriptions, and asking that they should definitely state if it was their intention to remain members of the Society or not. In the event of no reply being received to the president's letter, the secretary was instructed to write and ask for the return of the certificate of membership.

A lengthy discussion then took place on the programme for next year, and it was decided to hold a general meeting in Manchester early in January, and to arrange for a practical demonstration to be held at one of the studios in the centre of the city, so as to demonstrate the advantages or otherwise of films as against plates. It is intended to make this demonstration a thoroughly practical one, and it is hoped that every member will take the advantage of attending.

Another demonstration of a practical nature will be held in March, and the secretary was instructed to get in communication with the Autotype Company, of London, and to ask them to arrange to give a demonstration of their "Carbro" process, and it was also suggested that a demonstration of aerograph work be also given

The secretary reported that there was a movement on foot to organise a trade exhibition and conference to be held at Blackpool during May next; it being suggested that the photographic and the cinematographic trades co-operate in this effort.

After some discussion the committee decided to give this project their whole-hearted support, and the secretary was instructed to make the arrangements for the annual meeting of the Society to be held during the week of the exhibition and conference, and the committee was asked by the president to endeavour to arrange for some practical demonstration to be given during that week.

Before separating, an opinion was expressed that this was one of the most successful meetings that had been held since the incorporation of the Society, and it was felt that during the coming year the paying members of the Society would take a greater interest in the work of the Society and attend the meetings more regularly.

Commercial & Legal Intelligence.

LEGAL NOTICES.—Notice of intended dividend is given in the case of Archibald Rouse, picture frame maker and dealer, residing at 21, Kingston Road, Freemantle, Southampton, and carrying on business at 5, Queen Anne's Buildings, Canal Walk, Southampton, under the style of Godfrey and Company. Proofs must be lodged on or before December 14, with Frederick William Darley, Official Receiver, Midland Bank Chambers, High Street, Southampton.

NEW COMPANIES.

EDMUNDS CAMEOGRAPH CO., LTD.—This private company was registered on November 23 with a capital of £25,000 in 24,925 participating preference shares of £1 each and 1,500 ordinary shares of 1s. each. Objects: To adopt an agreement with H. M. Edmunds and to carry on the business of photo-sculptors, photographers, sculptors, engravers, printers, engineers, makers of lenses and cameras, manufacturers of and dealers in works of art of all kinds, etc. The subscribers (each with 250 ordinary shares) are: H. Edmunds, M.I.C.E., Moulsecombe Place, Brighton; J. G. S. Gibson, F.R.I.B.A., 5, Old Bond Street, W.1; H. M. Edmunds, A.M.I.C.E., Moulsecombe Place, Brighton; J. D. Forsyth, 51, Broadhurst Gardens, Hampstead, N.W.6, artist. The subscribers are to appoint the first directors. Secretary: E. J. Pilcher. Registered office: Parliament Mansions, Victoria, S.W.

NEWTON, ROBERTS & CO., LTD.—This private company was registered on November 24 with a capital of £2,000 in £1 shares. Objects: To acquire the business carried on at 40, Great Pulteney Street, W., as "C. E. Newton," to adopt an agreement with J. A. Watts, C. E. Thirkettle and Mabel Watts, and to carry on the business of manufacturing photographic apparatus and chemical, optical, scientific instruments, etc. The subscribers (each with one share) are: A. Rothery, 12, Montana Road, Tooting Bec, S.W.17, accountant; J. A. Watts, 51, Downhills Park Road, Philip Lane, Tottenham, camera maker; W. G. Roberts, 5, Nelson Terrace, N.1, instrument maker. The directors are to be appointed by the subscribers. Qualification (except first directors), £100.

GLASGOW AND WEST OF SCOTLAND SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.—At the next meeting of the Society, to be held on December 13, in the Glasgow School of Art, a lecture on psychology in the studio will be given by Mr. C. P. Crowther.

News and Notes.

ROYAL PHOTOGRAPHIC SOCIETY.—At the meeting arranged by the Scientific and Technical Group for Tuesday next, December 13, Mr. G. I. Higson will read a paper on potassium persulphate as a reducer, and Mr. F. C. Toy will describe an improvement in the Goldberg wedge. A paper by Dr. S. E. Sheppard on the action of halides and cyanides on the photographic emulsion will also be read.

SECONDHAND REFLEX CAMERAS.—The City Sale and Exchange, 93½, Fleet Street, London, E.C.4, send us a special clearance list of over 200 reflex and folding focal plane cameras, which are being offered from this depôt of the firm. The list includes cameras of almost all makes and sizes, and contains particulars of many reflexes of that most advisable size for the amateur, namely, 3½ x 2½ ins. A copy of the list is obtainable free on application.

POSTCARD PRINTING.—The London & Provincial Photographic Service, of 18, London Road, Leicester, send us some samples of their work in black and sepia matt and semi-matt cards, which are altogether excellent. The firm are making a specialty of only first-class work, at the lowest prices, as set out therewith, and from a specimen of the order form which is sent to us evidently carries on its business in a well organised manner. No extra charges are made for vignetting, toning or half-tone orders.

THE ABDULLA ALMANACK for 1922 is just being issued by the well-known cigarette firm, of 173, New Bond Street, London, W.1, to the number of 10,000 copies, at the price of 1s. 6d. The gross receipts are being devoted to the British Red Cross Society, Messrs. Abdulla bearing the expenses of production. The Almanack is of attractive design for wall use, and consists of reproductions in colour of works by well-known artists, representing aspects of national life in the different countries of the world. These have been drawn specially for the publication.

ECLIPSE PHOTOGRAPHS TO PROVE EINSTEIN'S THEORY.—The photographs to be taken in Australia during the eclipse of the sun next September are expected to put the much-talked-of Einstein's Relativity theory to the supreme test, and astronomers of South Australia have sent British scientists an invitation to journey out to the colony to observe the total eclipse. It is pointed out that if the stars close to the sun appear in a different position during an eclipse than when the sun has moved away from their neighbourhood, and if the displacement is of the magnitude predicted by Einstein, his theory will emerge triumphant.

KODAK SHOWCARDS for the Christmas season have been produced for the use of dealers in most attractive styles. They are three in number, all fine examples of colour printing. One by Lawson Wood is a fantastic version of Father Christmas putting a Kodak into a super-stocking hung by the fireside. The title of another, "Daddy, how did you know," delightfully emphasises the choice of a camera as a Christmas gift. In the third the Kodak girl, still summer clad, is taking a snapshot of a skating party at Mürren or Grindelwald, elevation apparently 15,000 ft. But all are most effective as posters, and will be welcomed by dealers in the Kodak manufactures throughout the country.

CROYDON CAMERA CLUB.—The annual dinner of the club was held at the Greyhound Hotel, High Street, Croydon, on November 30 last, Mr. J. Keane, president of the club, in the chair. Croydon is nothing if not hospitable, and a number of guests had accepted the club's invitation, among them Dr. H. Rodman, and Messrs. J. C. Weston, Arthur C. Brookes, F. C. Tuney, W. L. F. Wastell, and George E. Brown. In a vein of dry humour, the president proposed the only toast of the evening—the guests of the Club, to which Dr. Rodman and Mr. Brown replied. A most enjoyable evening followed, to which Mr. Tuney, Mr. Harpur, and Mr. Ackroyd contributed songs, and Mr. Wastell anecdotes. Dr. Knott and his daughter, Mrs. Carpenter, gave an extraordinary demonstration of thought-reading, and Mr. C. Keeler repeated, with variations, his performance of last year, in which, as Father Christmas, he distributed to many members presents appropriate to their personal failings or grievances. The proceedings of a happy company lasted until a late hour, having been enlivened by a stream of informal and spasmodic fun in accordance with the best and most sacred traditions of the Club.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

FOREIGN PHOTOGRAPHIC LENSES.

To the Editors.

Gentlemen.—My experience has been all against the foreign article. I had a Goerz lens which could not be used without a long lens hood, however poor the light.

Another German lens, with an aperture marked *f*/6.5, worked at *f*/9.

I recently purchased a soft-focus lens from America. The lens was praised sky-high in the firm's catalogue. Beautiful reproductions of photographs taken with the lens were given, and an actual reproduction of the lens, showing it as a beautifully finished doublet. When the lens arrived (24 dollars for 6¾-in. focus) it was a single lens in a badly finished mount.

When I pointed out the difference between the illustration of the lens in their catalogue and the actual article, they simply said that the illustration was an optical delusion.

No more Yankee or Boche goods for me.—Yours faithfully,

"KEATINGS."

To the Editors

Gentlemen.—The correspondence on this subject only serves to demonstrate, in my opinion, the complete dependence of most of us who use lenses upon what the makers may feel inclined to tell us about them; or, should we desire confirmation of such statements we have no option but to send the lenses to the National Physical Laboratory, and to pay a fee for information which may not convey a great deal to us when translated into terms of practical commercial photography.

My object in writing this is by no means to cast any insinuation against any manufacturer, for I am convinced that modern lenses are much more wonderful tools than most photographers imagine, but to suggest that there is great need among us for instruction or information regarding lenses which goes beyond the elementary details of relative aperture, depth-of-focus tables, and so on, but stops short of the "scientific" or theoretical side which interests the lens-maker but not the user.

It must be as obvious that a photographer has as little need (as he has as little time) to study optics for the purpose of understanding his lenses as he has need or time for learning chemistry and emulsion-making in order to know how to use various kinds of plates to the best advantage in the hundred-and-one problems that fall to the lot of the commercial operator. The qualities of our lenses in solving these problems one can really only learn by trial and error, and one gets to prize a certain lens because of a certain job that it did so well. One often notices that an operator, on setting up in business for himself, seeks a lens identical with the one that he has been used to for so many years, though probably there are plenty of others whose results would be indistinguishable or better. He mistrusts others because he has no ready means or knowledge for testing any other lens, and knows equally that the average photographer's test, that of making a couple of negatives with it under normal (that is to say favourable) conditions, is no indication of the qualities a lens may or may not possess for getting a result under difficulties.

The ordinary test which anyone can apply, that of photographing a sheet of newspaper at open aperture, does not by a very long way cover the information that one would desire, and one supposes that all tests made in factory or laboratory are refinements of this type of test. There are, however, so many occasions on which a lens is used *not* with its axis centrally perpendicular to the plate. In fact, it would be hardly an exaggeration to say that the vast majority of exposures made by the professional do not comply with that condition, and frequently one employs purposely a lens in ways which a lens manufacturer would probably

be horrified at. For instance, I very often use a certain whole-plate lens with the back of the camera vertical and the lens not only two inches or more below the centre, but also swung downwards and sideways. Needless to say, the stop employed is a very small one, but the part of the image in which particularly good definition and great depth of focus are required lies somewhere in the margin of a 15-in. circle. A half-plate lens by the same maker becomes, when slightly stopped down, a better wide-angle than some specially made for the purpose, but has the peculiarity, when employed for enlarging, or for lantern-slide reductions, of requiring the most accurate focussing and shows considerable want of definition when the front is swung so slightly that with other lenses the difference is scarcely noticeable. I have to produce acute sharpness of detail, and so may be hypercritical in criticising the performance of various lenses.

At the same time such exacting requirements make one appreciate what a good instrument really will do in extraordinary circumstances, and with one exception the lenses that I have most satisfaction from are of British manufacture. My point is that I have no knowledge of why these various lenses behave in unexpected ways when problems arise. Manufacturers, as a rule, are not very communicative. For instance, one firm issues a lens of which the smallest aperture is *f*/22. They state as a reason that this lens works at its best at that aperture, but as one often has need to stop down even beyond *f*/70 (at which stop another authority states that definition is worsened) one is left in bewilderment as to what will happen if one uses a lens of the same series by the same maker which is actually graduated to *f*/64.—Yours faithfully,

D. Charles.

45, Beaufort Road,
Kingston-on-Thames,
December 3

INVENTIONS IN COLOUR PHOTOGRAPHY.

To the Editors.

Gentlemen,—I have read with interest Mr F. E. Ives' observations on the work of all and sundry who have laboured in the realm of colour photography.

Since my student days in Philadelphia I have read much which has been published by my eminent fellow townsmen.

I have also had the privilege of from time to time examining some of Mr. Ives' colour photographs.

But were Mr. Ives' most ardent admirer to devote the necessary time to examine all he has invented, patented and claimed, I fear there would be little or no time left from Nature's average allowance to permit of original research or the creation of methods to which Mr. Ives might not lay claim. Speaking for myself only and with due diffidence, I am not prepared to acknowledge so liberal a measure of sole proprietorship in colour photographic processes as Mr. Ives is prone to assume.

Mr. Ives' reflector-filter, of which I have heard but which I have never seen, may, or may not, have been the first suggested. This does not seem to me to matter. I do venture to assert, however, that the combination of a reflector-filter, constructed to a carefully computed curvature (for which computation I expressed my obligation to Prof. A. E. Conrady by joining him with myself in the patent) with devices for keeping such curvature constant, and for moving plates which are to be exposed at right angles to each other, so as to assure their always being in the same focal plane, was the first really accurate means of securing simultaneously exposed tri-colour selection negatives. It is obvious that, lacking any of these elements, there would be little of value in the others.

This was the Polychromide camera, patent No 28,722 (1912), applied for in 1911 and granted me in the U.S.A. Great Britain, Germany, France, Switzerland, Belgium, etc., etc.

I still have the temerity to believe that this camera remains the simplest and most efficient one-lens one-filter device which has been constructed, and that until its advent negatives in perfect register were not obtainable. I say this in the face of a deluge of patents and claims to priority by Mr. F. E. Ives. Its recent adaptation to cinematography (with success) has, I fear, been the cause of its seeming neglect by its still fond parent. The recent completion of a quite simple method of making paper prints from Polychromide negatives (where again I fear I am under no obligation to Mr. Ives) will, I anticipate, be the means of its early being given a dusting in anticipation of early commercial exploitation.

In closing my remarks, may I "start something" by observing that it has often occurred to me that we have all been losing something while we have been wasting much valuable time in what seems (to me) to be utterly futile dependence upon so-called panchromatic emulsions? At the risks of exposing my devoted head to the storm, I venture to prophesy that the road to success in colour photography will before long be found to lie in the direction of differentiated sensitisation of plates or films which are to be used for colour separation. The resultant elimination of filters and screens, with the consequent gain in speed and accuracy of selection, will ultimately consign all special cameras to the scrap heap or the museum. It is also more than probable that methods of making colour prints and transparencies will be considerably revised when the numerous and more or less uncertain dyeing, toning and colouring processes in general use are brought a little closer to those used on Nature's own palette. I predict that this will be found more simple than heretofore supposed, but I am becoming indiscreet! For I, too, have contracted the patent habit —Faithfully yours,

Aron Hamaurger.

51, Warwick Street,
Regent Street, W.1.
December 2

CONTRASTY TRANSFER BROMIDE PAPER FOR COPYING.

To the Editors.

Gentlemen,—In reference to the short article, "Multiple Negatives for Photo-Lithography," by Mr. W. T. Wilkinson, in your issue of December 2, p. 716, we should like to draw attention to the fact that we supply a special contrasty Transferotype paper which, when used according to the special procedure which we recommend, is a much more suitable material for copying work than the ordinary and more rapid Transferotype paper. We have nothing to say against the usefulness of the ordinary paper in the making of copy negatives of natural full-tone subjects, but for work in which the utmost degree of contrast is required, as in process work, the ordinary paper is by no means an efficient substitute for the wet collodion plate.

On the other hand, we claim that by means of our paper, which is solely made by the Kodak Co. for us, we can obtain beautifully crisp images, and we should be very pleased to show you, or anyone who cares to call on us, the very fine results made in this way, or shall be very pleased to send anyone our special printed instructions. The process is so simple that anyone doing this work is assured of success. The process is particularly applicable to the making of negatives for copies of fine line originals, or, in fact, for any work where a wet plate negative would be used.—Yours faithfully,

per pro Pictorial Machinery Ltd.,
Frederic T. Corkett,
Managing Director.

7, Farringdon Road, London, E.C.1,
December 5.

[We note in the working instructions referred to by Mr. Corkett for the use of the paper which is supplied as "Pictograph" that the paper is supplied in eight sizes, from 4½ x 3⅛ inches to 59 x 39 inches, the papers being cut somewhat smaller than the regular sizes of negatives in order to allow for cleaned-off negatives to be used as supports after transfer, the paper stretching very slightly when wetted.—Eds., "B.J."]

Take a number of sheets of glass corresponding with the negative required and coat same with a substratum of:—Hot water, 100 ozs.; gelatine (Nelson's), 4 ozs.; chrome alum, 100 grains.

In adding the chrome alum it is advisable to dissolve the latter in part of the hot water and to add this hot solution to the hot gelatine solution drop by drop, with constant stirring.

Set glasses up to dry, or the plates can be dried at once over a gas ring.

A good method is to coat over night a quantity of the glass, thus having next day a supply ready for immediate use. The object of this substratum is the holding of the sensitive film to its glass support.

Take some of the sensitive paper and immerse for a few minutes in a tray of cold water, then squeegee on to the substratumed sheets of glass.

The paper so treated can then be exposed in the camera either while it is wet, or it can be allowed to dry and exposure then made. The exposure is made through the glass, and consequently the back of glass should be clean. A reversed negative can be thus made direct.

If the exposure has been made while the paper is in a moist state, it is preferable to allow the paper on the plate to dry before development. When dry, the paper on its glass support is placed in hot water rather hotter than the hand can bear (150 deg.). After a few minutes in this hot water bath, the paper will be found to strip off easily, thus leaving the sensitive exposed film upon the glass ready for development. Now place the plate in cold water, making sure the film is free from any of the medium used (the soluble adhesive solution whereby the emulsion had been temporarily affixed in its manufacture to the paper), when the plate is ready for development.

This can be done by any good formula, but developer as follows is found to give excellent results:—

(*a*) Hydroquinone	...	1 oz.
Potassium bromide	...	1 oz.
Potassium metabisulphite	...	1 oz.
Water	...	40 ozs.
(*b*) Caustic potash	...	2 ozs.
Water	...	40 ozs.

For use take equal parts (*a*) and (*b*).

Fix in a bath of hypo, 4 ozs.; water, 40 ozs.

After fixing, wash in running water for five minutes. A further bath for a few minutes in a solution of Pictograph hypo destroyer will ensure a negative free from all traces of the fixing bath.

If negative is in any way stained or fogged it can be much improved and rendered bright and clear by placing in Pictograph Clearing Solution. This excellent clearing solution will not do its best unless all trace of fixing solution has been removed from the negative.

Intensification, if necessary, by any of the usual methods known may be employed as preferred by the operator.

The above method of negative production provides a cheap and reliable means of making negatives for process workers. The negative produced is crisp, clean, and remarkably free from defects, and requires less spotting and after-attention than the average wet plate. As a reversed negative is obtained direct, good clear glass should be used. The substratum advised may be dispensed with; it is a precautionary measure, but is not a necessity.

THE 1922 CONGRESS OF THE PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

To the Editors.

Gentlemen,—At a meeting of the Congress Committee appointed by the P.P.A. Council it was decided to hold an independent Congress, and to celebrate the 21st year of the Association's foundation, in the month of September next, at the Princes Galleries, Piccadilly, W.

The galleries selected for the purpose are among the best and most convenient in London—very central and spacious—affording special facilities for a large display of professional photography. In addition to the "home" collection of pictures, it has been decided to invite exhibits from the most prominent professional photographers residing abroad, and it is hoped this departure will prove an attraction and education.

In the past the educational programme has been cramped for lack of accommodation, but as the Princes Galleries will be entirely under the control of the Council, it will be possible to arrange a more extended list of lectures and demonstrations.

The position and interior comfort of the Galleries afford exceptional opportunities for extending the social side of the Congress, and it is determined to take full advantage of it.

The reason the foregoing information has not been made public earlier, was because Mr. Brookes desired to make the first announcement, and our Council—in consideration of the many happy associations with him at the Royal Horticultural Hall—agreed.

Fuller particulars will be issued to members of the Association as soon as possible.—Yours faithfully,

LANG SIMS,
Secretary.

437, Brixton Road, S.W.9.
December 6

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

J. W.—You should write to the Registrar of Trade Names and Designs, 25, Southampton Buildings, Chancery Lane, London, W.C.2, for a circular of instructions in registering a trade mark or design.

T. S.—The copyright is yours. You should point out the fact to the proprietors of the paper which has now printed it, asking them what they propose to do in the matter. You should take this course in preference to naming any particular sum in respect to the infringement.

V. B.—Ordinary distemper or size colour is generally used for backgrounds. It is better to purchase one of the ready-made brands. The foreground may be distempered first and then given two thin coats of good white oil paint, this allows footmarks to be sponged off.

E. V.—Registration at Stationers' Hall was abolished when the present Copyright Act came into force in June, 1912. You can take action for infringement of your photograph, since the Act assumes that you are the owner of the copyright, unless the defendants can prove otherwise.

H. J.—Your trouble is probably due to allowing your sheets to become too dry before cutting. It is usual to keep the sheets in a hydraulic or powerful screw press for some hours, say overnight, then to cut two edges true, one sheet at a time, with an ordinary card cutter. They are then "knocked up" level and cut in the guillotine. This is the usual practice of the big postcard printers.

A. C.—We confess we are at a loss to account for the disappearance of the image in the acetic acid bath. We do not think its disappearance has been caused by the use of the sulphocyanide or the ammonia. We think there must be some original image there, even if invisible. This might be redeveloped with the Wellington silver intensifier, formula for which is given in the "Almanac."

S. A.—We have found the most generally useful installation to be six 1,000 c.p. half-watt lamps. You can, of course, use fewer lamps of higher candle-power, say, two 3,000, but the light is then not so well diffused. The lamps should go up to 8 ft. from floor for standing figures and groups, and should come down to about 5 ft. for children and sitting figures, as this greatly shortens the exposure.

K. W.—We do not know of any enamel now on the market that will fulfil your requirements, as our manufacturers almost invariably stove their work. There was, before the war, a German enamel which could be used cold, when it was very slow drying, or could be stoved in the ordinary way, but it is not now procurable. Possibly, if you wrote to Messrs. Mander Bros., varnish makers, 2-4, Noel Street, Soho, London, W.1., they could help you.

D. J.—Impossible to say what amount of bicarbonate solution is sufficient for, say, 50 self toning cards, since different brands of paper are liable to vary considerably as regards the amount of

bicarbonate which is required. As bicarbonate is so cheap and is used in such weak solution you should use plenty of it. There can be no possible reason that we can see for trying to economise in it. There is no need to wash in changes of water before inserting in the fixing bath.

W. L. G.—We do not think you can buy zinc with the required grained surface. At any rate, we have never heard of its being supplied. But any photo-engraver should be able to etch for you zinc in almost any required pattern, either by photographing a textured surface, or by laying down one or other of the numerous patterns of shading medium. We think if you applied to the photo-engraving firm which ordinarily makes your blocks they could give you what you require.

C. J.—Aluminium is not a suitable metal for developing dishes owing to its being strongly affected by alkalies. Since amidol is made up without an alkali it is the developer which is most suitable for aluminium, but even an amidol developer is slightly alkaline owing to the sulphite having a certain alkaline reaction. So far as we know there is no chemical action between aluminium and amidol, nevertheless it would not surprise us if the amidol developer caused staining and slight roughening of any aluminium dish in which it was kept for any length of time.

S. L.—(1) There is no objection to cream colour on the studio walls unless the sun is upon the glass during the day, when it would cause the negatives to be rather flat. If your ruby lamp is safe there is no reason why your dark-room walls should not be white. We have daily experience in a dark room which has very light grey walls, and although the most rapid plates are used there is no trace of fog. The dishes are not covered, nor is any unusual precaution taken. (2) We think it is quite necessary to use the makers' formulæ for papers giving special tones. We have not obtained as satisfactory results with "Kodura" and "Vitegas" when using amidol as with the special metol-hydroquinone recommended. If you want to keep to one developer metol-hydroquinone is the most convenient.

W. W.—(1) We have found that the minimum power necessary is 6,000 c.p., and this is best applied by having six 1,000 c.p. lamps. (2) The General Electric Co., Magnet House, Kingsway, London, W.C.2, who will give you an estimate. (3) Nothing except the G.E.C. booklet. (4) It is largely a matter of expediency. In an ordinary glass roof studio many prefer to put the lamps on the solid side of the roof, so as not to interfere with ordinary lighting, while others place them on the glass side to use in conjunction with poor daylight. The lamps should be placed about 8 ft. from the sitter's end of studio, and should go up to 8 ft. from the floor for full lengths, and come down to about 5 ft. for sitting figures and babies. They should be arranged in a slight curve so that two lamps serve as a side light.

C. J.—(1) Diamidophenol, which is the same thing as amidol, but different from paramidophenol, is usually sold in the form of hydrochloride, which is a combination of the "base" with hydrochloric acid. We expect that both of your samples are this hydrochloride. Very frequently, in fact as a rule, the hydrochloride is sold simply under the name of diamidophenol. (2) We are not able to identify the gas burner, which is evidently of French make, but we are pretty sure that it is not made for ordinary house gas, but for acetylene. It seems to be an arrangement for burning acetylene under a small mantle, although we have never heard of a burner of this type. If it is an acetylene fitment, Mr. R. J. Moss, of 98, Snow Hill, Birmingham, would no doubt be able to fit the necessary accessories. "Déposé" on the burner means registered. We have no means, however, of ascertaining the name of the registered firm from the number.

C. R. W.—So far as our experience goes photographers do nothing towards warming the water supply used for washing prints in cold weather. Certainly, as you say, the efficiency of the wash water is less when cold, though considering the large excess in which the water is used we do not think that that makes very much difference as regards removal of hypo, providing the prints or negatives have been thoroughly fixed. It makes a great deal of difference, however, in the comfort of handling plates or prints. It would be an easy matter to arrange for a small coil water heater to be connected with the water supply. For raising the temperature from about 40 to 60 the consumption of gas would be relatively small, and a sufficient flow of water could be obtained. Messrs. Fletcher Russell, of Warrington, make a number of patterns of water-heater suitable for this purpose, one of which, we see, is regularly listed by Messrs. Sinclair, of 54 Haymarket, S.W.1, as a valuable dark-room fitment, which is what it is

P. T.—Acetylene is very little used in portrait work, and we have not been able to find any installation in use. We are of opinion that it is quite suitable for the purpose, but are unable to say what candle-power would be necessary. Much would depend upon the length of exposure you can afford to give, but we should imagine that 500 c.p. would be the minimum. Replying to your inquiries:—(1) 7 litre burner, 14 c.p., consumption ¼ cubic foot of gas per hour. 14 litre burner, 30 c.p., consumption ½ cubic foot of gas per hour. 21 litre burner, 50 c.p., consumption ¾ cubic foot of gas per hour. (2) Yes, at equal visual candle-power. (3) A very rapid ortho plate, such a Marion's Iso Record. (4) If the burners are well distributed we do not think that a diffuser would be necessary. (5) It is impossible to compare acetylene with other lights, except on a basis of cost per exposure, and we have no data available to do this. So far as we can ascertain there is no lamp or arrangement of burners suitable for photography now on the market. We would, however, recommend you to apply to Messrs. Thorn and Hoddle, 151, Victoria Street, Westminster, London, S.W.1, or Mr. David Allan, 107, Mansfield Street, Kingsland, London, E.2, who have made such apparatus. (7) Milton is an efficient hypo eliminator; only a very weak solution is necessary, about one part in 100 parts of water.

W. S.—(1) Providing that the facts can be established beyond question respecting your having taken the photographs at your own cost and with your employer's permission, we think you are the owner of the copyright. If the case came into a County Court the judgment would rest purely on the evidence. Prima facie the copyright in photographs taken by you as an employee is the property of your employer, and therefore it would be necessary to be able to show quite clearly that you were taking them under special conditions. If the evidence was conflicting on the point, we think it is more likely than not that judgment would be given for the employer. (2) Your second query perplexes us by apparently contrary claims which it seems to imply. You have made an enlarged negative from one of those referred to under (1) and have sold it to your employer. Very good, that is certainly evidence that your employer admits your ownership of the copyright. This is the strongest piece of evidence you could bring in claiming copyright of the exposures mentioned under (1). Now you also say that you wish to claim the enlarged negative by paying for the cost of enlarging. We are quite at a loss to understand what you mean. We should have thought that as you had sold the enlarged negative to your employer you had also undertaken the costs of making it. If those costs were undertaken by your employer, we think you have no case whatever, either for copyright in the original subjects or for any right to purchase the enlarged negative. But the facts are not as clearly put as they might be, and perhaps we are misunderstanding the circumstances.

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THE BRITISH

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Contents.

SUMMARY.

Mr. H. O. Thompson describes the making and electrical wiring of a vertical enlarger which he has made at small cost and which has rendered valuable service. (P. 746.)

The conditions which apply to the choice and care of apparatus in a tropical climate are usefully instanced by some notes on his experience by a photographer in Java, who adds a description of his method of developing films under tropical conditions of temperature. (P. 744.)

In a contributed article Mr. D. Charles suggests a short educative series of tests in the making of development prints. (P. 743.)

Mr. A. Lockett contributes a note on simplified formulæ for the calculation of telephoto separation. (P. 747.)

The requirements as regards lighting and exposure which are determined by the colour of the subject are of importance in portraiture, and equally in the photography of commercial articles. (P. 742.)

Messrs. Loyd A. Jones and C. W. Gibbs, of the Eastman Research Laboratory, have described the method used in measuring the absorption of light by tinted or toned cinematograph picture films, and have brought together a large number of their results, showing the considerable increase of projection light which is required for normal brilliancy of such coloured pictures on the screen. (P. 747.)

At the Royal Photographic Society, on Tuesday evening last, Dr. G. I. Higson drew attention to the advantage of potass. persulphate over ammonium persulphate as a reducer. A paper by Dr. S. E. Sheppard dealt with the effect of iodides and cyanides on emulsions. Mr. F. C. Toy contributed a note on the adjustment of Goldberg wedges; and Mr. F. F. Renwick gave a demonstration of the properties of a new filter for ultra-violet light more effective than aesculine and without the drawbacks of impermanence and German origin of the latter. (P. 753.)

In a letter to the "Times" of Tuesday last Professor R. Melville Jones describes the experimental programme which is now being carried out in the Faculty of Aeronautics of Cambridge University for establishing the conditions under which sufficiently accurate maps may be prepared by aerial photography. (P. 750.)

Further information respecting the 1922 Congress of the Professional Photographers' Association is forthcoming to the extent that the venue will be Princes Gallery, Piccadilly, and that an exhibition of portraiture from foreign studios is to be arranged, in addition to that by professional photographers in this country. (P. 741.)

A Congress of northern photographers was mentioned at the annual dinner of the Edinburgh Society of Professional Photographers. (P. 754.)

A system of producing speaking cinema films and the design of a roll-film holder are among the patents of the week. (P. 751.)

Students of the perennial subject of depth of focus may be interested in being reminded of the various meanings attached to the term "hyper-focal distance" in writings on depth. (P. 742.)

The practical drawbacks, which are attached to the use of the incandescent acetylene light are briefly described in a paragraph on page 741.

EX CATHEDRA.

Acetylene Light. Last week we replied to a correspondent who sent to us what appeared to be a burner for acetylene to be used under an incandescent mantle and stated that we were unaware of burners of this type being in use. Messrs. R. J. Moss & Sons, the well-known acetylene firm of Snow Hill, Birmingham, very kindly send us some particulars bearing upon this matter. They tell us that mantles for acetylene incandescent burners are made by Messrs. George Bray, of Leeds, and by many Continental firms, and they confirm us in our opinion that very few such burners are in use. While, theoretically, a burner of this type gives more light for a given consumption of acetylene than the self-luminous flame, the colour of the light is not so good. But the chief objection to this form of acetylene light is the very great difficulty of keeping the minute air passages free and thus of burning the gas with a proper adjustment of air. Even with coal gas, which is burnt at the rate of from 3 to 5 feet per hour in an incandescent burner, care has to be exercised in providing proper adjustment of the air; the difficulty is greatly increased in the case of an acetylene atmospheric burner consuming from one-quarter to one cubic foot per hour. For these reasons incandescent acetylene as a light-source for projection and enlarging lanterns has not proved a satisfactory plan in practice. Although when in new and perfect working order a burner consuming one foot per hour will be nearly equal to two self-luminous burners consuming two feet per hour, very slight variations in pressure of the gas or in its degree of purification and drying so greatly upset the action of the burner as to render it useless.

* * *

The 1922 Congress. The letter from the secretary of the Professional Photographers' Association, which appeared on page 739 of our issue of last week, adds little to the information which had so far been made public respecting the arrangements for the Congress of next year, which will celebrate the coming of age of the Association. It does, however, tell us that the Congress is to be held at the Princes Galleries, Piccadilly, London, W., and that it is hoped to supplement the exhibition of portraiture by photographers in this country by exhibits from leading studios in other countries. We are cordially in agreement with the view that next year's Congress should assume a special character worthy of the completion of the twenty-one years of life of the P.P.A. We hope to be reassured by the further announcements which are to be made that this aim will be better realised in Piccadilly in September than at the Horticultural Hall in May. In our opinion the crux of the choice between these two times and places resides, not in physical facilities, but in entirely human considerations, chief among which is the question whether professional photographers in sufficient number will attend the Congress at the end

of the summer. We are inclined to think that the attractions in the displays of apparatus, etc., at the Fair rank at any rate equally with those of the Congress meetings in the estimation of the rank and file of members of the P.P.A.; and if that is so, it is at least questionable whether a September Congress has the same chances of special success which one in May would have in Vincent Square. From what we can hear exhibitors at the Fair (who, we are informed, have without exception rebooked their space) are satisfied that they will get the attendance of professional photographers, and we have no doubt that Mr. Arthur Brookes will provide other special features making the Fair specially attractive to portrait photographers.

* * *

Hyperfocal Distance. Photographic literature suffers from many examples of confusion of terms, but it is perhaps more unfortunate than in most other instances that the somewhat involved subject of depth of focus should include in its vocabulary a term, namely hyperfocal distance, which is used by various writers in three different senses. Most usually, perhaps, it is employed to denote the nearest distance of an object to the camera which is rendered without perceptible unsharpness when the lens is focussed on infinity. By others it is used to denote the distance of an object from the camera on which one should focus in order to obtain infinity without perceptible unsharpness. There would not be much objection to these two senses of the term, since the two distances are very nearly the same, differing from each other in fact only by one focal length of the lens, which, in most cases, can be entirely neglected. It is not the same, however, with the meaning which is attached to the hyperfocal distance by French writers on optics, notably Moessard. In French papers on the subject the term hyperfocal distance is employed to mean the distance of the nearest object which is obtained without perceptible unsharpness (according to the particular standard adopted for the disc of confusion), when objects at the extreme distance corresponding with infinity are rendered in like manner. A very simple geometrical construction shows that hyperfocal distance, according to this last definition, is one-half that according to either of the two former. These differences are, perhaps, the cause of some of the misunderstandings which habitually occur in discussions of depth of focus.

* * *

Self-Toning Papers. The paper read by Mr. P. R. Salmon at the South Suburban Photographic Society, which appeared in last week's "Journal," usefully drew attention to the very considerable variety which exists at the present time among commercial self-toning papers, not only as regards facilitating the production of certain colours in the prints, but also as regards contrast. From being in its early days the favourite paper of the amateur, a popularity which it has still retained, self-toning paper has come to be the stand-by of many professional portraitists, more especially those who work practically single-handed. It is, perhaps, the opinion among those who have not interested themselves particularly in self-toning papers that the latter are all much of a muchness in requiring a somewhat vigorous negative, that is to say, a negative of a kind which is not the best for gaslight printing or for the making of enlargements. It is therefore worth while to direct attention to the detailed notes contained in Mr. Salmon's paper, from which will be seen the opportunity which exists for choosing among self-toning papers those which are specially suitable to soft or to vigorous negatives in reference to the degree of contrast which is desired in the prints. Doubt upon this point has very likely deterred individual portrait photographers from making greater use of the self-toning type of paper. So far as surface, texture and colour of the paper base are concerned it is surely not necessary to point out that makers have provided between them all the variety which is ordinarily called for.

THE INFLUENCE OF THE SUBJECT UPON LIGHTING AND EXPOSURE.

The variations in treatment which are rendered necessary by differences in the colour and surface of various subjects, including the human sitter, do not always receive at the hands of the photographer the attention which is due to them, and therefore the results, although perhaps passable, are by no means as good as they might be.

Technical or commercial photographers do not usually err in this respect, but the average studio worker is rather apt to go on with his subjects as if they were as much alike as is a row of pins, and to attribute his poor negatives to some wickedness inherent in them rather than to his own ignorance.

Let us take a familiar example, a wedding cake. How often do we find full detail in the high-lights as well as the shadows, and the texture of the surface correctly rendered throughout? Very rarely indeed. To go to the other end of the scale, the same may be said of a dark bronze figure or a carved ebony panel. Assuming that in each case the plate is capable of taking care of the colour rendering, it has been found by actual experiment that the bronze statue will require thirty times as much exposure as the wedding cake, plate speed and lens aperture and lighting being, of course, identical.

In practice it is, however, undesirable to use the same kind of lighting for such widely dissimilar subjects, for the glaring white cake requires a very subdued illumination, while the bronze will stand any amount of light, even the direct rays of the sun not being too much for some antique specimens. In either case it is important that the exposure should be sufficient to give full detail with a reasonably short time of development.

The colour of the subject, apart from its whiteness or blackness, as exemplified in these two instances, has a very important bearing upon exposure, not only when the colour is pronounced, but when it exists in such delicate shades as are hardly perceptible to the eye. If when copying a series of engravings mostly upon white paper one printed upon a slightly yellowish india tint is encountered, it will be found necessary to give three or four times the exposure necessary for the others, if it is to have the same degree of contrast.

In the case of subjects which show extremes of light and shade, such as machinery with polished steel for lights and dark green or brown for shadows, sufficient exposure must be given to secure detail in the latter. If the plate be backed and a diluted but unrestrained developer be used, it will be found that a fairly accurate representation of the subject as it appears to the eye will be obtained. It must never be forgotten that density accrues in the high-lights much quicker than detail appears in the shadows, and that the loss of detail in the former more than compensates for any gain in the latter. In passing, it may be noted that very rapid plates are not as a rule suitable for subjects with strong contrasts, their scale of tones being shorter than that of slower ones.

We have so far dealt only with inanimate models, as our points can best be illustrated by such, but the same idea holds good in ordinary studio portraiture. Although

such extremes of white and black rarely occur, there is enough variety in the complexions and dresses of sitters to call for some modification of lighting and exposure. Taking the question of complexion first, it is obvious that a pale-faced woman with undistinguished features and, if we may say so, a generally washed-out appearance demands a lighting which, while subdued in the high-lights, provides sufficiently strong shadows to give a proper idea of relief, while a rubicund soldier whose palest flesh tint is a deep yellow will stand a strong illumination and free use of the reflector. Although, perhaps, foreign to our subject, it is not out of place to advocate the use of colour-sensitive plates for all portrait work, there being no circumstances in which they are inferior to the ordinary variety, while in many cases they give perceptibly better results without a light-filter. With difficult sitters, such as those having blue eyes and golden hair, the improvement resultant upon the use of an orthochromatic plate with a pale yellow filter is so marked, that once seen it will not be forgotten.

Although it is just now a fashion to ignore clothing and draperies in portraiture and to present the face in a sombre surrounding, it is sometimes required to give full details of these, and it may again be fashionable to do so. Sometimes a difficult problem such as a pale lady in a black velvet dress, will present itself. Here a full exposure is necessary if the result is not to be hard. If only sufficient exposure be given for the proper rendering of the face, there is a great temptation to over-develop in trying to get some detail into the velvet, but with a fuller exposure this detail can be attained before the shadows in the face are lost. The face may be a little lacking in contrast, but at least it will have the texture of flesh and not that of a plaster image. With such a subject a small head screen may be used with advantage, placing it so that the light is softened upon the face only and allowed to play in full strength upon the dark clothing.

The old slogan "Get it in the negative" is the soundest piece of advice which can be given. Matt-varnishing, dodging in printing and such devices falsify the scale of tones in the original subject and are apparent to the artistic eye. Correct exposure, careful lighting and judicious development, joined, of course, to artistic posing are the main factors in successful portraiture. It may be necessary to define judicious development, and in the fewest words this may be done by saying "Avoid forcing." No negative was ever improved by trying to get out reluctant detail, and thousands have been ruined by it.

FOR AN ODD HALF-HOUR IN THE PRINTING-ROOM

This is going to be a different sort of article to any I have ever read or written, so it may be new, both in *modo* and in *re*, to others also. The novelty will consist in my asking those who feel inclined to perform certain simple and possibly apparently uninteresting acts, and even to spend a small amount of money in doing so, without my stating the benefit or results that I suggest will ensue. The reason for adopting what may seem at first sight to be an unreasonable attitude is that the benefits cannot fully be obtained by merely reading about them.

First of all I will give a list of the articles required for these experiments. They comprise principally merely part of the ordinary equipment of the printing-room. A big, deep dish of acid-hypo and a whole-plate dish with about a pint of developer; a lamp that really is safe for bromide paper, and the printing-box or machine that is in regular use will obviously be required for a little while, and, in addition to these, I recommend very strongly the acquisition of one of those small plates of graduated densities sold as plate testers or as actinometers for carbon-printing; one with not less than twenty gradations should be chosen. It is possible for the expert photographer to make one for himself, but it is much cheaper in the end to buy one. In addition to this graduated plate, I will ask the experimenter to make a larger and simpler one of four gradations only with overlapping sheets of translucent paper. The bands of gradation might be an inch wide each, and the whole thing may conveniently be pasted by its edges on to the lid or bottom of an empty plate-box which has a fairly large aperture cut in both.

The materials for the tests will comprise a few pieces of printing-paper such as are in regular use, either bromide, gaslight, or one of the crosses between these which are finding great favour nowadays. It will be all the better if several kinds are available, and if a couple of pieces of a slow paper as large as the glass top of the printing-box (or at least the size of the largest negative printed on it) can be spared it will add greatly to the value of the tests. If bromide-paper only is used the effect of the slow paper can perhaps be got by temporarily changing the lamp used for printing with a carbon-filament of low candle-power.

Having arranged these few matters the first thing I will ask the reader to do is to develop a few tiny strips of paper previously exposed on the printing box so as to find the exposure that will produce, on full normal development, a fairly strong grey, but not a black. Having determined this, it is possible to expose one of the large size sheets of the slow paper, and it is very likely that only one will be required. After exposing this sheet, it is to be developed in a bath rather weaker than normal, say half-strength, and while in the bath it is necessary to keep the sheet moving continuously. As soon as the sheet has developed to a fairly strong tint it is washed free of developer under a fairly strong jet of water from the tap, and on immersing it in the hypo it is kept moving from the moment it touches the fixing-bath for, say, fifteen seconds or so. After a further short fixing the sheet may be turned up and examined.

Even from this very simple effort something should be learned. If the tint is beautifully even all over one can be sure, at any rate, that certain troubles must not be attributed to either the paper or the printing-box, but if the contrary is the case it should not be difficult to decide whether one will at last make an effort to give the inside of the printing-box a new coat of white paint and fit it with a sheet of ground-glass an inch or so below the negative, or whether a change of paper is desirable. If any doubt exists as to the cause of any phenomenon which may present itself a second sheet treated exactly like the first will decide the point. If the peculiarities in the two results are identical, obviously they are due to some feature of the apparatus. If not, they must be due to faulty paper.

The next experiment I suggest is to take the plate-box which was cut out and fitted with layers of tissue paper, and lay it upon the printing-box—tissue side downwards. If a piece of printing-paper is then laid upon the box and exposed, it should show a range of tints on development from light to dark, but more or less diffused by reason of the distance between the sensitive surface and the tissue papers. After having exposed and developed one or two pieces to get the hang of the idea, I will ask that a few pieces be treated as follows:—One sheet, on being taken out of the developer, is just dipped in water, dropped into the hypo, and left there. The

second is to be rinsed under the tap in passing from developer to fixing-bath, and the third well washed by a stronger flow of water directed along its surface for more efficient removal of the developer. The two latter are to be well moved on immersion in the hypo. Anything that may be learned from this test will be much more marked in the case of the slow papers, and the same applies to the following one. For this, either the tint negative of tissue paper may be used, as in the previous experiment, or a negative in which there is some area of delicate thin gradation, such as a male sitter in dark clothing, or a negative which has been vignetted in the camera.

The experiment consists in giving two sheets identical exposures but developing them separately, one being kept moving continuously hroughout development and the other being allowed to lie still in the developer till dark enough. Comparison of the two usually will arouse surprise, and it may be remembered in this connection that when more than three or four prints are developed simultaneously in a dish together they are still for a great proportion of the time period of development. It may be added that prints that are fully or slightly over-exposed (as I believe the great majority of bromide prints are) will show a greater difference under this test than correctly exposed prints which are allowed to develop right out.

The last experiment of all is to expose a few bits of paper under the plate of numbered densities, and to develop them right out. Naturally some papers and some exposures will reach a higher number than others, but usually the tints at the lower and thinner end of the plate will produce a certain number of black areas showing no difference. The gradation of any particular paper will start, of course, from the lowest tint that shows a difference in depth from the one before it, and the number of tints from that to the highest which can be just seen against the white paper is a measure of the gradation. A more rapid paper, therefore, which a similar exposure gives a higher number, will not necessarily have a longer gradation, but if it has the fact is easily recognised. Having done this, it is not a difficult matter to compare the highest and lowest densities of the current negatives with the numbered densities of the test plate and so determine whether or not they show a greater difference than those extremes which it has just been found the paper used will register. On the other hand, it may be found that the negatives exhibit a still shorter range of tints. In either case it follows that the negatives are not calculated to make the best possible prints on that particular paper, and either they should be developed differently, or another brand of paper should be selected. Persons are not unknown who are very keen on paper prices, and who persistently ascribe lack of quality in prints to obstinate carelessness on the part of the printer. An occasional half-hour spent in such practical little experiments as those I have described will do more to settle disputes between operator and printer than hours of argument. It is also a good plan to make such tests before sending complaints to a paper manufacturer. When the reader has carried out the simple operations outlined above once or twice he will appreciate that the results will be far more convincing in the case of a dispute than any number of faulty prints. If they are too much trouble for him to perform then I can only retort that to describe why they will be so convincing is too much trouble for me.

D. CHARLES.

PHOTOGRAPHIC EXPERIENCES IN JAVA.

THE information contained in this article is prepared from an unsolicited communication sent to Messrs. James A. Sinclair and Co., Ltd., Haymarket, London, by a customer of theirs, Captain C. S. Blunt, of Batavia, Java, who is an enthusiastic and serious amateur photographer, and writes of his experience in the use of apparatus and the practice of photography in the hot and moist climate of Java. We owe to the courtesy of Messrs. Sinclair the opportunity of putting Captain Blunt's information before our readers.

The Dutch Island of Java, like other places in the East, presents many attractive subjects for the traveller with a camera. With a population, including the island of Madura, of 35,000,000, chiefly native, there are numerous subjects representing native customs and industry, relics of the old religions of the East, all side by side with the modern prosperity which has followed in the wake of the Dutch colonists. Although Java obtains the strong light of the Tropics, at the higher mountain levels the light is often bad, owing to the mist in which hill tops and mountains are generally enveloped. For this reason the user of a camera on a tripod is very frequently better equipped than the less serious worker with a hand camera.

Captain Blunt states that the islands form a fine market for cameras, but one which, unfortunately, is left almost completely in the hands of the Germans. The latter are leaving nothing undone to regain and extend their trade. If a German camera goes wrong, the agent is on the spot to remedy matters or, if need be, to supply a new one. Captain Blunt's report is that British firms are complaining of no business, whilst the German firms are growing fat on their profits. Nevertheless, the preference for British goods exists, but is stultified by the want of accommodation on the part of London firms in comparison with the thoroughness with which the German studies the market. Such is the opinion formed by Captain Blunt from his observations.

Choice of Apparatus.

In choosing a camera for use in a climate such as Java—and the conditions there may be said to prevail more or less throughout the East—the first piece of advice is that, for good results, it should be one with which focussing can be done; that is to say, should be usable on a tripod, when so required. From the point of view of the photographer who takes his hobby seriously and wishes to obtain really good results, the best camera is a quarter-plate "Una," or something like it; that is to say, one which can be used efficiently on a stand and also in the hand. It is also recommended that the outfit should include an extra small camera, such as an N. and G. vest-pocket for roll film.

If a reflex camera is to be chosen, the extremely short exposures given or claimed by makers of most reflexes can be put aside as useless. The exposures that are needed are half-seconds, not of the order of thousandths of a second. Captain Blunt works usually at one-eighth, one-sixteenth, or one-twenty-fourth of a second, very seldom, if ever, at one-fiftieth or one-hundredth, and is of the opinion that the only reflex meeting all the requirements in a country like Java is the Sinclair "N.S.," having a between-lens instead of a focal-plane shutter. A reflex camera should be fitted with an $f/4.5$ lens for facility of focussing under the bad conditions of light which often prevail.

As regards the lens and shutter for the ordinary type of camera, the best selection is a first-rate objective of $f/6.3$ or $f/6.8$ aperture, such as Ross or Cooke. The shutter is preferably of the between-lens type giving accurate slow speeds from 1 second to one-hundredth. Owing to the bad light which is often available, it is more than ordinarily necessary to have a shutter, the speed of which can be depended on, in order that exposure worked out by a meter or otherwise can be accurately given.

In giving the above advice Captain Blunt is taking the

oint of view of the quite serious photographer. Those who ust have a more portable equipment which they can sling er their shoulder or put in their pocket cannot do better an a quarter-plate camera of the Kodak type, but it should e one fitted with a plate adapter in order that focussing ay be done in the case of near subjects, figure studies, etc.

Care of Apparatus.

There is a great deal of exaggeration about the damage hich a camera quickly sustains in a moist, warm climate ke that of Java, which normally is both hot and damp and, uring the rainy season, awful. As a matter of fact, the isks are not great if a little trouble be taken and common ense used. On the other hand, the dampness of the atmosphere causes bellows and other leather parts to be easily ffected, with formation of a kind of green mould upon them a time. Lenses are attacked in a similar manner.

For keeping the camera in good condition, it should be a ule to take it out of its case every morning and give it a ood rubbing down. It should then be placed on a table or hair, where it will get the warmth of the sun, but not in irect sunlight. The aim is to keep it in a dry state. For his purpose it should be put away, not closed, but with every art opened up, in some roomy cupboard where as much fresh ir as possible can get to it. It should be frequently dusted ith a flat soft brush, which should be carried in the case nd frequently used. It is specially necessary to observe aution in carrying the camera about in the sun after a eavy downpour of rain, when the atmosphere is left in a ondition of extreme damp; the camera in these circumtances should be protected as far as possible from the rays f the sun. As a general rule, when on foot in the hot eather, some kind of cloth should be carried over the leather ase in order to protect it from the sun's heat. On no account hould a camera be left to itself for even one or two weeks. If it be constantly kept exposed to fresh air and kept free from dust and dirt, it will not suffer from the trying conditions of the climate.

Lenses require exactly the same kind of care. On no account should they be kept in a room with the lens caps on. The glasses should have as much fresh air as possible. Lenses will occasionally show stains on their surface due to the glass having been touched with the finger. Inasmuch as the hands are in a continual state of perspiration, a certain greasy deposit sticks to the glass. It can easily be removed with a little petrol. A focal-plane shutter, likewise, needs to be "exercised" regularly every day, whether the camera is to be used or not. The blind should be wound and released a few times so as to expose it to the air and to dislodge dust which in time, in conjunction with the damp atmosphere, may give rise to trouble.

Sensitive Materials.

Captain Blunt is emphatic in his experience that plates give the best results. Next to them he places roll film as regards quality of the result and reliability. Film packs have the drawback that in the damp climate the films will stick together, so that when you pull out, say, No. 3, Nos. 4, 5, and 6 may also come out altogether. He would not use film pack larger than quarter-plate, but even with the much smaller 60 × 45 mm. size has had a good deal of trouble due to sticking.

Development.

Loose chemicals sold in Java are unreliable for photography. For security it should be a rule to use well-known preparations such as Burrough Wellcome's "Tabloids" or other bottled branded goods of repute, and in any case to exercise great care in purchasing from local suppliers. The damp climate appears to attack hypo in some way, for if stored in a paper wrapping it will melt, bursting the bag, and possibly doing a great deal of damage to surrounding goods. Hypo should always be stored and carried in sealed tins.

Excellent results are obtained by tank development if done with proper care. On no account must the developer be used unless with a thermometer to test the temperature. In many cases ice must be used for tank development. The best method is to wrap up a lump of ice in a cloth and beat it into practically a pulp. A bucket of water has now several large lumps of ice put into it, so as to keep the temperature of the water under or about 50 deg. The ice pulp is then put into the tank with the developer, and when the thermometer registers 50 deg. or a little under, the film is put in and then the whole tank is put into the bucket of cold water and allowed to remain there during the whole time of development, say, 20 minutes. During this time care must be taken that the temperature of the water in the bucket does not rise above 50 deg. This method will give good results, because it ensures that the developer is working at 50 deg. The great tendency is for the temperature to rise much more quickly in the tank than might be supposed. It is important to see that the rubber band on the lid of the tank fits properly. Sometimes these rubber bands are too big, so that the tank cannot be closed.

In washing, very great care is required, because water which may be running quite cool from a tap for the first few minutes will suddenly be delivered at a temperature of 90 deg. or more. Alum should be used freely before washing.

Lastly, a hint may be given to travellers taking their film exposures to be developed. There are many firms in Java who develop films, and not only will they develop them badly, but in some cases ruin them also. As a rule, it is best to pick out a good Chinaman, who is usually more careful. And a rule should be made to hand in the film pack in the tin case in which it has been supplied. Assistants in these developing firms are often shockingly careless in the way they squeeze or twist a pack in their hands, so that delivery in the original tin is a certain amount of protection against them.

Scottish Photographic Circle Exhibition.—Membership of the Scottish Photographic Circle is open only to those who can demonstrate by their work their fitness to belong to it. The members are all, therefore, pictorial enthusiasts of considerable ability, and the Exhibition now open until to-morrow, December 17, in the rooms of the South Glasgow Camera Club, 43, Bankhall Street, contains much that is interesting. The entries (limited to three per worker) numbered 129, and from these Mr. Archibald Cochrane has selected the 50 prints which form the present exhibition. This rather drastic treatment has resulted in the exhibits being of a uniformly high standard, considerably in advance of the Circle's previous efforts. Only a small proportion of the exhibits are portraits. W. Crooke shows two of his large scale works treated in his usual masterly fashion. R. Creerar and Wm. Findlay appear to work along similar lines, and both show dainty examples of softly-lit pictures of young womanhood. Among the landscapes J. M. Whitehead's three pictures are worthy of particular study. His "Craigmillar" is a very dramatic impression; "A Dream of the Raplock" is perhaps more likely to give general pleasure, while his "Joyous Summer" is joyous indeed. Dan. Dunlop shows "The Cloud" with fine, open-air feeling; "The Flowing Tide" and "Palace Courtyard, Stirling," from which some undesired buildings have been cleverly removed. In "Sand Castles" W. S. Denver seems to have discovered a new foreground, the shadows of a group of adult spectators being used with very pleasing effect. John Baird sticks to his beloved Scottish mountain and flood; his three examples give evidence of the poetic feeling with which he regards nature. "The Goods Entrance" (A. T. Edgely) and "The Arch" (C. E. Jenkins) show that even in smoky Glasgow fine effects are obtainable by those who appreciate the beauty of light. We find bromoil at its best in "The Isle of Ely" (Hector Murchison) and "Loading Sand" (D. L. Taylor). These workers seem to have avoided the loss of quality observable in so many examples of this process.

A HOME-MADE VERTICAL ENLARGER.

The enlarger which I am about to describe owes its origin to the purchase, some years before the war, of a set of square-form 12 × 10 bellows, with a plain front board attached, which was picked up at an auction sale for 5s. A joiner was called in, and the main body of the enlarger, as shown in the photograph ((fig. 1), was constructed and the bellows affixed thereto, the front board being supported upon a pair of wooden arms which, in turn were fixed to a cross piece made to slide between guides fixed upon two of the uprights.

The opening in the top frame of the main portion of the enlarger is 14½ × 11½ inches, so that a 15 × 12 negative can be placed in position between a pair of guide bars, or a nest of carriers (15 × 12 to 12 × 10, 12 × 10 to 10 × 8, 10 × 8 to whole-plate, whole-plate to half-plate, and half-plate to quarter-plate) can be slid in. The wooden frame which is fixed below this opening, and to the lower edge of which the top of the bellows are fixed, is made 15 × 12 inside, with the idea that although the bellows themselves are only for 12 × 10, it would be possible to work from a 15 × 12 negative. It may be said, however, that in practice it is not found that a 15 × 12 negative receives even illumination right up to the edges. Still, it is not often that one wishes to work from a 15 × 12, and no trouble is now found in working from any size of negative from 12 × 10 downwards.

Fig. 1.

Around three sides of the opening on the upper platform is fixed a wood frame about 3 inches in height, to embrace the light-box; and the remaining side, where the negative carriers slide in, is closed in by a sliding panel of wood, which is dropped into position after the carriers are slid in, thus cutting off all outlet of light from within the box.

The original light-box was made of three-ply wood, and was in the first place equipped with a small mercury-vapour lamp, known as the "Bastian." This had an M-shaped tube and a self-tilting rheostat, but did not give even illumination, except with the addition of so much ground glass or opal interposed as to hopelessly increase the necessary exposures, so it was discarded, and a half-watt lamp substituted. This worked all right for small negatives, but was no good for anything over half-plate, and, as we often have to enlarge from whole-plate or larger negatives, the light-box, as shown in the photograph, was designed, and constructed by a local tinsmith. It is fitted with five half-watt lamps—one at each corner and one in the centre, and these are wired up in such a manner (see fig. 2) that it is possible to use the central one only, the four corner lamps only, or all five together. The box is enamelled black on the outside, but the sheet tin of which it is constructed is left bright within which, of course, assists in obtaining even illumination.

The front board carrying the bellows was originally made to work "grip-tight" in its guide bars, but this was only a temporary and never satisfactory arrangement; and after endeavouring for some time to obtain a suitable focussing screw in steel or brass, it was finally decided to have one made of wood, and this has given perfect satisfaction. The bromide paper for enlarging is laid upon a loose drawing board, usually covered by a sheet of good glass, free from flaws and specks. This drawing board is supported upon another board made the full width of the space between the uprights and resting upon cross-bars fixed at convenient heights upon the uprights. An index pointer is fixed upon the sliding board

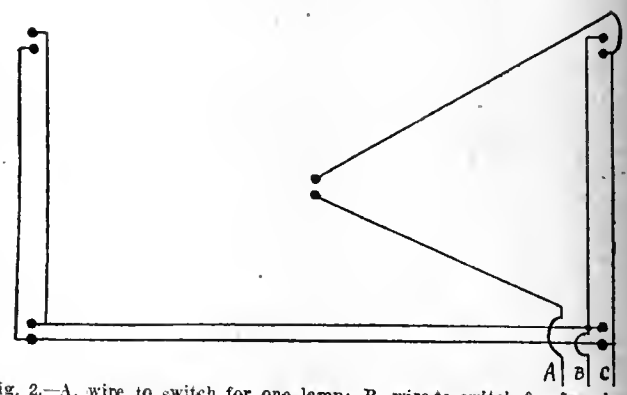


Fig. 2.—A, wire to switch for one lamp; B, wire to switch for four lamps; C, return wire.

which bears the bellows front and lens, and this travels up and down upon a scale fixed on one of the uprights, which shows the degree of enlargement given at any distance with any of three different lenses available, 6, 7, and 8½ inches focal length respectively. It is thus possible to focus rapidly to any desired degree of enlargement by first of all setting the lens board to the scale as required, getting a rough focus by moving a sheet of white cardboard up and down, placing the drawing board in an approximately correct position by supporting it upon a few old discarded pulp boards (at one time used for glazing), and finally getting an exact focus by a slight movement of the screw.

The wider dimension between the uprights of the main frame is 25″, but enlargements can be made to a still greater length than this by placing the negative cross-wise on the upper platform and using a larger board for the bromide paper, also placed cross-wise below. To guard against accidental fogging of the bromide paper, the enlarger is closed in, when in use, by a curtain around three sides of the frame; and it should be mentioned that the top of the light-box, which bears the lamp-holders, is made to lift completely off for convenience in replacing lamps.

The light-box is pierced with a series of ventilating holes on the rear side, well up towards the top, these being trapped for escape of light by a curved plate of tin fixed all along on the outside.

The total cost of the whole affair, which in its present state is giving every satisfaction, has amounted to about £7 10s.—this includes the bellows, joiner's account for wood-work, drawing board for bromide paper, wooden focussing screw, sheet tin light-box, nest of carriers, lamp-holders, switches, wire and lamps. The wiring was done by the writer. A sheet of good ground glass is laid upon the nest of carriers, above the negative, and this is found to give quite satisfactory diffusion of illumination.

H. O. Thompson.

Half-Watt Installations.—In sending us a circular describing their "Dominion" installations for studio half-watt lighting, Messrs. Sichel & Samuelson, 52, Bunhill Row, London, E.C.1, remind us that they were the first to embody the half-watt lamps in a commercial form. They have still in use the original installation and lamps, for demonstration purposes, which they will be pleased to show to any professional photographer who may be interested.

USEFUL FORMULÆ FOR TELEPHOTO SEPARATION.

GENERALLY speaking, writers on telephotography tend to make their formulæ unduly hard of comprehension to the non-mathematical reader. The separation, for instance, required between the positive and the negative lens for a given magnification, is commonly expressed in a roundabout and unnecessarily obscure way, as the sum of the "telescopic condition" and the "optical interval" or "delta" (Δ).

The telescopic condition is the difference between the focal length of the positive lens and that of the negative lens, or f_1-f_2; while the optical interval is the amount by which the separation exceeds the telescopic condition, and may be anything between the latter and the focal length of the negative lens. This, however, merely tells us the limits of the separation, namely, that it cannot be as long as f_1, nor as short as f_1-f_2.

Some may assert that the separation is of comparatively little practical interest, since most adjustable telephoto lenses have a fixed negative element, and obtain variations in magnification (M) by racking out the positive; so that all the worker really has to do is to measure the extension (E) from the negative lens, which equals $f_2 \times (M-1)$. Nevertheless, it quite often happens that the photographer has to employ an extemporised telephoto attachment, fitted inside the camera at the back of the positive lens. In such a case, it is sometimes extremely useful to know the separation, or the degree of alteration necessary.

Disinterred from its undeserved burial beneath the "delta" pyramid, the formula for telephoto separation may be exhibited in the following intelligible and straightforward garb.

Let f_1 = the focus of the positive lens, f_2 = the focus of the negative lens, and, M = the magnification wanted. Then

$f_1-f_2+\frac{f_2}{M}$ = the nodal separation from positive to negative lens.

Thus, suppose the positive lens is of 7 ins. focus, and the negative lens of 3 ins. focus, what separation will be required for four magnifications?

Here, $f_1 = 7$, $f_2 = 3$ and $M = 4$. Therefore,

$$(7-3)+\frac{3}{4} = 4\tfrac{3}{4} \text{ ins. separation.}$$

Magnification, of course, is the quotient obtained on dividing the positive focus into that of the telephoto combination. In the foregoing instance, since the original focus is 7 ins., and the magnification 4, the focus of the resulting combination will be 28 ins.

An alternative formula, giving the separation necessary to obtain a telephoto combination (F) of a desired focal length, is:

$$f_1-f_2+\frac{f_1}{F}\times f_2$$

Thus, suppose the positive lens is of 9 ins. focus and the negative of 4 ins. focus, what separation is required to make a combined focal length of 16 ins?

The calculation here will be:—

$$9-4+\frac{9\times 4}{16} = 5+\frac{36}{16} = 5+2\tfrac{1}{4} = 7\tfrac{1}{4} \text{ ins. separation.}$$

Where a scale of magnifications is marked, as on the ordinary type of adjustable telephoto mount, the photographer often wishes to obtain some other magnification not there included. By using the following formula, this is quite an easy matter, provided the focus of the negative lens is known.

Let M^1 = an existing marked magnification, M^2 = the new magnification desired, and f_2 = the focal length of the negative lens. Then, $f_2 \times \frac{M_1-M_2}{M_1\times M_2}$ = the difference of separation required.

Suppose, for instance, a magnification of 5 is wanted, and the nearest mark on the mount is 3, the focus of the negative lens being $4\frac{1}{2}$ ins. Then,

$$4\tfrac{1}{2}\times\frac{5-3}{5\times 3} = \frac{9}{2}\times\frac{2}{15} = \frac{18}{30} = \frac{3}{5} \text{ in.,}$$

the necessary extra separation, which is readily measured from the existing mark for 3 magnifications.

Even when the focus of the negative lens is not known, it is a simple matter to ascertain it from the distance between any two magnification marks on the telephoto mount. It is merely necessary to multiply together the two magnifications indicated, and divide the product by their difference, multiplying the quotient by the distance (D) between the two marks. Expressed as a formula, this is

$$\frac{M_1\times M_2}{M_1-M_2}\times D.$$

For example, suppose the distance between the marks 8 and 4 on a telephoto mount is $\frac{3}{4}$ in. Then

$$\frac{8\times 4}{8-4}\times\frac{3}{4} = \frac{32}{4}\times\frac{3}{4} = \frac{96}{16} = 6 \text{ ins.,}$$

the focus of the negative lens.

With a telephoto combination having a fixed positive and a movable negative lens, it is not a difficult matter, by means of the formulæ already given, and a few trials, to graduate the sliding tube inside the camera for various magnifications. Since it will, however, be awkward to measure the extension from the negative lens in the usual manner, one may proceed instead by adding together the separation and extension ($s+E$), and measuring from the node of emission of the positive lens, or from the lens-board after making the necessary allowance. Expressed as a formula, let f_1 = positive focus, f_2 = negative focus, and M = required magnification. Then,

(Separation + (Extension)

$$(f_1-f_2)+\frac{f_2}{M}+\left(f^2\times(M-1)\right) =$$

the total distance from positive lens to plate.

A. LOCKETT.

THE ABSORPTION OF LIGHT BY TONED AND TINTED MOTION PICTURE FILM.

A communication from the Research Laboratory of the Eastman Kodak Company.

THE past few years have seen a remarkable increase in the use of toned and tinted motion picture film, and a large proportion of the films made are coloured by some process of toning or tinting. It is quite evident that since the production of colour involves the absorption of certain components of the white light ordinarily used for projection purposes, the screen brightness will in general be less when coloured film is used. While the lower screen brightness may be desirable in the production of certain effects, it may be very objectionable in many cases and demand an increase in the current used in the projection lamp in order to produce a picture of satisfactory brightness. A knowledge of the absorption characteristics of the film coloured by three various toning and tinting processes is of considerable practical importance, and it seemed desirable to make precise quantitative measurements of the amount of light absorbed by films coloured in various ways. This communication is a report of the work done on the subject, and consists of a description of the apparatus and method for the measurement of these values, with considerable data relating to the absorption of light

by samples prepared according to certain definite methods used in the toning and tinting of positive motion picture film.

The photographic deposit of which a picture is built up consists of minute particles of metallic silver embedded in a matrix of transparent gelatine. These deposits are of a diffusing nature, that is, the light transmitted by them is to a great extent deviated from its original direction of propagation and emerges from the film as scattered light. In specifying the transmission or density of such a deposit it is, therefore, necessary to define carefully the conditions under which the measurement of these characteristics are made.

In the case of non-scattering media, the value of transmission is given by the ratio of the transmitted to the incident light intensity. Thus, if

I_0 = intensity of incident light
I_1 = intensity of the transmitted light
T = transmission

$$T = \frac{I_1}{I_0}$$

It has been found convenient in many cases to express the light-stopping characteristics of a material in slightly different terms, this being especially true in the case of photographic deposits. For this purpose another term, namely, "density," is used, and if this be designated by the symbol D its value is defined by the equation

$$D = \log \frac{1}{T}$$

It has been shown experimentally in the case of photographic deposits consisting of particles of metallic silver embedded in gelatine that density is directly proportional to the mass of silver. Density values are additive quantities, that is, if two layers of known densities be superposed their combined density will be equal to the sum of the individual densities.

While values of transmission and density may be thus simply defined in the case of non-diffusing or non-scattering media, this is not true in the case of materials that scatter the light transmitted by them. The light transmitted by a diffusing media may be said to consist of two components:

(a) The "specular" component, which is not deviated from its original direction of propagation by passing through the material.

(b) The "scatter" component which consists of light that has been deviated from its original direction of propagation by the material.

Since a photographic deposit is of a diffusing character, it is usual in speaking of the density or transmission of such deposits to qualify the terms by the adjectives "specular" or "diffuse," the former being applied to the value obtained by using the intensity of the "specular" component of the transmitted light, while the latter term applies to the value obtained by considering both the "specular" and "diffuse" components as transmitted light. In practice, this latter value is usually obtained by illuminating the sample by completely diffused light, such as may be obtained by placing the sample in contact with a piece of diffusing material, such as pot opal glass. The value for specular transmission is measured in practice by placing the sample in a beam of parallel or collimated light in such a way that the transmitted intensity is that of the undeviated rays. It is evident in the case of a cinematograph picture being projected in the usual way that the scattered component of transmitted light is not useful as image-forming light, and that only the specular or image-forming portion of the transmitted light is of interest. From a consideration of the optical characteristics of a motion picture projecting machine it is evident that the density or transmission values of interest are thus almost identical with the "specular" values as defined above. The illumination on the film being projected, however, is not completely parallel, and hence the effective value of transmission may be somewhat different than the true "specular" density. It seems advisable, therefore, in this particular case to measure what may be termed the "projection" density or transmission which may be defined as follows:—

If in a given projection assembly the screen brightness be measured with no film in position, and this value be designated by B_0, and the screen brightness again measured with the photographic deposit under consideration in position and designated B_1, then the "projection" transmission T_p will be given by the relation

$$T_p = \frac{B_1}{B_0}$$

All of the transmission and density values given in this paper and applying to the various toned and tinted samples are computed in this way, and are, from the standpoint of projection, the effective transmission and density values. Since many of the samples are highly coloured, the problem of determining the transmission is further complicated by the existence of colour differences in the photometric field, and in order to reduce the photometric errors to a minimum a flicker method was adopted. By this method the photometric field is alternately illuminated by the two lights which are to be compared, and a means is provided whereby the frequency of alternation can be varied. In case the two lights being compared differ both in colour and in intensity, a flicker due both to inequality of colour and intensity will be present when the frequency of alternation is low. As this frequency is increased, however, a point is soon reached where the flicker due to colour difference disappears owing to a blending of the two colours, while the brightness flicker persists. If, now, the frequency of alternation be maintained at a value just sufficient to eliminate colour flicker, the residual flicker due to brightness—difference may be eliminated by bringing the intensity of the two beams to equality. Since the field viewed is alternately illuminated by the two lights being compared, and the frequency of alternation is sufficient to produce a blending of colour, this field appears to be uniform in colour, and the criterion of photometric equality is the condition of no flicker, no flicker occurring when the intensity of the two beams is equal. In this way the necessity of judging the relative brightness of two fields differing widely in colour may be avoided. The frequency at which the colour flicker is eliminated depends both upon the magnitude of the hue and saturation differences, and in practice if maximum precision is to be obtained, the rate of alternation should be maintained at the critical frequency for the colour difference under consideration. It is the general opinion among photometricians that the flicker photometer provides the most reliable means of comparing the intensity of two lights differing widely in colour.

In fig. 1 is given a diagram showing the essential parts of the instrument constructed for this work. At D is mounted a Whitman disc which is driven by the motor M. Such a disc consists essentially of a circular plate from which alternate 90 deg. sectors are cut away. The surface of this disc is covered with a matt white

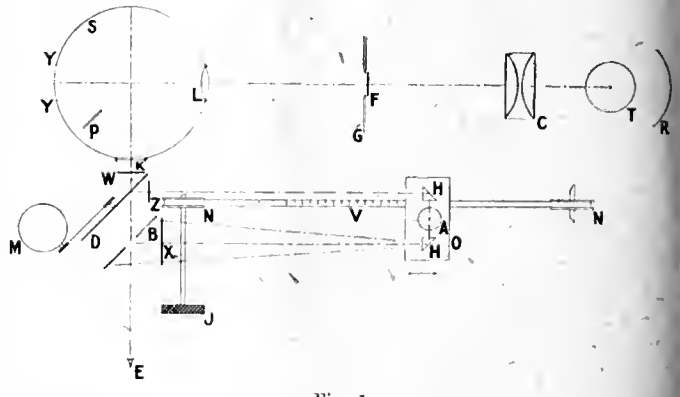


Fig. 1.

paper and is illuminated by the lamp A, which is mounted on the carriage O. This carriage is moved back and forth by means of the steel tape V operating over the pullies NN and actuated by the hand-wheel J. The two total-reflecting prisms HH are also mounted on the carriage C, as shown, so that the Whitman disc D and the screen B are each illuminated to exactly the same extent, regardless of the position of the carriage. Holders are provided so that neutral tint filters may be inserted at positions W. Z, and X, as may be necessary.

The parts thus far described may be regarded as composing the flicker photometer proper, while the parts indicated by the other elements of the diagram represent the special attachment for measuring the transmission of the film. Since it seemed desirable to measure the effect of various toning and tinting processes when applied to the finished positive film, it was necessary to adopt some method of integrating the light transmitted by the treated pictures. Such pictures consist of areas of widely varying density, and in order to determine the mean or integrated value of transmission a small integrating sphere was used. This is represented by the circle S, and consists of a copper sphere 12 inches in diameter, in one side of which is mounted the lens L, and at a point 90 deg. from this the opal glass window K. The interior surface of this sphere is covered with a dead matt white enamel. A metal plate G serves as a support for the film being measured, and in this plate a rectangular aperture of exactly the same dimensions as that in standard motion picture machine is cut.

The film to be measured is placed in position as indicated at F. A 250-watt stereopticon lamp T was used as a source for the illumination of the sample, a reflector R being used to increase the illumination on the aperture plate. The condenser C served to give to the illuminating beam the same convergence as is found in standard projecting machines. The lens L is of such focal length that a sharply-defined image of the film F is formed on the interior wall of the sphere at YY, the magnification being two diameters. A small opaque disc P is placed in position, as shown, and serves to shield the opal glass window K from the direct illumination from the picture area YY. The photomteric field is observed from the point E as indicated, and consists of a circular area, the outer portion of which is formed by the screen, B, while the inner portion, termed the "flicker field," is illuminated alternately by light reflected from the Whitman disc D, and by that transmitted by the opal glass window, K. A photometric setting is made by adjusting the position of the lamp A to such a point that flicker is eliminated from the inner portion of the field, this being the condition under which the brightness of the disc surface is equal to that of the opal glass. In this particular instrument a brightness balance between the outer and inner portion of the field also exists at the no-flicker setting. It is thought that the use of a surrounding field of the same brightness tends to increase the sensitivity of the flicker method since the observer at all times has in the field of vision a non-flickering area which tends to increase his sensitivity to flicker in the inner part of the field. This point has not as yet been definitely verified, but it has been found that readings can be repeated with great precision with this instrument. The comparison lamp A and the illuminating lamp T are run under constant conditions by means of suitable rheostats and indicating instruments. In practice it was found most convenient to calibrate the instrument in terms of the density of the film placed at F. In order to increase the scale of the instrument the multiplying filters must be used at positions W and Z. These also are carefully calibrated in terms of density. From the calibration curve plotted with density values as ordinates and scale readings as abscissæ, the density of any film placed at F can be read directly, and in case transmission values are desired they can be read directly from suitable conversion tables.

Photographs of the complete instrument as assembled are shown in figs. 2 and 3.

The methods of colouring positive film may for the purpose of this discussion be divided into three classes, namely :-

a. Dye tinting.
b. Dye toning.
c. Chemical toning.

In dye tinting the colour is obtained by immersing the finished positive in a solution of dye, which colours the gelatine, thus giving a uniform colour to all parts of the picture. A complete discussion

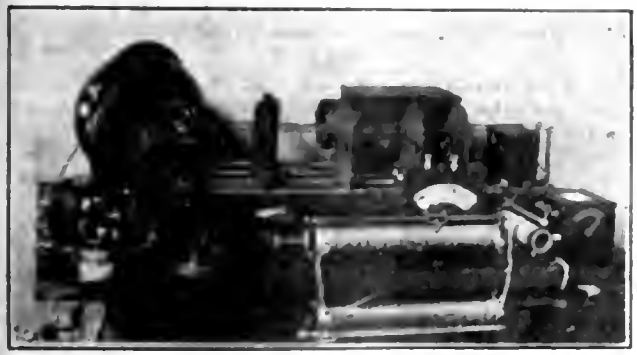


Fig. 2.

of the various processes of dye toning and chemical toning will be found in a booklet entitled "The Tinting and Toning of Eastman Positive Motion Picture Film," published by the Eastman Kodak Company. An article dealing with the subject was published by Mr. J. I. Crabtree in the "Motion Picture News," p. 3255, December, 1918. The results obtained with samples treated by these various methods will, for the sake of convenience, be treated separately.

Transmission of Dye-Tinted Samples

Three types of samples were prepared for each of the various tints examined. The first sample consisted simply of a piece of unexposed, fixed-out positive film, which was subjected to the action of the dye bath for a time sufficient to give the desired colour. Since it is possible that the presence of the silver image may have some influence on the behaviour of the tinting process, the effect produced when the process is applied to a picture consisting of such lights as may be somewhat different from that indicated by the measurement of the fixed-out sample. A typical negative of what was judged to be average quality (from the standpoint of contrast and relative proportion of high-light and shadow region) was chosen and a considerable length of positive printed from a single negative and developed in the usual way giving a normal positive consisting of a large number of identical pictures. In order to illustrate the general nature of the subject chosen, this positive is reproduced

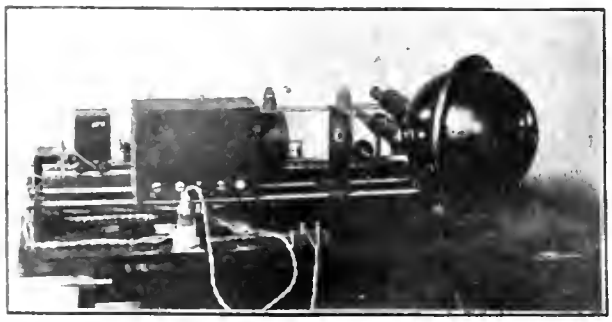


Fig. 3.

as Picture No. 41, in fig. 8 of this communication. Short lengths of this positive were cut and dyed along with the unexposed fixed-out samples, the two receiving identical treatment in the tinting bath.

In order to study still further the effect of photographic density on the result, a sensitometric strip consisting of areas of increasing density was also prepared. These strips were made on ordinary cine positive film and each area of uniform density was of the same size as a standard cinematograph picture and therefore filled completely the aperture in the film holder of the photometer previously described. The minimum density was practically equivalent to the fog density of the material, while the maximum density was approximately 2.8, thus including the entire density range ordinarily used in the production of positives. One of these sensitometric strips was treated along with the two samples previously described, the dye treatment for the three samples being identical. All tests were run in triplicate, so that the values reported are in all cases the mean of three independent detensinations. The various formulæ used for the tinting of the samples examined are given at the end of this communication.

In Table I are given the numerical results obtained with the various samples of tinted film. Under the section marked "Plain Film" are those applying to the unexposed, fixed-out samples, the values in Column D being those of "Density," in Column T those of transmission, and in Column T_r the relative transmission values referred to the transmission of the untinted samples as 100 per cent. Under the section marked "Picture" are the corresponding values relating to the pictures tinted according to the various processes. The A and B variations are obtained by changing somewhat the time of dyeing so as to obtain small variations in the resultant tint, the "A" tint in each case being the lighter, that is, having the higher transmission.

TABLE No. I. TRANSMISSION OF TINTED FILM.

Sample.	Name.	Plain film.			Picture.		
		D.	T.	T_r.	D.	T.	T_r.
0	Untinted	0.055	88	100	0.84	14.5	100
2	Cine red (A)	0.41	39	44	1.18	6.6	45
1	Cine red (B)	0.43	37	42	1.20	6.3	43
3	Cine scarlet (A)	0.36	44	50	1.13	7.4	51
4	Cine scarlet (B)	0.66	22	25	1.43	3.7	25
7	Cine orange (A)	0.20	63	72	0.99	10.0	69
8	Cine orange (B)	0.25	56	64	1.01	9.7	66
5	Cine yellow (A)	0.16	68	77	0.92	11.9	82
6	Cine yellow (B)	0.15	71	80	0.95	11.2	77
29	Cine green, No. 1 (A) ..	0.18	66	75	0.98	10.5	72
28	Cine green, No. 1 (B) ..	0.45	36	41	1.19	6.4	44
31	Cine green, No. 2 (A) ..	0.25	56	64	1.05	9.0	62
30	Cine green, No. 2 (B) ..	0.61	24	27	1.34	4.6	32
26	Cine blue (A)	0.65	22	25	1.44	3.6	25
27	Cine blue (B)	0.81	16	18	1.54	2.9	20
33	Cine violet (A)	0.62	24	27	1.33	4.7	32
32	Cine violet (B)	0.63	23	26	1.43	3.7	26

Measurements on the sensitometric strips show that in general the absorption of the dye is practically independent of the density, although in the case of cine yellow and cine orange there is indication that the high-light region absorbs slightly more dye than the shadow regions; that is, regions of high density. This tends to produce a slight decrease in the contrast, and hence produces a slight flattening of the picture. The effect, however, is not large and does not manifest itself in the case of all tints. The results of the measurements of the sensitometric strips treated with the cine orange are shown graphically in fig. 4, the density values of various

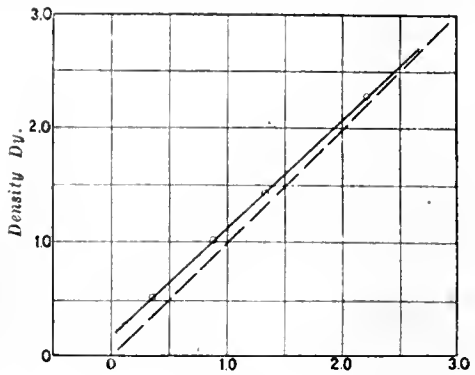


Fig. 4.

areas of the tinted sensitometric strip being plotted against the density values of the corresponding areas of the untinted strips. The points indicated by the small circles represent the results of the measurements plotted in this way. A line at 45 deg. to the X axis and passing through zero represents the line of no density change owing to the tinting. It will be noted that the curve obtained is not precisely parallel to this 45 deg. line, thus indicating that the areas of low density have suffered a greater proportional density increase than those of higher density.

LOYD A. JONES.
C. W. GIBBS.

(To be continued.)

PROGRESS IN AERO-PHOTOGRAPHIC MAPPING.

THE following letter by Professor R Melvill Jones, professor of aeronauties, Cambridge University, which appears in the "Times" of Tuesday last, December 13, provides a short account of the experimental work which is being carried out at Cambridge on aero-photographic methods of map-making.

I notice that in your issue of December 3 you published a leading article on the problem of mapping from the air. It may interest you to know that experimental work on this subject has been in progress at Cambridge University for the last eighteen months. The Royal Air Force have placed at our disposal, for this and other work, a small experimental flight of aeroplanes working at an aerodrome in the neighbourhood of Cambridge. The work is being carried on under my direction, with the close co-operation of the Department of Geography here and with the personal assistance and advice of Captain H. H. Thomas, who is a member of the University and an ex-Air Force officer intimately connected with aerial surveying in Palestine during the latter part of the war. We are also in close touch with the War Office Air Survey Committee and with the Photographic Department of the Air Ministry. The bulk of the work is being carried out by two research assistants, financed by the Department of Scientific and Industrial Researeh.

If aerial photographs are required to provide anything more than a somewhat inaccurate picture of the ground, it is necessary to know with considerable accuracy the angular position of the camera when the photographs are taken, and experience has indicated the order of accuracy that will probably be required before aerial mapping may be expected to compete successfully with detailed ground surveying. Unfortunately, experience has also shown that this order of accuracy is not generally obtainable when the aeroplanes are flown by pilots who are not specially selected or trained for the work.

It is possible, even when large unknown tilts occur, to calculate these tilts accurately by a method known as "resection"—that is, to calculate the tilts from the position on the plates of known ground marks that have been accurately surveyed independently. This method of overcoming the difficulty is being developed in England and other countries; but it is our belief that it will involve the fixing of too many points by independent ground surveying, and that it requires too much office work, in connection with the "resection," to be commercially successful, except in special cases.

The alternative line of attack on the problem that we are following up is to improve the flying until a camera fixed in the aeroplane will seldom vary from the correct position by more than a certain permissible angle, and then to use the photograph without "resection." War experience of experimental flying indicated that it should not be impossible to do this, using selected pilots correctly trained, and our experimental work to date has therefore been mainly directed to the training of pilots and to the calculation of the tilts of the aeroplane when flown by them, in order to discover whether the desired accuracy of flying is being realised.

So far as we are aware, the experimental determination of aeroplane tilts had never previously been carried out with the accuracy and on the large scale which is required for this work, but the problem in our case was rendered particularly easy by the existence, between Cambridge and the Wash, of great stretches of level country well supplied with marks, in the form of drainage canals, which can easily be identified on the plates.

We have to date succeeded in showing that we can, in an experimental flight, reduce the errors of tilt to within the required amount, and we are now engaged on the further problem of flying so as to cover the ground without gaps or excessive overlapping between the strips of photographs whilst still maintaining the accuracy realised in the previous experimental flights. Although we have not yet reached any definite conclusion on this second problem, satisfactory progress is being made, and we hope to be in a position to issue a report on this subject early in next year.

With regard to the determination of contours from the air mentioned in your leading article, we do not propose to attack this problem until we have cleared the ground in respect of the fundamental problem of straight level flying; but it is well known that approximate contours can be obtained by estimation, with the aid of a stereoscope in which two successive overlapping photographs are viewed simultaneously. We are not yet in a position to say whether this method can be developed to give great accuracy.

FORTHCOMING EXHIBITIONS.

December 3 to 17.—Scottish Photographic Circle. Hon. Secretary, W. S. Crocket, 10, Parkgrove Terrace, Tollcross, Glasgow.

1922.

January 21 to February 4.—Partick Camera Club. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 11 to 25.—Scottish Photographic Salon. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

February 14 to 17.—Exeter Camera Club. Latest date for entries, January 30. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

February 18 to March 4.—Edinburgh Photographic Society. Latest dates, entry forms, February 4; exhibits, February 9. Particulars from the Hon. Secretary, G. Massie, 10, Hart Street, Edinburgh.

March 8 to 9.—Birkenhead Photographic Association. Latest date for entries, February 25. Particulars from the Exhibition Secretaries. Messrs. Longstaff and Trace, 33, Hamilton Square, Birkenhead.

BARGAINS IN VEST-POCKET CAMERAS.—Following their recent list of reflex cameras, issued by the Fleet Street Branch, the City Sale & Exchange has just published from 54, Lime Street, London, E.C.3, a closely-printed 12-page list of bargains in secondhand vest-pocket and 3¼ by 2½ cameras for plates or film. The list contains particulars of scores of cameras of all makes, and is obtainable free on application.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, November 28 to December 3 :—

MOUNTING.—No. 31,899. Mounting photographs W. H. Collins.

DESIGNS ON GLASS.—No. 31,946. Method for producing photographic designs on glass, porcelain, etc. J. Sobawa.

STEREOSCOPY.—No. 32,355. Means for obtaining stereoscopic pictures. E. H. Wright.

CINEMATOGRAPHY.—No. 31,992 Means for obtaining cinematograph pictures. E. H. Wright.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

SPEAKING CINEMA FILMS.—No. 157,925.—(January 13, 1920.)—The object of the invention is to provide a process for the recording and reproducing of optical images and sound waves simultaneously, of the kind in which the sound waves are transformed into light-fluctuations the photographic record of which is reduced to such a form that it can be acoustically reproduced by a sound box, such as is made use of in ordinary talking machines. The recording operation, which corresponds to the negative process in photography, is carried out by apparatus which is already partly known, and consists in the fact that the sound waves are received on a diaphragm the vibrations of which are made to influence the direction of a beam of light. The latter, which is protected from dispersion by a stationary screen, falls on a uniformly moved photographic layer (a film) and by creating shades of varying

gradation in the latter produces a symbolic representation of the sound waves. The recording of the pictorial effects is effected on the same film, which, however, is, for this purpose, moved intermittently.

The essential feature of the invention is that reliefs corresponding both to the views and to the sound waves are produced side by side directly on a chrome-gelatine positive film by a purely photographic process.

In the drawing, the diaphragm *a*, responsive to the sound waves, is, by means of the rod *b*, connected with the screen *d*, which is free to oscillate about the axis *c*. Axially opposite to the screen *d* is arranged a second, stationary screen *e*, so that the light-rays *f*, issuing from the luminous source *g* and concentrated by the system of lenses *h*, produce shades of intensities varying with the position of the movable screen *d*, on the film which is made to move uniformly in the direction of the arrow. If the apertures in the screens have the shape of narrow rectangular slits, then, after development, the representations of the sound waves obtained, will take the form of lines *l*, ranged parallel to each other and of shades of more or less pronounced intensity. Since, for the subsequent reproduction, the lines need have a breadth of only 1 to 2 mm. the rest of the film may be utilised for the recording of the pictures. This latter operation is accomplished by the objective *i*. The intermittent motion of the film required for this is permitted by a loop *j* in the film, dimensioned to suit the sound recording. When the film is being developed, exceptional care has to be taken that the sound symbols come out in sharp and strong contrast. Should the picture records, for this reason, be developed either too weakly or too intensely, they may, subsequently be corrected in the positive process.

For the reproduction operation or the positive process, a second film is made use of, containing no silver emulsion and the gelatine layer of which is sentitised by immersion in a solution of bichromate of ammonium or potassium. If now the negative film records be transferred to this chrome-gelatine film, by placing the films one above the other, and then illuminating them and subsequently treating them with warm water, relief representations are obtained of such a kind that positions of greater or less elevation on the positive film correspond to more or less intensely blackened positions on the negative. The film, after this treatment is finished, is drawn through a rather strongly concentrated solution of dyeing material (such as aniline dyes, for example) and the operation continued till picture-records, when held up to the light, seem to be sufficiently distinct, after which the film is washed in weakly acidulated water and dried.

By the dyeing solution, not only do the picture records become more visible but the relief ones are also improved by the elevations and depressions being more pronounced, owing to the absorption of the dye-stuff by the gelatine. Films prepared by this process show pictures of a high brilliancy, as the grain (or imperfectly smooth surface), which otherwise makes its appearance as the silver separates out, is here almost entirely absent. To reproduce both picture and sound effects from such a film, the picture-recording part of the latter is projected, but the part containing the sound-records is made to pass under the needle of a resonating-box, and the motions or vibrations of the needle produced by the elevations and depressions, now create the sound waves which have been previously recorded photographically.

In the process just described, and in contradistinction to other processes, the sound waves are not retained in the form of a sound curve, but by means of more or less intense shadings of the photographic layer, in the form of lines, this layer having an upper surface entirely free from grain and which, owing to its relief form, permits of the use of a stone-pointed needle which does not require to be replaced. Further, in the development of the negative film, the picture and sound records are quite independent of each other and the usual thickness of gelatine is also well adapted for both.—Eugen Reisz, 12, Wilhelmstrasse, Zehlendorf Mitte, Berlin

ROLL-FILM HOLDERS.—No. 149,615 (July 26, 1919). The invention relates to roll-film dark slides in which after each exposure the film band is moved by rotating the receiving drum. The actuation of receiving drums in cinematographs and certain textile machines by means of a friction change gear, the ratio of gear of which is automatically changed according to the gradually increasing diameter of the roller of the wound-on part of the film or band, is well known, *e.g.*, by the Patent Specifications 15,083 of 1901 and 13,471 of 1904.

A corresponding device is desirable for photographic cameras with which a great number of exposures are to be made in rapid succession. In spite of the gradually increasing diameter of the receiving drum, there corresponds to a certain definite angle of rotation of the actuating shaft for the changing device in each case a movement of the film-band by a definite length, viz., that of a picture. Since, however, where a rapid change of pictures is concerned, especially with larger sizes of pictures, there arise disturbances by the mass inertia of the supply drum, to the shaft serving for actuating the receiving drum there is coupled the supply-drum, by means of a friction change gear, and, moreover, the adjusting device for changing the ratio of the gear is coupled with the receiving drum in such a manner that by the rotation of the receiving drum the ratio of the speed of the actuating shaft to the speed of the supply drum is gradually diminished.

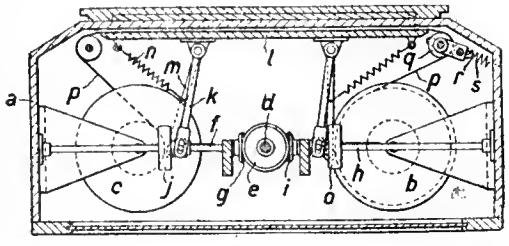
The friction change gear may, for instance, be of a kind in which a plane-face wheel coacts with a spherical-disc wheel, which throughout the following will be referred to as a friction disc, which for the purpose of changing the ratio of the gear is so disposed as to be displaceable along its shaft, and the movement of the member to be displaced for changing the ratio of the gear (hence, in the change gear of the kind referred to as an example, the displacement of the friction disc on its shaft) may, for

instance, be derived from the rotary movement of the respective drum. The adjusting device would then substantially have to consist of a gear by which the rotary movement of the drum is transformed into a rectilinear one, and by which a transformation of the comparatively quick movement of the receiving drum into a slower movement is effected, which may, for instance, be attained by a worm gear.

The adjusting device may be simplified by coupling it with the respective spool by means of a member which is kept in contact with the surface of the part of the film wound on the respective spool, and which is movable parallel to a plane perpendicular to the axis of the respective spool. In this case, by the gradual change of the thickness of the part of the film wound on the respective spool, to the member kept in contact with the surface of the film a movement is imparted which may be made use of for changing the ratio of the speed gear, so that then the arrangement may be made in such a manner that a transformation of the already comparatively low speed of the member kept in contact with the film is no longer required. A special advantage of this kind of coupling as compared with that first mentioned, also consists in that the continual, automatic adjustment of the correct ratio of the gear may not only be obtained by using a film of a definite thickness, but also by using films of any desired thicknesses.

It will not always be possible to make the parts of the film-band wound off the supply drum, when the actuating shaft is rotated by a certain definite angle, exactly equal to the part which is wound up thereby, so that sometimes a warping or an excessive tension of the film may occur. In order to avoid this drawback it is desirable to provide a tension roller over which the part of the film between the supply drum and the receiving drum is passed. By these means an excessive tightening of the film is automatically avoided, also in case the film, after it has been exposed and moved by the length of a picture, is pressed against a glass-plate, or the air-tight frame of a sucking-on device.

In the drawing, in a casing a there are supported a supply drum b and a receiving drum c. A shaft d is provided with a bevel wheel e, which on the one hand engages a bevel wheel g fixed to a shaft f, and on the other hand a bevel wheel i fixed



to the shaft h. The friction change gear for actuating the receiving drum c substantially consists of a friction disc j which may be displaced on the shaft f, and the flange of the receiving drum c, which in the drawing lies in front.

A one-armed lever k, which is fork-shaped at one end and supported on a plate l fixed to the casing a of the dark-slide, in such a manner as to be rotatable about an axis parallel to that of the receiving drum, and which is fixed to a second one-armed lever m, serves for adjusting the friction disc j.

By a spring n, which is fixed on the one hand to the plate l and on the other hand to the lever m, the free end of the lever m which carries a small roller is pressed against the film wound on the receiving drum, so that the position of the lever m, and thereby the position of the friction disc j and the ratio of the change gear becomes the more gradually changed the more of the film is wound on the receiving drum. The arrangement is in that case made in such a manner that, when the receiving drum is empty, the friction disc coacts with a circular ring surface of the drum flange, the middle diameter of which is equal to the diameter of the empty receiving drum, and the friction disc then coacts, when the drum is partly or entirely wound on, the film-band having any desired thickness, with a circular ring surface of the drum flange the middle diameter of which is equal to the outermost diameter of the drum containing the exposed part of the film, so that in each case the film-band is moved by the length of a picture by a rotation of the actuating shaft d through the same angle.

The change gear for actuating the supply drum contains a friction disc o, which is displaceable on the shaft h and coacts with the front flange of the supply drum b. The friction disc o is gradually adjusted on the shaft h according to the thickness of the part of the film wound on the supply drum b, in the same manner as the friction disc j on the shaft f. The film, marked p, is from the supply drum first passed over a roller q, which is so disposed as to be displaceable in slit r in the front and back side-wall of the dark slide, and which is under the action of two tension springs s (of which only one is visible in the drawing), by means of which the film is continually kept tight.—Firm of Carl Zeiss, Carl Zeiss-strasse, Jena.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

KALO.—No. 418,128. Chemical substances used in photography, photographic plates and photographic films. Ilford Ltd., Britannia Works, Roden Street, Ilford, Essex, manufacturers of photographic plates, paper and films. August 31, 1921.

ARISTAR.—No. 419,456. Camera lenses. Bloom's, Ltd., 7, Ridgmount Street, London, W.C.1, opticians and photographic dealers. October 12, 1921.

New Apparatus.

The Victor Mitre Cutter. Made by Henry Lawson, Pittenweem Fife, Scotland.

THIS appliance is a mitre-cutting board fitted with an extremely solid metal guide for the saw, and providing the means of accurately and quickly cutting mouldings to the required 45 deg. angle. It consists of a heavy base of hard wood occupying a bench space of 12 x 21 in., and surmounted by an equally heavy superstructure of wood on which is pivotted a metal box, or chamber, midway through which is a guide for the saw. This guide-box occupies one or other of two position at an angle of 90 deg. to each other, and is firmly held in each by a heavy flanged nut on the pivot on which the guide-box turns. A pair of screw stops on the supporting framework provides the means of adjusting the angle of the guide-box to a nicety. The moulding is laid on the board below the guide, an extension piece measuring about 3 ft. being clamped on to support it. With this extension piece the overall length of the appliance is about 4 ft. 6 in. There is an adjustable stop, fixed by a flange nut, for keeping the moulding in the exact position for the cut.

In operation the appliance is very simple. A length of moulding is first put on the board so as to make the first mitre cut with the minimum of waste. The saw-guide is then turned over on its pivot into the other position, and the moulding being now pushed against the adjustable stop in the position appropriate to the length of moulding required, a second saw cut is made; and so on for each of the four pieces for the frame.

The positive and accurate guidance given to the saw by the guide-box is such that anyone of very small skill in the handling of tools can cut the mitre joints with all the required accuracy. We have nothing but praise for the thoroughly solid and substantial build of the appliance and its very simple design. Complete with heavy 16-inch saw it is supplied at the price of £4 10s., including boxing. Mr. Lawson supplies also other appliances for frame making, and a circular describing the various patterns of cramping machines which he supplies will also be of interest to those making their own frames large or small.

New Books.

Photograms of the Year, 1921. Edited by F. J. Mortimer, London: Iliffe and Sons, Ltd. 6s. net and 8s. net.

The harvest of the year in pictorial photography is again effectively gathered (with selection) by Mr. Mortimer in the handsome volume which has just appeared. While one finds in it many of the works which attracted chief attention at the exhibitions held during the past twelve months, its pages represent the pictorial work of photographers scattered throughout the world. The excellent reproductions are given an added educational value by Mr. F. C. Tilney's running criticisms and appreciations of them. And Mr. Mortimer, whilst obtaining extremely fine reproductions from his engravers, shows a nice sense of art editing in the arrangement of the sixty odd pages of plates. While we are sometimes left wondering what are the motives which have prompted inclusion of some of the works in the volume, we can enter into the spirit of gentle raillery which has prompted, for example, the opposition on pages xxviii. and xxix. of the study of a pierrot, who is hardly there at all, and that of "Betty in Her Attic," another scheme of emptiness, which perhaps would have been just as good a thing if Betty had left the place to the play of lights and shadows on the bare floor and walls. As at the exhibitions, portraits and figure studies outnumber the landscapes, and it is perhaps a sign of the present running after sensations in figure studies that there are only three or four landscapes which rise above an ordinary average of work, namely, those by Charles Job, L. Misonne and Alex. Keighley; the latter's, a romantic rendering of a little bit of mountainous country.

In the articles which follow Mr. Tilney's notes, we obtain some short accounts of the interest which is being taken in pictorial photography in the Scandinavian and Latin States, America, Canada, Australia, New Zealand, South Africa and Japan. In these countries, as in the United Kingdom, "Photograms of the Year" worthily takes its place again as a recorder and preserver of what has recently been accomplished.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, DECEMBER 19.

Birmingham Photographic Art Club. Midland Federation Slides.
Bowes Park and District P.S. "Colour Photography." Paget Prize Plate Co.
Bradford Phot. Soc. "Elementary Bromide Printing—Contact Method." Bernal Riley.
Dewsbury Phot. Soc. Members' Lantern Evening.
Forest Hill and Sydenham P.S. "What to See in an Old Church." H. Creighton Beckett.
Glasgow and W. of Scot. Amateur P.A. "Cornwall: The Delectable Duchy." Donald V. H. Smith.
Kidderminster and Dist. P.S. "The Making of a Lantern Slide." A. Dordan Pyke.
Leeds Camera Club. "Child Photography." J. Haswell.
Southampton Camera Club. "Old Processes and New Methods." W. F. Slater.
South London Phot. Soc. Jumble Sale.
Wallasey Amateur P.S. Competition: Holiday and Outing Prints.
Walthamstow and Dist. P.S. Affiliation 1920 Competition Prints.

TUESDAY, DECEMBER 20.

Royal Photographic Society. Lantern Meeting, "The Chamounix Valley." C. Ralph C. Petley.
Birmingham Phot. Soc. "Working up the Exhibition Print." E. A. Bierman.
Exeter Camera Club. "Enlarging." F. Walker.
Hackney Phot. Soc. Lantern Slides by Members.
Manchester A.P.S. "Some English Cathedrals." F. Eastwood.
Nelson Phot. Soc. Inter-Club Slides.
South Glasgow Camera Club. Print Criticism.
South Shields P.S. "Flashlight Photography." Geo. A. Keen.
Stalybridge P.S. "Through the Grecian Archipelago and the Near East." W. Butcher and Sons.
Tunbridge Wells Amateur Phot. Assoc. "How a Reflex Camera is Made." W. Butcher and Sons.
Tyneside P.S. "Photography in the Field." H. O. Thompson.
Welfare Camera Club. Social Evening.

WEDNESDAY, DECEMBER 21.

Accrington Camera Club. Hot-Pot Supper.
Borough Polytechnic P.S. 2nd Lantern Slide Competition.
Croydon C.C. Affiliation 1921 Lantern Slides.
Dennistoun Amateur Phot. Assoc. Calendar Competition.
Edinburgh Phot. Soc. "Exposure." W. Chalmers.
Ilford P.S. "Photography in all Weathers." F. Bradley.
Partick Camera Club. "The River Kelvin." St. George Co-op. Camera Club.
Rochdale Amat. P.S. "Combination Enlarging." J. C. Wild.
South Glasgow Camera Club. "Enlarging."
South Suburban P.S. Members' Evening. Question Box.

THURSDAY, DECEMBER 22.

Gateshead Camera Club. "The Cornish Riviera." G. W. Rly.
North Middlesex Phot. Soc. "Psychic Photography."
South Glasgow Camera Club. Whist Drive.

FRIDAY, DECEMBER 23.

Partick Camera Club. "Finishing and Mounting the Exhibition Print." A. T. Edgeley.

SATURDAY, DECEMBER 24.

Accrington Camera Club. Xmas Eve Social.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, December 13. Mr. F. F. Renwick in the chair.

Dr. G. I. Higson, D.Sc., F.I.C., read a paper on "Potassium Persulphate as a Reducer." He first showed the method employed for exhibiting the action of a reducer upon a scale of densities, viz., by plotting the percentage reduction of each density against the original densities. In this way the action of a reducer, which acts proportionately on all densities, is shown by a straight horizontal line: one which acts more or less on, say, low densities is shown by a corresponding inclination of the line, whilst other abnormalities are represented by the curve of the line.

Potass persulphate differed from ammonium persulphate in being much less soluble, and, therefore, more readily purified by recrystallisation. Its action was accelerated by acids and by traces of copper and iron salts; when used as a plain solution in distilled water it exerted considerably greater proportional action on the heavier densities. Dr. Higson described its characteristically erratic behaviour when a certain quantity of chloride was present, and proceeded to discuss his observations in reference to the theory of persulphate reduction.

A paper by Dr. S. E. Sheppard, entitled "The Action of Soluble Iodides and Cyanides on the Photographic Emulsion," was read in abstract by Mr. K. C. D. Hickman, who gave an account of the experimental work, and discreetly permitted himself to transmit the theoretical conclusions in the form of quotations verbatim from the paper. Dr. Sheppard's observations of the fogging effect (on subsequent development) produced by treating plates with iodide solution had been contested by Mr. Renwick, who had shown that the effect of the iodide on Ilford plates was to produce red-sensitiveness. By further experiments Dr. Sheppard had confirmed his original results, obtained on Seed plates, and also the specific red sensitising when Ilford plates were used. The action of iodide, and also of cyanide, thus took specific forms, varying with the nature of the emulsion. With Eastman commercial film, strong red-sensitiveness had been obtained.

Mr. E. C. Toy, M.Sc., then read a note on "An Improvement in the Goldberg Wedge," in which he briefly described the occurrence under certain conditions of curved markings on plates exposed behind a Goldberg gelatine-pigment wedge. He explained how the defect was permanently cured by interposing a thin strip of paper between the wedge and its front cover glass, and also between the wedge and the plate.

Mr. Renwick then gave a demonstration of a new absorption filter for ultra violet light, replacing æsculine. The substance employed was an aceto-amino-quinine, which was one of a series prepared by Miss Hamer, of Cambridge University, which had been examined in the Ilford laboratories. It absorbed ultra-

violet light much more perfectly than æsculine (a German monopoly), was practically non-fluorescent, and also was much less susceptible than æsculine to darken on exposure to light. Mr. Renwick showed the action of the first filter which had been prepared commercially.

Votes of thanks were accorded to authors and readers of papers.

CROYDON CAMERA CLUB.

Messrs. G. A. F. Gildea and W. E. Tapper, in place of Mr. Gooch, at very short notice undertook to demonstrate the merits of "Vitegas," one of the products of Kosmos, Ltd., and judging by the pictures on the walls a very good paper indeed, yielding by development a fine warm-black, a long scale of gradation, and, all important, a luminous image.

The president, Mr. John Keane, in his short introductory address, must have cheered the somewhat youthful visitors by expressing a conviction that in all probability they would leave the premises alive. Mr. Gildea, looking a little preoccupied, then rose, mentioned that Vitegas is neither a gaslight nor a bromide paper, that the image gradually builds up, and exposure should be adjusted to the fixed time of development, which is 1½ minutes. He followed with some general information (all comprised in an excellent booklet issued by the company), and then suggested an immediate adjournment to the dark-room.

Judging from reports furnished by half-asphyxiated members who emerged at intervals, three successful enlargements were made, and sepia toning was demonstrated. Finally, all returned, were regaled with free samples on a generous scale, and the discussion began

Mr. Walker mentioned that only on one glossy developing paper had he secured good sepia tones, and that one was Vitegas. Considering that he consistently experiences disaster at every turn, the fact that the paper is Walker-proof is a testimonial of great value. Mr. Wadham, alluding to a Vitegas bromoil paper, said an absent member had tried it, and the results were bad eggs. "The bromoil paper is not yet on the market, but shortly will be," politely said Mr. Tapper, a nasty tap for Mr. Wadham. Mr. Harpur, afflicted with a severe cold, wheezed his usual anathemas against bromoil, and the president and secretary and other criminals addicted to the vice. "Is it not a fact that you have given it a good trial and dismally failed?" tenderly inquired Mr. Salt, a question which so aggravated Mr. Harpur's indisposition as to render him quite inaudible. Mr. Purkis next obliged with a few remarks on scientific development, and Mr. Moody spoke in high terms of the results he had secured on the paper. It also transpired that Vitegas can be pronounced in more ways than one without any loss of quality. Oxford does it one way and Cambridge another. Billingsgate and other districts would doubtless add to the number. A hearty vote of thanks was accorded for a thoroughly practical demonstration of a product which all considered possesses real merit.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

The fourth annual dinner of the Society was held on Monday, December 5, 1921. Mr. John Campbell Harper, President of the Society, presided over a company of thirty-four ladies and gentlemen. The guests of the Society were Mr. William Crooke, photographer, Edinburgh; Mr. Morley Fletcher, Director of the College of Art, Edinburgh, and Mrs. Morley Fletcher; and Mr. and Mrs. Robert Scott.

The President, in proposing the health of Mr. William Crooke, the guest of the evening, referred to Mr. Crooke's pre-eminence in artistic camera portraiture, not only in Edinburgh, but the whole world over. He said that Mr. Crooke's position in photography, which had been gained by consistent hard work and study, was unique. The high standard and quality of Mr. Crooke's work merited recognition and great praise wherever it was exhibited. Mr. Crooke had gained many honours in photography at exhibitions both at home and abroad, and his recent success in winning the "Tacoma Cup" over allcomers in Vancouver, had brought distinction, not only to himself, but also to photographers in Edinburgh, and the Society of which he was an honoured member. The President conveyed to Mr. Crooke the cordial congratulations of his professional brethren in Edinburgh, and wished him in their name long life, health, and prosperity.

Mr. Crooke, in reply, gave an interesting retrospect of his early career. He said that it was absolutely essential if a photographer was to be a success that he should have an extensive knowledge of art. He deprecated the word "posing," as he thought it was the duty of the photographer to interest the sitter in a subject which appealed to him, so that a mental picture of the sitter might be obtained. The recent honour which he had gained at Vancouver was unexpected and unsought. He had been asked to send some of his work for exhibition in Vancouver, and in complying with the request he had merely the desire to further the interests of photography in that country. He highly appreciated the honour which the Society had done him in inviting him as a guest, and for all the kind words which the President had said about him.

Mr. Robert Scott proposed the toast of the Edinburgh Society of Professional Photographers, and in doing so congratulated Mr. Harper on his being appointed President for the coming year. He complimented them on what they had achieved in getting classes for lighting and composition started at the College of Art, and a class for optics and chemistry inaugurated under the auspices of the Edinburgh Education Authority. He said that this Society's work had been closely followed by the photographers' societies in England and elsewhere, and had aroused great interest amongst them. He strongly urged the Society to maintain its position as leader and to go forward towards greater achievements. He thought that the time was most opportune for combining forces with the Glasgow and District Society, and the formation of a northern federation to embrace the provincial towns. He thought that the Society should seriously consider holding a Congress here, combined with a photographic exhibition of members' work.

Mr. E. D. Young suitably replied, and said that he associated himself with every word which Mr. Scott had said in regard to forming a northern federation, and he was sure that the Society would undertake the ground-work, which would be a task of some magnitude and importance.

Mr. E. D. Young, in proposing the toast of "The Guests," Mr. and Mrs. Morley Fletcher and Mr. and Mrs. Robert Scott, said how much the Society was indebted to Mr. Morley Fletcher for his indefatigable support and influence in getting the classes for photographers at the College of Art made a reality. Mr. Robert Scott, he stated, was one of themselves, and had gained the esteem and respect of his fellows by his happy nature, his strenuous activity on their behalf, and his sterling loyalty.

Mr. Morley Fletcher, in reply, said that his wife and he felt greatly honoured by being invited as guests of the Society to their annual dinner, and they highly appreciated the members' kindness. He said the directors of the College now looked upon the class in connection with the photographers as a permanent part of the College curriculum. He was sure that under the able tuition of Mr. E. D. Young and Miss Grey, they would be much appreciated by the pupils. Mrs. Morley Fletcher, in returning thanks, gave a delightful and dramatic rendering of two stories from Æsop's fables, which gave much enjoyment.

Mr. Pelham S. Moffat, in a humorous and racy speech, proposed "The Ladies," and Miss Grey, in her usual graceful and accomplished manner, returned thanks.

Mr. Philip, Mr. E. D. Young, Mr. William Crooke, Mr. Yerbury, Mr. Hutcheson, and Mr. Gordon Brown contributed songs during the evening, which were thoroughly enjoyed, and Mr. Lennie's entertainment and Mr. Nelson's recitation also gave great pleasure to the company. Mrs. E. D. Young acted as accompanist, with much acceptance.

Mr. E. D. Young proposed a vote of thanks to the chairman, who, in reply, said that if the Society existed only for the annual dinner, it warranted its existence after the jolly evening they had spent together.

A vote of thanks was also moved to the vocalists and entertainers, members of the Society and guests who had contributed so much to the evening's enjoyment

The company broke up after singing "Auld Lang Syne."

News and Notes.

MR. R. B. FISHENDEN has resigned his position as director of the inting department of the Manchester College of Technology, after teen years' association with that institution, and has accepted position at the London office of Messrs. Stephenson, Blake & ., type founders, 33, Aldersgate Street, E.C.1. On leaving nchester, Mr. Fishenden was presented with a sectional book- e by the part-time evening staff of the College and with a Shef- ld plate tea service by the Printing Crafts' Guild, as tokens of regrets felt in his severance from these associates.

PHOTOGRAPHERS OF PHILADELPHIA newspapers and local motion- ture enterprises have banded together in an association of otherhood to "create a better understanding between the staff otographers of the many publications in Philadelphia using otographs and to incorporate among camera men a higher sense their duty while working on important assignments." The iladelphia News Photographers' Association is declared to be in no sense a labour union." An organisation meeting was held November 23. At that time, Walter Crail, of the "Public dger," was elected president; Charles M. Clark, of the Fox ws, vice-president; and Stanley D. Levegrove, manager of the Ledger" Photo Service, secretary and treasurer. The associa- n has affiliated with similar organisations in Washington, New rk and Boston.

THE POPULARITY OF LANTERN LECTURES.—The Lecture Agency ates that the leader of the Mount Everest climbing party, Mr. orge L. Mallory, is giving an account of their experiences early January on behalf of the committee of the expedition. This, the t of a series, will be at Queen's Hall on January 10, and the ory, illustrated with wonderful mountain photographs, will be of ceptional interest. Commenting on this announcement, the Evening News" "Man About Town" writes:—"Lecturing, ntrary to the generally held opinion, has not suffered from the mpetition of the cinemas. So far from there having been a slump ere has been, since the war, a greater demand than ever for really st-class lecturers, especially in the industrial districts. Draw a ne from Cardiff to Hull on the map and north of it there is ughly a ten times stronger demand for lectures than in the South. hat is apart from London of course. The mining centres are eat patrons of the first-class literary or scientific lecture."

Correspondence.

* *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

* *We do not undertake responsibility for the opinions expressed by our correspondents.*

DEVELOPING TANKS

To the Editors.

Gentlemen,—We have been reading your comments in the cur- nt issue of the "British Journal of Photography" on develop- g tanks, and as photographers who have adopted this method tirely with Eastman portrait film we find that your remarks do t apply, at least, to the above mentioned film. During the whole me we have used this system we have never had an unevenly veloped film, neither have we ever found it necessary to rock e tanks or agitate the solution in any way, the films being erely placed in the tanks (in the Eastman hangers) and left for e requisite period, and when taken out, they will *always* be ound to be without blemishes of any kind.

Yours faithfully,

REGINALD W. BROWN & SON.

Boulevard Studio, Weston-super-Mare.
December 12.

Commercial & Legal Intelligence.

NEW COMPANIES.

THOMAS EVANS AND SON (PENDLETON), LTD.—This private company was registered on December 1 with a capital of £1,500 in £1 shares. Objects: To take over the business of photographers, photographic material printers, formerly carried on by T. Evans in Whit Lane, Pendleton. The first directors are:—H. N. Evans (permanent governing director), 7, Whit Lane, Pendleton; J. Jones, Claremont Road, Pendleton. Qualification: 100 shares. Remuneration of H. N. Evans, £350 (with an additional £150 per annum as governing director); of J. Jones, £250 per annum.

BARON PRODUCTS CO., LTD.—This private company was registered with a capital of £5,000 in £1 shares. Objects: To acquire land, buildings, and hereditaments in England for the erection of a factory, etc., for the manufacture of cameras, emulsions, plates, papers and photographic materials etc. The first directors are:—H. R. Smith, 4, Hereford Road, Southsea; G. H. Meades, "Havenholme," Havant, Hants.; P. H. Palmer 1a, Addington Terrace, London Road, Portsmouth (all provision merchants). Qualification: 100 shares. Secretary: G. H. Meades. Registered office: 27, St. Thomas's Street, Portsmouth.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors

J. A. D.—For enlarging dense negatives there is no better light-source than a small enclosed arc lamp. The Westminster Engineering Co., Victoria Road, Willesden Junction, London, N.W.10, make an excellent sound small model.

J. N.—As a general rule the lens should be *slightly* higher than the head of the sitter, and the camera pointed down until the figure is properly centered upon the plate. The camera should be higher for a person with a short nose than for one with a long one. With children sitting on the floor, or on a low stool, the camera must be brought down as far as necessary, sometimes within two feet of the floor.

E. GARDINER.—We have several times comes across old lenses bearing the same monogram as yours. They were sold by various dealers 40 or 50 years ago. The specimens we have seen appeared to be ordinary French portrait lenses. Before the introduction of the *f*/value system, every maker had his own way of marking diaphragms. Some made No. 1 the largest aperture and some made it the smallest. The numbers, therefore, bear no relation whatever to the apertures or the exposures.

E. F.—We should try carefully rubbing over the whole negative with purest essence of turpentine from the chemist, renewing the turpentine frequently on the cotton wool as medium is removed by it from the negative. If turpentine does not remove the medium entirely you might try immersing the negative in ether and gently rubbing it therein with cotton wool. Remember that ether is most highly inflammable, and must on no account be used in a room where there is a naked light.

W. H. D.—The separate A and B solutions of the "B.J." pyro-soda developer will keep in satisfactory condition for at least a year. The one-solution glycin developer keeps for a much longer time. We have used glycin paste, made according to this formula, years after it has been made up. The metol skin ointment has no special virtues for ordinary cuts or sores. There would be no object in using it in preference to a good antiseptic ointment, such as one made with vaseline and boric acid.

D. O. S.—If you can have electric current supplied to the studio at a cost which is not prohibitive, we most strongly advise you to use electric light instead of gas. There is no comparison as regards efficiency and convenience between a half-watt electric installation and a gas mantle one. We do not answer your questions regarding the latter because we are perfectly convinced that you will think our advice good when we suggest that you should give up the idea of gas and consider putting in electric mains, and providing a half-watt installation of, say, 4,000 to 5,000 c.p. distributed among four to five 1,000 c.p. lamps. Your place is particularly unsuitable for gas on account of its lowness, and in summer the heat from the twenty or so incandescent mantles, which are necessary, would be very great, unless you had very special means of ventilation.

E. B.—We can tell you how to clear off slight veil before intensifying, although not in the exact formula that you ask for. At the same time it seems an unsatisfactory state of things to have to do this reduction and then intensifying in order to get decent negatives for platinotype printing. The best means of clearing off slight veil is to make up the Farmer's reducer by adding a few drops of 10 per cent. potass ferricyanide solution to, say, 2 ozs. of 10 per cent. hypo solution You mustn't put the negative into this mixture, but you must apply it with a tuft of cotton wool to the negative. Add only enough ferricyanide to make a pale yellow mixture. If it acts too slowly, add a little more ferricyanide, but you mustn't overdo the action (we mean make it too quick) otherwise you will play havoc with the quality of the negative. By going over the negative from end to end and crosswise with the reducer you should be able to clear away veil from the shadows without perceptibly affecting other parts of the negative.

G. C.—(1) The usual blue toning formula, which is a better one than that which you quote in your question, is the following :—

10 per cent. solution ferric ammonium citrate...	2 ozs.	10 c.c.s.
10 per cent. solution potassium ferricyanide	2 ozs.	10 c.c.s.
10 per cent. solution acetic acid ...	20 ozs.	100 c.c.s.

The well-washed prints are immersed in this bath until the desired tone is given. Then well wash until high-lights are clear. This bath intensifies the image.

(2) The "Lanternscope" was supplied years ago by the firm of Tylar, of Birmingham. The apparatus simply consisted of a large magnifying lens fixed at one end of a box, whilst at the other was a to-and-fro carrier for the slides. Any optician could fix up a similar kind of appliance, for example the Premier Optical Co., 63, Bolton Road, Stratford, London, E.15, could do it for you. The most scientifically adjusted viewing apparatus of this kind is the "Verant" of Zeiss.

G. F.—We presume that you (1) wish to obtain more colour in the pink printing negative, and (2) to find some means of securing a silver image on a non-stretching support so as to enable you to work up prints made from each negative. (1) Instead of under-exposing the pink negative give a full exposure and development, and after development reduce the negative until thin in the middle and lower tones; then intensify with mercuric bromide and blacken with any non-staining developer, or if extreme contrast is required blacken with cyanide of silver. On the positive it is possible to obtain still further contrast by reduction and intensification. When making screen negative use a 100 ratio for the screen distance, and for the shadow stop either v/64 or v/96 to secure extreme contrast. (2) With regard to obtaining a silver image upon a non-stretching support. Use Kodak Transferotype paper and transfer the film containing the silver halide, before exposure or development, to opal glass, as given in the directions. When dry print on this film from negative and develop and fix as for bromide paper. Or coat opal glass with iodised collodion and sensitise in the usual silver solution, expose and develop with half strength iron developer, and before fixing re-develop with metol silver, the following being the formula :—

A.—Water, distilled	20 ozs.
Metol	144 grs.
Citric acid	96 grs.

First flow over the positive with the above A. and well drain, again flow over plus one-third the amount of the following solution B :—

B.—Distilled water	10 ozs.
Citric acid	130 grs.
Silver nitrate	½ oz.

After sufficient density has been obtained, wash and fix in 2 per cent. hypo, or 2½ per cent cyanide of potassium. Varnish negative with 5 per cent. gum dammar varnish, and when thoroughly hard lightly rub over surface with fine cuttlefish powder, so as to secure a tooth to enable the film to take pencil work, etc.

E. E. W.—(1) The book you refer to is "The Air-Brush in Photography," by G. F. Stine, published by the Abel Publishing Co., 421, Caxton Building, Cleveland, Ohio, U.S.A., price 3.5 dollars. (2) As regards persulphate it is not possible to recommend any special formula. The average formula of 10 or 20 grs. of ammonium persulphate in 1 oz. of water usually works quite well, with the addition—as is necessary—of a drop of sulphuric acid to about each 2 ozs. of working solution. The trouble with persulphate is that the commercial samples vary somewhat. We advise you to use that of Lumière. A little while ago MM. Lumière published a paper on avoiding irregularity in the use of the persulphate reducer. It would probably be of assistance to you, and no doubt MM. Lumière would send a copy on application to Lyons. The negative should preferably be dry when put into the reducer, and should be taken out a little before it has been sufficiently reduced and put in 5 per cent. sulphite solution to check the action of the bath sharply. (3) So long as prints are not given too much exposure and therefore are somewhat superficially developed, the developing formula (M.Q. or amidol) does not make much difference in the colour of the toned prints, either hypo-alum or bleach and sulphide. From your specimens it seems that you prefer a somewhat purplish tone, although many people would like the browner tones of the larger portrait specimens. You will get less staining in the whites with hypo-alum than with bleach and sulphide, but we are afraid we cannot see how we can say anything to help you beyond this. (4) As you are tied down to the use of the particular plates and cannot use a screen, the best thing you can do is to develop with a hydroquinone formula made up with caustic soda, similar to that in the 1921 "Almanac." This will give a great deal more contrast than M.Q. If the contrast is not sufficient, you can increase it by developing slightly, or reducing with Farmer's reducer if you develop fully, and then intensifying with Monckhoven's intensifier. Another plan is to re-copy the negative again on your process plate, and from the positive transparency make another negative, again on a process plate. The two extra stages enable you to get a considerable increase of contrast.

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Contents.

SUMMARY.

With next week's issue (December 30) it is hoped to include, as a Supplement, the index to the "British Journal" for the present year.

In a recent paper on the method of producing warm tones due to colloid silver by means of tin salts, Dr. F. Formstecher points out the special application of the process to self-toning papers. (P. 759.)

In a paper in "American Photography," Mr. Arthur Hammond usefully emphasises the importance of view-point and the unimportance of the focal length of the lens in determining the perspective rendering in photographs. (P. 761.)

In a leading article we give some hints to the beginner in professional portraiture on the equipment of a small studio as regards blinds, wall and floor coverings, furniture and backgrounds. (P. 758.)

The Professional Photographers' Association has appointed nine sub-committees to deal with the arrangements for the Congress to be held in September next. It has also obtained a concession in the supply of electric current at a reduced rate; and at a special general meeting has finally authorised the measures which have recently been in progress for its registration under the Companies' Consolidation Act. (P. 769.)

The awards made by the judges are published in the competition organised by Messrs. Wellington and Ward in which prizes amounting to £1,000 are distributed in part to professional photographers for the most beautiful portraits of women and in part to the sitters. (Pp. 758 and 770.)

A recent judgment in the High Courts exhibits the extraordinary view which can be taken in law of "personal luggage." (P. 757.)

Fish glue, supplemented by aid from the retoucher, will allow of satisfactory job being made of a broken negative. (P. 758.)

Particulars of the design of a portrait lens for which greater depth is claimed, and details of envelopes for daylight changing of dry-plates are contained in recent patent specifications. (P. 767.)

On Wednesday, in last week, the new mills erected by Messrs. Pirie's Photographic Paper Co., Ltd., for the manufacture of photographic raw and baryta-coated paper were formally opened. It was mentioned that during the war, with facilities inferior to those which have now been provided, Messrs. Pirie manufactured 1,000 tons of raw paper base. (P. 765.)

The Scottish National Salon will be held at Hamilton from February 11 to 25 next. The prospectus and entry form are now obtainable. (P. 770.)

The two chief causes of failure in making the iodine-cyanide reduced are the subject of a paragraph on page 757.

Considerable additions have been made to the collection of geological photographs preserved for reference at the Museum of Practical Geology. (P. 770.)

EX CATHEDRA.

Personal Luggage. The view taken by some of the railway companies recently that photographic apparatus carried by a passenger should be subject to a charge because it is not "personal luggage" has come into prominence lately. Some companies are endeavouring to impose this charge, although the Professional Photographers' Association recently ascertained that the rules of the Great Western Railway provide that cameras or photographic apparatus, up to 60 or 80 lbs. may be carried by the passenger without extra charge. A case which bears on the question was heard in the High Court on December 12 in connection with a charge made by the Great Western Railway Company for a violoncello which a professional musician had taken with him on two journeys. Mr. Justice Horridge and Mr. Justice Shearman declined to give a definition of "personal luggage," but fell back on that of Chief Justice Coburn, namely, that it is luggage which "is personal to the passenger and carried for his use or convenience." Accordingly, they held that a violoncello carried by a professional player was not personal luggage, whence it is to be inferred that the same article if carried by an amateur would come in the category of "personal." The solemn processes of law lead to so many comic conclusions that the foregoing will not arouse surprise. At any rate, the judgment may be regarded as a warning that, so far as cameras are concerned, it is not very likely that the Courts would hold a different view as between amateur and professional photographers taking apparatus with them on a railway. The man in the street will very properly ask how it is that such questions as these have not been settled by an officious and heavily remunerated Ministry of Transport in a way which does even justice to members of the community.

* * *

Iodine-Cyanide. Queries which reach us respecting inactivity of this reducing or clearing solution can usually be traced to one or other of two causes. The first concerns the making of the iodine solution. Although iodine flakes dissolve almost at once in a strong solution of potassium iodide, they dissolve with much greater difficulty in a weak solution, and, owing to the dark colour of the solution, undissolved iodine may escape notice. The best way to dissolve the iodine is to mix the flakes with the required quantity of the potassium iodide and then to add only just enough water to dissolve the latter. The iodide then dissolves almost instantaneously and remains in solution when adding the further required amount of water. By working in this way less potassium iodide may be used, a consideration in view of the high cost of this chemical. The second cause is the very variable quality of commercial potassium cyanide. For this reason it is very little use to prescribe a definite proportion of cyanide solution for

admixture with a given quantity of iodine solution. The best plan is to use cyanide guaranteed of 80 or 90 per cent. strength, when the mixture should work with the required activity when made up in the round proportions which are given in the various formulæ. On the other hand, a less pure sample of cyanide will require a larger quantity of the solution in order to produce an active mixture with the iodine.

* * *

Broken Negatives. The disaster of a broken negative is an ever-present contingency which must be met as the printer best can. Several excellent ways have been published, that most frequently recommended being the cementing of the broken pieces with Canada balsam. This is hardly applicable to the ordinary studio in which there is rarely any balsam to hand, nor, what is more important, anyone who can use it, for Canada balsam is very sticky, and especially so where not required. Any good fish glue, such as is sold under various names, Seccotine, Mendine, and others is equally effective, although the refractive index is not the same as that of the balsam, which, by the way, does not render the crack invisible. The broken edges should be very thinly coated with the glue and brought into contact while the negative is lying on a flat, wooden surface covered with thin paper. A few push-pins should be driven in round the edges to prevent movement, and the whole put away in a dry, warm place for a couple of days. When dry, a thin line of opaque should be painted over the join so that there is a white line in the print, this being much easier to work out than the unequal shadow of the crack.

* * *

Lagging Behind. The showcases and windows of portrait photographers are always interesting, whether the contents be good or bad, and we have often felt that a little heart-to-heart talk would be beneficial to many of our friends. When visiting many of the smaller towns we have often been struck by the amount of utterly out-of-date work that is being shown by old-established men. It is not enough now to make a sharp, well-exposed negative and to print it upon glossy P.O.P. if a discriminating public is to be satisfied, nor is the situation improved if bromides of very poor quality are shown in addition. The poorer class may accept these, knowing of nothing better, but those residents who periodically visit the larger towns where the work is often of the highest class, may be excused if they patronise the photographers there instead of their own townsmen. The latter have the matter in their own hands if they will only awake to their opportunities and use to the full the suggestions which displays by the large photographers contain. A day or two spent in studying the styles shown by the masters of the art, followed by a demonstration of bromide and gas-light printing, would be the best investment many of our country friends could make.

* * *

The Wellington Competition. On another page of this issue Messrs. Wellington and Ward announce the names of the prize winners in the unique competition which closed on November 30 last. It will be remembered that Messrs. Wellington offered £1,000 in prizes for the most beautiful portraits of women. Moreover, the arrangements provided for the award of substantial prizes to the sitters in addition to those to the photographers, thus offering a special inducement for people to be photographed by a given date. We learn that the success of the competition has been thoroughly shown by the thousands of photographs which have been entered, each photograph necessarily representing an order from a new sitter, or a further one from a former customer. T judges, namely, the Earl of Carnarvon, Lady Diana D Cooper and Mr. Alfred Ellis, had a difficult task in maki the awards, for the entries represented a very high quali of work. There can be no doubt that the prints su mitted in this competition would form in themselves exhibition of the utmost interest and educative value professional photographers. We are therefore glad hear that Messrs. Wellington and Ward are not resti on the oars of their enterprise, but intend to make f use of the photographs which have been brought t gether. It is hoped that before very long at least a sele tion of the pictures will be available for inspection at t Wellington Gallery, 101, High Holborn, London, W.C. We imagine that visitors to the Photographic Fair ne May will have an opportunity of seeing them.

EQUIPPING A SMALL STUDIO.—I.

It is a matter of some difficulty for the beginner portrait work to obtain the most efficient equipment f his studio at a reasonable cost. If he can afford to gi carte blanche to one of the large dealers he can rely being well served, but he will probably find that t salesman's ideas are rather expansive, and that he provided with a good many items which are not essenti and which he would be glad to exchange for others wh he has gained a little experience.

The young photographer who has served a prop apprenticeship, usually follows in the steps of his mast and procures as nearly as possible duplicates of t apparatus with which he has been accustomed to worl This is not a bad plan if his employer has been an up-t date worker, but this is not always the case, and th beginner will often find that he could have started at le cost and with more convenient tools, by getting outsid advice if he is not confident of his own judgment. If h be an amateur carpenter he can effect a considerabl saving by making many of his own fittings, such article as reflectors, background frames and the like, calling fo very little skill in construction. We would suggest tha the first outlay should be that of fifteen pence for a cop of "The Portrait Studio," in which he will find sketche of some of the most necessary fittings.

Assuming that the studio is entirely bare, the firs step is to provide an efficient system of blinds or curtains In our experience the latter, although only costing fraction of the price of blinds, are more satisfactory, bot for ease in working and effectiveness in controlling th light. The festoon system should be used for the to light and straight curtains in two rows for the side. I the studio has a single slant or high side-light the matte is further simplified, as all the curtains will be upon on plane. Dark blue, dark green or black casement cloth and white nainsook or madapollam are satisfactor materials. Black or other dark-coloured Bolton sheetin is more durable, and is recommended where much sun light falls upon the glass; though more costly at th outset it is much more durable and in the long run i probably cheaper.

If the floor is not in sufficiently good condition to stair and polish, it should be covered with plain linoleum, which may be had in various colours to suit the tint o the walls. A small carpet should be placed at one end, as it is not only useful for full-length figures and posing children, but gives a cosy and finished effect to the studio. It is not advisable to cover all the floor with carpet, a this makes the camera difficult to use and adds considerably to the work of keeping the place clean.

Some means of warming is essential, and for thi

purpose we do not think anything is better than the closed stoves in which anthracite is burned. These can be kept going night and day during the winter; there is no labour of lighting daily and the studio never gets cold. In a studio so warmed snow will only remain on the roof in the most severe weather. If gas be preferred it is a good plan to use it in a radiator which can also be kept going continuously. Open fires, either for coal or gas, are to be avoided, as there is a risk of setting fire to light draperies or of children burning themselves if left unwatched for a moment.

Furniture is the next consideration, and considerable judgment must be exercised in its choice. Modern taste has banished "photographic" furniture from the studio. No longer are to be seen such monstrosities as multiple back chairs and weird settees which were never to be found in any dwelling; their places have been taken by reproductions of good specimens of more or less antique chairs and tables. These may be found at the principle photo-stock houses, or they may be purchased of the ordinary furnishing establishments; the latter, however, are not always willing to sell single chairs, and the photographer should avoid having duplicates of any one pattern. Even the reception-room furniture should be chosen with a view to its use in the studio as needed. We must here repeat a word of advice which we have already given, that is, not to buy any chair, settee, or other seat without having observed the effect of a lady model in it. The arms of many chairs are very unsuitable for posing the figure gracefully, and no matter how fine the design may be otherwise this point must never be overlooked. A set of grouping stools of various heights is a very useful thing, not only for groups, but for providing seats of various heights for bust portraits.

Backgrounds are now much simpler than they were a few years ago, when a considerable number of interiors and exteriors were regarded as necessary. For a small studio four, each measuring eight feet by six, or if there is room eight feet square, will be found sufficient. One black, or nearly so; one white, with a floor extension; a suggestion of foliage and a medium-toned cloud will meet nearly all requirements, although two small graduated or cloud grounds about seven feet by five will often be found a useful addition. All backgrounds should be strained upon frames and fitted with castors so that they can be moved without effort to any part of the studio. Next in importance to the backgrounds come the reflector and the diffusing screen. The former may be home-made and consist of a frame about six feet by three feet fixed upon some easel-like arrangement, so that it can be tilted to any angle. There are some excellent reflectors made in two sections, each of which is pivotted, but these are rather expensive just now. The diffuser or head screen should be purchased, as it is likely to be rather clumsy if home-made. It consists of a circular wire frame covered with cheese cloth, and fitted upon a metal support provided with universal movement. This is a most useful appliance, and should on no account be omitted from the studio fittings. A second diffuser covered with black gauze will often be found useful for subduing the light upon the lower part of a figure, but it is not as essential as the white one. The camera and lenses, together with dark-room and printing apparatus will be dealt with in another article.

COLLOID SILVER TONING WITH TIN SALTS.

[Among the many methods of toning development prints to warm colours, that by means of tin compounds is of special interest, since the coloured images which are obtained contain metallic silver in the colloid form. Attention was first drawn to this method of toning by Neugschwender some ten years ago, and was the subject of detailed investigation by Miss Bertha E. Woolley and Mr. Charles W. Gamble, whose experiments were published in the "B.J." of December 26, 1913, pp. 978-991. In a recent issue of "Photographische Rundschau," Dr. F. Formstecher, in a communication from the Mimosa research laboratory, describes further experiments in this method of toning.—Eds. "B.J."]

The use of tin salts in the toning and intensification of the silver images on prints and negatives was first made by Neugschwender[1] in particular application to bromide prints. The method which he used seems, however, to be still scarcely known. Yet it is, as later experiments have shown, the best form of this process of toning. Two years later Desalme[2] is mentioned as the discoverer of the same process, in which also Namias[3] has made some experiments. At the time of the outbreak of war the method appears to have been forgotten (Dr. Formstecher apparently is ignorant of the paper by Woolley and Gamble.—Eds. "B.J."), and has recently been revived by Pokorny[4], who, however, recommends a very unsuitable form of the method. The process, therefore, appears deserving of further attention on the part of technical photographers.

Apart from its practical usefulness, the toning of prints with tin salts possesses considerable theoretical interest. Unlike all other toning processes, in which the silver of the image is either replaced by some other substance or converted into other chemical compounds, we have the only instance of a definite adsorption compound of colloid silver employed as a toning substance. The process possesses an analogy with the formation of the well-known purple gold, or purple of cassius, in which silver takes the place of gold. This compound results when a tin salt in alkaline solution is allowed to act on a silver salt. If stannous chloride is used, the following reactions may be regarded as taking place:

$$Sn + 4\,OH \quad SnO_2 + H_2O \quad 2\,Ag + SnO_2'' = 2\,Ag + SnO_2.$$

The fact that the resulting purple silver actually consists of an adsorption compound of silver and varying proportions of metastannic acid ($SnO_2 + H_2O$) has been shown by L. Wohler,[5] who has ascertained that the purple silver does not contain oxygen in combination.

Whilst as a general rule a coloured colloid silver very readily changes into the coarse grey silver, in the case of this purple silver the metastannic acid acts as a protective colloid against chemical action to such a degree that there is no tendency for the colloid silver to agglomerate. It will, therefore, be understood that the warm colours of deposits (brown to red) are extremely permanent. The particular colour of the purple silver which is formed is, of course, dependent on the structure of the original silver grain.

For the toning of development prints with tin salts, the prints must be first bleached: that is, the silver converted into a colourless and sufficiently soluble silver salt. Neugsch-

1. "Koll-Zeitschrift," 7 (1910), 225.
2. "Eders Jahrbuch," 1912, 500.
3. "Phot. Korr.," 1913, 503; also "Eders Jahrbuch," 1914, 551.
4. "Photograph," 1920, 89.
5. "Koll Zeitschrift," 7 (1910), 249.

wender recommended conversion into silver ferrocyanide by means of potassium ferricyanide. For this purpose a solution is used containing 150 gms. potass. ferricyanide in 1,000 c.c.s. of water, with addition of 1 c.c. of 25 per cent. solution of ammonia. Neugschwender also mentions that bleaching with copper chloride yields a deeper brown. The copper chloride bath is employed by Desalme and Namias, converting the image into silver chloride. The most advisable formula for this bath is:—

Copper chloride	30 gms.
Hydrochloric acid, sp. gr. 1.12	3 c.c.s.
Water	1,000 c.c.s.

But the colour of the prints or the degree of intensification is not materially affected by the process by which the images are bleached.

The bleached prints must be very thoroughly washed, and are then ready for toning. Toning can be done either separately, by successive action of a tin salt and an alkali, or in one single alkaline bath of tin salt.

In separate toning the caustic alkalies are not suitable, since they attack the gelatine film too strongly. Lime and baryta are also unsuitable, and so is lithium carbonate, on account of its very slight solubility in water. Thus there only remain the carbonates of soda and potash and ammonia (ammonium hydrate). The following are suitable strengths of baths in using these alkalies:—

1 part potass. carbonate in 10 parts of water.
1 part of soda carbonate cryst. in 5 parts of water.
1 part of ammonia, sp. gr. .910 in 20 parts of water.

Since it is difficult to make a clear solution of tin salts in pure water, addition of some acid is necessary. The following solution keeps well:—

Stannous chloride	10 gms.
Hydrochloric acid, sp. gr. 1.12 ...	1 c.c.
Water	100 c.c.s.

If the prints are placed first in the alkali bath and then in the tin solution the results obtained are invariably flat; for vigorous prints it is necessary to immerse first in the tin bath and then in the alkali. After removal from the tin bath prints must be thoroughly washed in order to avoid neutralising the alkali by acid which is carried over with the prints. Unless this is done, the results are erratic and show bad gradation. By washing for a shorter time after the tin bath the colours which are obtained are better, but within a short time the alkali bath is rendered so muddy by tin salt carried into it that it is impossible to work cleanly or to obtain any desired tone with certainty. I find it best to allow the tin bath to act for one or two minutes and the alkali bath for from three to five minutes.

Ammonia yields reddish-brown tones; soda carbonate, brownish-purple tones; and potassium carbonate, intermediate tones. As was to be expected, ammonia, since it is the weakest alkali, yields the finest silver grain; caustic soda yields the coarsest grain, of colour almost approaching a neutral black. But for practical purposes the combined method of toning is by far the better.

For this purpose a bath of sodium stannite is prepared as follows:—A solution is made of 10 gms. stannous chloride (free from acid) in 100 c.c.s. of water, and 70 c.c.s. of 10 per cent. caustic soda solution added with constant shaking until the precipitate first formed is re-dissolved. Water, 80 c.c.s., is then added. A bath of potassium stannite is prepared in a similar way, using, however, 100 c.c.s. of 10 per cent. caustic potash solution and 50 c.c.s. of water for each 100 c.c.s. of 10 per cent. stannous chloride solution.

With bromide prints, the sodium stannite bath yields purple-black tones, whilst the potass. stannite bath gives brownish-black tones. Prints on gaslight papers yield warmer tones, *e.g.*, sepia-brown, resembling the results of platinum toning, with the sodium stannite bath; and a somewhat reddish tone, somewhat recalling that of selenium toning, with the potass. stannite bath.

The combined baths (tin salt and caustic alkali) keep fairly well, especially if always filtered shortly before use. As the substance of the toned image contains only metastannic acid in addition to silver, the prints are extremely permanent, and on this account the process deserves more attention than it has hitherto obtained.

The process of tin toning is applicable also to P.O.P. prints and, with these, allows of effects being obtained which cannot be secured by other methods. It is, of course, plain that P.O.P. prints can be toned by the process only after fixing, otherwise the high-lights and the uncoated surfaces of the prints would be stained yellow or greenish. Addition of stannous salts to the combined toning and fixing bath is out of the question, since it simply gives rise to pronounced sulphur toning. Nevertheless, this method has been both recommended and patented, but can hardly have obtained any use in practice.[6]

If fixed and well washed, P.O.P. prints are placed in a bath of stannous chloride; in the case of collodion prints there is scarcely any perceptible alteration of the colour. Prints on matt-albumen paper, probably in consequence of the fine grain of the image, show a slight apparent effect, especially if the immersed prints are allowed to remain freely exposed to the air, when the adsorbed stannous oxide is converted into stannic oxide. Moreover, there is scarcely any toning action by using a sodium stannite solution. For these reasons attempts were made, as in the case of development prints, to bleach and then to tone. Completely bleached prints, on subsequent treatment with stannous salts, yield very flat gradation with yellowed high-lights, the colour after a short time of toning being red and brown after longer toning. The only satisfactory results were obtained, at any rate with collodion paper, by bleaching incompletely, that is to say, so slightly as to show scarcely any perceptible effect.

I afterwards tried the effect of potass. ferrocyanide as a bleacher, using a solution of 150 gms. per litre diluted 100 times. Prints were immersed in this bath for about a minute and were then toned with the 1:10 stannous chloride solution diluted 20 times, or with the sodium stannite solution diluted 40 times. This process, however, gave prints of inferior reddish-brown tone with eaten-out high-lights.

A more suitable bleacher consists of a copper chloride solution (30 gms. in 1,000 c.c.s.) diluted 20 times. The most suitable toning solution for use with this bleacher is the 1:10 stannous chloride solution diluted 10 times.

The best results are obtained by leaving the prints in the copper bath for not more than one minute, well washing and then toning for one minute in the tin bath. They must then not be washed, but at once hung up to dry in the light. They then darken through formation of metastannic acid with considerable increase of the deposit of purple colloid silver. Subsequent washing does not alter the tone, but is unnecessary, as the unwashed prints are as permanent as those which have been washed.

It was thought that, owing to the fine grain of prints on print-out papers, stannic salts would have an appreciable action on unbleached prints, but it was found that a bath of stannic chloride is almost without effect on the tone of unfixed prints provided that, in order to avoid the slightest trace of sulphur toning, the print is thoroughly washed between use of the tin bath and subsequent fixation. Stannic chloride has an even smaller effect on the tone of fixed prints; and sodium stannate, prepared from stannic chloride and caustic soda, is equally weak in its action. On the other hand, a certain toning action takes place with fixed matt-albumen prints. It may be assumed that the following reaction takes place:—

$$Ag + SnCl_4 + 2\,H_2O \longrightarrow (Ag + SnO_2 + 4\,HCl).$$

The hydrochloric acid evaporates on drying the prints.

A better toning action was obtained with the following

6. "Eders Jahrbuch," 1913, 423.

bath:—10 gms. of commercial "tin salts" (sodium tin chloride $Na_2SnCl_4H_2O$) was dissolved in 100 c.c.s. of water and ammonia added (about 7 c.c.s. of solution of sp. gr. .910), so that the mixture remained slightly acid, without smell of ammonia, and clear after a quarter of an hour. This bath, unlike the more acid solutions, has no eating-out effect on matt-albumen prints; it has an appreciable toning action, though not a great one.

In practical work the use of gold in the purple colloid form is of more importance. Toning baths containing gold in admixture with tin salts have long been recommended.[7] The modern self-toning collodion papers, containing a considerable quantity of gold, are very suitable for toning with tin salts. By using the above mentioned "tin salts" bath instead of the customary bath of salt, reddish-brown tones are obtained with distinct intensification of the print.

By adding potassium bromide, or potassium iodide, to the bath the tone becomes bluer,[8] and at the same time greater intensification is produced.

The following, however, proved to be the best method for the toning of self-toning collodion papers with the salts. The paper is strongly printed, and is immersed for from 10 to 15 minutes in a 1 per cent. solution of potassium iodide, washed for a short time, and then immersed in the following bath:—

"Tin salts"	10 gms.
Water	1,000 c.c.s.
Ammonia, .910 sp. gr.	7 c.c.s.
Potassium iodide	1 gm.

The potassium iodide is added a quarter of an hour after the previous chemicals have been mixed. This bath must be used freshly prepared; it becomes coloured on keeping with formation of free iodine and then has a prejudicial action on the half-tones of the prints.

The prints are allowed to remain in the bath for 15 minutes, are then washed for 30 minutes in order to remove all traces of soluble tin salts, then fixed for 30 minutes in a 1:10 hypo solution, and finally thoroughly washed in the usual way. In this manner vigorous bluish prints are obtained of a kind which is not obtainable by any other process.

The tone may be made more reddish by using a preliminary sulphocyanide bath[9] containing 1 gm. of ammonium sulphocyanide and 1 gm. of potass iodide in 100 c.c.s. of water. This bath must be used before the above-mentioned solution containing both iodide and "tin salts." If it is used after this latter the blue toning effect of the process is very much less.

F. FORMSTECHER.

7. "Photograph," 1904, 126.
8. "Phot. Rundschau," 1921, 162.
9. See "Eders Jahrbuch," 1902, 84.

PERSPECTIVE IN PHOTOGRAPHS.

[The following article by Mr. Arthur Hammond, in a recent issue of "American Photography," while not offering any fresh treatment of the subject of perspective rendering by the photographic lens, usefully draws attention to considerations which too frequently are lost sight of by photographers of both portraits and landscapes.—EDS. "B.J."]

THERE are two kinds of perspective that concern the maker of pictures, whether he uses a camera and lens or whether brushes, paints or pencils are his chosen media. One is linear perspective and the other is aerial perspective. The former is the one that is generally associated with the term perspective, the latter properly should be considered in the study of values. All of us are familiar with the principles of linear perspective and the convergence of lines to a vanishing point that may be inside or outside the boundaries of the picture. We have, most of us, drawn diagrams in school of a railroad track with the lines of the track and other parallel lines all meeting at a point in the distance, and we have learned to draw the outlines of a cube with the lines converging to a vanishing point. In drawing with a pencil we have to study these things very carefully, no matter whether we are making an architectural plan or a purely decorative picture, for incorrect perspective would be a very obvious defect.

That the lens renders such perspective as this automatically and without any thought on the part of the photographer is the generally accepted idea, but this is only partly true. In one sense the perspective as rendered by a lens (provided the lens is free from distortion and the focal plane is at right angles to the axis of the lens) is correct in that a lens reproduces accurately exactly what is before it and in the field of view. But scientific accuracy is not always in strict accordance with what we imagine correct perspective to be, and the brain is always at work correcting our vision and making objects agree with our ideas of how they ought to look. For example, if we close one eye, thus bringing our vision in line with the camera that has only one lens, and hold up one hand about 12 inches from the other eye, the hand will appear large enough to cover and hide entirely a house or a large tree at some distance from us. If we stand close to a person who is holding out towards us a good-sized fish at arm's length the fish will, strictly speaking, appear to be very large in comparison with the person holding it, and if a photograph is taken from a close view-point with a lens of short enough focal length to include both the fish and the person holding it, we shall get a freak picture which will be strictly accurate but not at all in accordance with our ideas as to the relative sizes of the fish and the person holding it.

The correctness of the perspective as it appears to us depends very largely upon the distance between the lens and the objects photographed, just as it does on the distance between the eye and the objects we see. The closer we are the more violent will the perspective appear. To the eye, a hand 12 inches away actually appears so large as to obliterate a house 500 yards away, and a fish held out close to us actually is so large as to appear out of all proportion, but our brain tells us very emphatically that the hand is just an ordinary sized hand and that the house looks small because it is far off. It also corrects our actual impression as to the size of the fish. But the lens has no brain to work for it; it can only work according to the inexorable laws of optical science.

A short focus lens can include a wide angle of view. That is why such a lens is called a wide-angle lens. But the amount of subject that is included depends, naturally, upon the size of the plate or film that the lens covers. A short focus lens used with a large plate will include altogether more than can be taken in by the eye without turning the head. The amount of subject that can be seen by moving the eyes but without turning the head is included in an angle of about 25 deg., and the comparatively wide angle of about 45 deg. is that which is included by the lens commonly fitted to Kodaks and other cameras. Pictorial workers very frequently use lenses of about twice the usual focal length, a 10-inch lens for a 3¼ × 4¼ plate, for instance, instead of the usually fitted 5-inch lens, and thus they get an angle of view that corresponds very nearly to that of the human eye.

The perspective is governed not so much by the focal length of the lens as by the distance between the lens and the objects photographed, for the focal length of a lens is entirely comparative. A 6-inch lens would be a long focus lens if used to cover a plate only an inch and a half square, but a 6-inch lens used for a 5 × 7 picture would be a wide angle, short focus lens. If we took a picture on a 5 × 7 plate with a 6-inch lens we would get just the same perspective and the image would be just the same size as in a picture on a little 1½-inch plate made with the same lens *if the point of view in*

both instances was the same, but in the larger picture there would be more of the subject included. We could trim the 5 × 7 picture down to 1½ inches, and we would then have just the same picture as was taken with the 6-inch lens on the 1½-inch plate. If we wanted that picture to be 7 inches square we could enlarge it, but in order to get a 7-inch picture direct, *from the same view-point*, we would have to use a lens of longer focal length. We could not get the same result by going closer to the subject in order to make it larger with the 6-inch lens, for that would entirely alter the perspective. To get the same perspective in a large picture or a small one, we must take both from the same view-point. If the view-point is the same, the pictures will be identical as regards perspective, though they may vary in size, according to the focal length of the lens that is used. So we see that the perspective depends entirely upon the view-point, and the size is governed by the focal length of the lens. The reason why this is often misunderstood is that we judge the size of objects in a picture chiefly by the important objects in the foreground without paying much attention to the relative size of these objects and objects in the background. Suppose we are photographing a scene in which there are some trees and a background of distant hills. With a certain lens we can get the trees the size we want them by taking the picture from a certain view-point, but if we were using a shorter focus lens and wanted to get the trees the same size, we could only do that by going closer to them, and that would alter the relative sizes of the trees and the distant hills. In the two pictures taken with the long focus lens and the shorter focus lens, the trees might be about the same as regards size, but the distant hills would be entirely different. They would look smaller and apparently farther away in the short focus picture than in the one taken with the long focus lens.

Correct perspective and pleasing perspective often are thought to be synonymous terms, but, strictly speaking, they are entirely different. Perspective may be correct, but, at the same time, far from pleasing. The "big fish" picture already referred to and pictures of people lying down with their feet towards the camera, showing enormous feet and a very small head, are quite correct, but they are far from pleasing. Such things are what we actually see when we are at close quarters and when we look at things impartially, without paying any attention to what our brain tells us as to how they ought to appear. It is rather hard to do this, because the eye is not able to include as wide an angle of view as can be included by a short focus lens, nor can the eye see clearly at the same time a thing close to it and things farther off. I have just been holding up a graduated ruler about 6 or 8 inches from my eye, and when I am looking at the ruler and can see distinctly the lines and figures on it, the pictures on the wall about 8 feet away are blurred and indistinct. When I focus my eye on the pictures the ruler is blurred. The lens is a more perfect optical instrument than the human eye; it can, when stopped down to a small aperture, focus sharply both near and distant objects. The only way we can see near and distant objects clearly is by looking first at one and then at the other. Then, also, a lens can be made that can include a far greater angle of view than the eye. Without turning the head and without moving the eyeball in its socket, our vision embraces only a very narrow angle of about 4 deg. A wide-angle lens specially designed for working at close quarters can be made to include an angle of 90 deg. The lens usually fitted to cameras for average work includes an angle of about 45 deg.

The agreeableness or otherwise of the perspective is governed very largely—we might say almost entirely—by the points of view from which the picture is taken. To get objects of a reasonable size without going too close necessitates the use of a fairly long focus lens. A lens that would include about the same angle of view as we see ordinarily with our eyes would be a good lens for purely pictorial photography, and a 10-inch lens used on a 3¼ × 4¼ plate would be about right. Then we would get in our picture about the same perspective as we ordinarily see. Of course, it is not always practicable to use a lens of such focal length, and it is quite possible to get pictures showing agreeable perspective with such lenses as are commonly fitted, if the photographer will keep in mind the fundamental fact that perspective is governed entirely by the point of view and that the focal length of the lens determines only the size of the objects in the picture. Suppose we take a picture of a landscape—trees, with some hills in the background—with a 10-inch lens used for a 3¼ × 4¼ inch plate, and we get the trees, say, 2½ inches high. Then the distant hills will look about the same as they appear to us when we look at the scene from about the same point of view as we take to get the trees that size in the picture. Then suppose we take the same scene with a 5-inch lens on a 3¼ × 4¼ inch plate and make the trees the same size, 2½ inches high. We shall find that it is necessary to get a good deal closer to the trees, and we shall find that in the picture taken from the closer view-point, though the trees are about the same, the distant hills are dwarfed and are quite insignificant in size, so that they do not give a true impression of the scene as we remember it. But that is not the fault of the lens; it is due to the change in the view-point. If we were to take a picture with a 5-inch lens from the same view-point as we selected when using the 10-inch lens, we should find that the relative size of the trees and hills would be just the same; both would be smaller, and there would be more of the scene included in the picture, but if that portion of it containing only as much as was included in the 10-inch picture was enlarged to 3¼ × 4¼, it would be exactly the same as the picture made with the longer focus lens.

The important fact to remember with regard to perspective is that the focal length of the lens has nothing to do with it. The perspective is governed entirely by the selection of the point of view, and the focal length of the lens determines only the size of the objects included in the picture. The more distant the view-point, the less abrupt will the perspective be. A comparatively long focus lens, one that embraces only a fairly narrow angle of view, is said to give good perspective, but this is only because with such a lens the photographer is forced to adopt a reasonably distant view-point and is not tempted to get too close in the endeavour to make the objects larger in the picture.

The question of agreeable perspective is even more important in portraiture than in landscape work, for the lack of it is far more noticeable. In making large-sized heads a long focus lens must be used, because if we try to get size by going very close we shall get very unpleasant distortion of the features. The very common complaint that the hands in a portrait look too large is often due to the use of a lens that has not sufficient focal length to enable the photographer to select the best view-point. The lens should never be placed closer than 7 or 8 feet from the subject in making a portrait. If at this distance the picture is too small it can always be enlarged, and it is better to get a small picture that has good drawing and good perspective than a larger one that is distorted.

With regard to aerial perspective, that is something entirely different from linear perspective. It deals with the gradual loss of strength in colour and in light and shade in objects as they recede into the distance. This is a valuable aid to the artist, whether he be a painter or a photographer, in enabling him to impart to his picture the quality of "atmosphere."

Without atmosphere a picture looks flat, and is often uninteresting. The illusion of distance and the suggestion of separation of planes given by atmosphere impart a feeling of depth and spaciousness to a view that makes it more realistic. We get a suggestion of distance from the fact that objects in the distance are smaller in size than nearer objects, but if there is no aerial perspective there can be no suggestion of depth and space, and we do not get a proper separation of the planes.

Picture making is, after all, a means of conveying a suggestion of impressions, and there are certain common-sense

principles that are used as aids in creating illusions. The illusion of depth and space is best conveyed by the distant planes being softer and flatter in tone and having less decided light and shade contrasts and colour contrasts. The veil of atmosphere between our eyes and distant objects has the effect of making a light object appear darker and a dark object lighter, so that it is quite possible that a light object and a darker object both at a distance might both appear to be similar in tone. The photographer can control this to some extent by proper selection of suitable conditions, by the use of the right kind of plate or film and by the right adjustment of exposure and development. It is obvious that unless an atmospheric condition exists in nature at the time the picture is made it cannot be photographed. There are times when the air is very clear and dry and the distance appears unusually distinct and dark in tone. Those are ideal days for mountain climbing and for enjoying extended views from the mountain top, but, for picture making, they should generally be avoided, because at such times the illusion of distance is hard to suggest. The distance under such conditions does not look distant, it is so clear and distinct that it appears to be too near, and a picture made at such a time would be lacking in aerial perspective. As a general rule the early morning or late afternoon in the summer are better times for picture making than around noon. In the early morning especially, the atmospheric effect often is very strongly marked.

The use of the right kind of plate or film often means the use of an ordinary plate instead of one that is orthochromatic, because the ordinary plate tends to increase the atmospheric effect a little. The mist or haze is blue, and is therefore strongly actinic, so a plate that is very sensitive to blue would emphasise the haze, while an orthochromatic plate would represent it more as it really is. An orthochromatic plate does not, as is very commonly supposed, "cut out" the haze, it simply does not exaggerate it. There is some scope here for the photographer to use his own judgment. If the mist or haze already is strong enough, it would not be necessary to increase it, and a correct exposure on an orthochromatic plate with a properly adjusted filter would give the best effect.

With regard to exposure and development and their effect on the representation of atmosphere, the exposure must not be too short nor development too long. Too short an exposure always is a serious fault in photography, and it is especially detrimental to a proper rendering of the softened tones of distant planes. Over-development must be avoided, because it tends to block up and destroy gradation in the high-lights.

Photography is not by any means as mechanical a process as it is often supposed to be; there is a good deal of opportunity to exercise personal control, and a pictorial photographer must become thoroughly familiar with the possibilities of his craft, so that he can avail himself of their aid to the fullest extent.

Owing to the fact that we see things with two eyes while the camera usually has only one, it is sometimes necessary to exaggerate and make the most of atmospheric effect in separating planes. Our stereoscopic vision imparts a roundness and solidity to objects we see, and helps very much in placing them correctly, one behind the other. A stereoscopic photograph is vastly more convincing in this respect than one made with only one lens, so it is often quite permissible and quite necessary for a photographer to accentuate mist or haze in the atmosphere as much as he can. This is another reason why a long focus lens is helpful. Its use enables a photographer to select a more distant view-point, and the greater distance between the camera and the objects photographed necessarily increases the amount of atmosphere.

A suggestion of aerial perspective can also be conveyed by selective focussing, which simply means having the important objects in the foreground a little more sharply focussed than those in the background. This tends to make such objects stand out more clearly and helps to separate the planes. If a semi-achromatic lens is used intelligently it will help even more in separating planes, because it can be so manipulated that the quality of definition will vary in the foreground, the middle distance and the distance, and yet there need not be any part of the picture that is so much out of focus as to lose form and coherency and become so much blurred as to be entirely meaningless.

ARTHUR HAMMOND.

THE ABSORPTION OF LIGHT BY TONED AND TINTED MOTION PICTURE FILM.

A communication from the Research Laboratory of the Eastman Kodak Company.

(*Concluded from page* 750.)

In fig. 5 are shown the results obtained on samples 30 and 31, namely, cine green No. 2 (A) and (B). In this case it will be noted

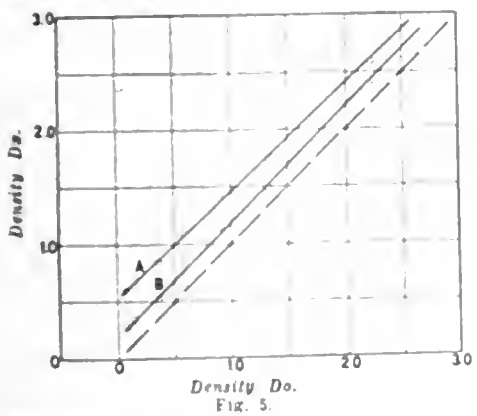


Fig. 5.

that the curves are (to within the errors of measurements) straight lines parallel to the line at 45 deg. to the X axis, indicating that in this case no measurable change in the photographic quality other than the uniform increase in density has resulted from the action of the tinting dye. The curves shown in figs. 4 and 5 are typical of those obtained on all of the samples thus far examined, the cine orange and cine yellow samples behaving as shown in fig. 4, while all other tints appear to behave as shown in fig. 5.

In preparing the tinted samples the following dyes were used, the figures given being the amounts of the various dyes per 200 litres of water.

Tint.	Amount. Grams.	Name of dye and manufacturer.
Cine red ..	.. 250	Amaranth (H. A. Metz & Co., N.Y.)
Cine scarlet	.. 250	Crocein scarlet (MOO) (National Aniline and Chemical Co., N.Y.)
Cine orange	.. 250	Wool orange (GG) (National Aniline and Chemical Co., N.Y.)
Cine yellow	.. 250	Wool yellow, extra conc. (National Aniline and Chemical Co., N.Y.)
Cine green, No. 1	400	Acid green (L) (National Aniline and Chemical Co., N.Y.)
Cine green, No. 2	400	Naphthol green (B conc.) (White Tar Aniline Corp., 56 Vesey St., N.Y.)
Cine blue ..	250	Direct blue (5B) (Essex Aniline Works, 39, Oliver St., Boston, Mass.)
Cine violet ..	250	Fast wool violet (B) (National Aniline and Chemical Co., N.Y.)

Transmission of Dye-Toned Samples.

In colouring film by this process, the positive is bleached in a suitable bath and then immersed in a solution of the dye being used. This dye is mordanted to the image, thus producing the dye tone. Samples were prepared in exactly the same way as for the dye tinting process, an unexposed, fixed-out sample, a normal picture, and a sensitometric strip being prepared in each case, and all tests run in triplicate. The results obtained with the fixed-out sample and the picture are given in Table 2. It will be noted that the transmission of the unexposed, fixed-out samples is uniformly high for all samples. This is typical of this process, since very little mordanting of the dye occurs, except where there is a bleached silver image. Since these samples were unexposed, the only silver present was that due to the inherent fog of the material, which is relatively low, so that in these samples very little bleached image is present upon which the dye may be mordanted.

Table No. 2.—Transmission of Dye Toned Film.

Sample.	Name.	Plain film. D.	Plain film. T.	Plain film. T_r.	Picture. D.	Picture. T.	Picture. T_r.
0	Untoned	0.055	88	100	0.84	14.5	100
9	Bismark brown	0.17	67	76	0.96	10.9	75
12	Malachite green (A) ..	0.16	69	78	1.10	8.0	55
10	Malachite green (B) ..	0.17	67	76	1.12	7.6	52
11	Malachite green (C) ..	0.18	66	75	1.15	7.0	48
15	Safranine (A)	0.18	66	75	1.00	10.0	69
14	Safranine (B)	0.18	66	75	1.03	9.0	62
13	Safranine (C)	0.18	66	75	1.20	6.3	43
18	Auramine (A)	0.15	71	81	0.86	14.0	96
17	Auramine (B)	0.16	69	78	0.90	13.0	89
16	Auramine (C)	0.16	69	78	0.93	12.0	83

In fig. 6 are shown the measurements obtained on one of the sensitometric strips dye-toned with Malachite green. It will be

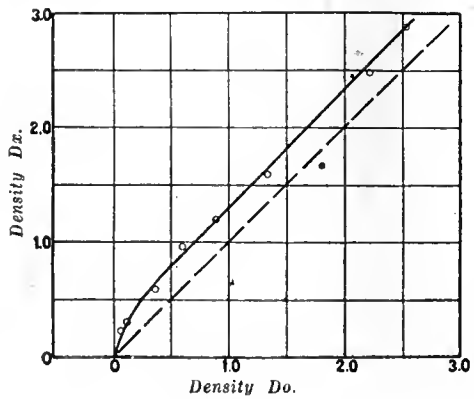


Fig. 6.

noted that in the region of higher densities that the curve is parallel to the 45-deg. line, thus indicating that in this region the increase in density is independent of the original density, but in the regions of lower density this is not the case, as is indicated by the curve in fig. 6. The high-light regions, therefore, suffer less intensification than the shadows and darker half-tones. It is evident that such action results in increased contrast in the dye-toned positive. The results illustrated in fig. 6 are typical of the other dye-toned sensitometric strips that have been examined thus far.

Transmissison of Chemically-Toned Samples.

Complete discussion on the methods for obtaining these chemical tones have been referred to earlier in this communication, and no attempt will be made at this time to specify the exact processes by which the samples examined were prepared.

Detailed directions may be found in the booklet referred to or in the "Motion Picture News," as follows:—Sulphide, Tone F, page 3580, 1918; iron, Tone H, page 3580, 1918; uranium, Tone B, page 3411, 1918. The variants A, B and C were obtained by changing the times of toning.

The results obtained with the unexposed, fixed-out sample and the normal picture are given in Table 3, the values of the various columns being analogous to those in the previous tables. It will be noted in this case also that the transmission of the unexposed fixed-out sample is in all cases very high, approaching in some cases that of the untoned sample. In the case of this method the colouring is very slight in those regions of low photographic density, the effect increasing as the amount of silver present increases. The transmission values of the normal picture, it will be noted, are in general somewhat low, this indicating that films prepared by this method will in general be of high density and require a considerable increase in the intensity of the projecting light in order to produce pictures of normal brilliancy.

Table No. 3.—Chemically Toned Film.

Sample.	Name.	Plain film. D.	Plain film. T.	Plain film. T_r.	Picture. D.	Picture. T.	Picture. T_r.
0	Untoned	0.055	88	100	0.84	14.5	100
19	Sulphide	0.14	72	82	1.00	10.0	69
22	Iron	0.09	81	92	1.04	9.1	63
21	Iron	0.09	81	92	1.15	7.1	49
20	Iron	0.10	79	90	1.17	6.7	46
24	Uranium	0.14	72	82	1.01	9.8	68
25	Uranium	0.15	71	81	1.07	8.5	59
23	Uranium	0.15	71	81	1.17	6.7	46

In fig. 7 are shown graphically the results of the measurements obtained on one of the sensitometric strips toned by the iron process. In this case the lack of proportionality in the increase of density is even more marked than in the case of the dye-toning process shown in fig. 6. It will be noted that there is a very slight

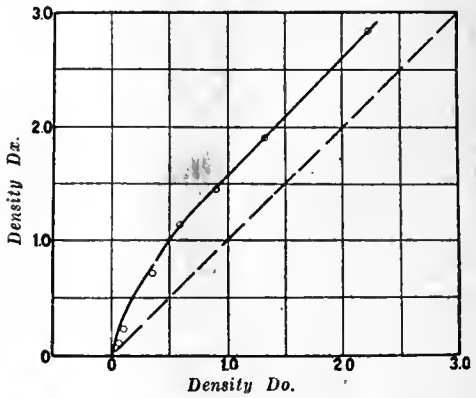


Fig. 7.

increase in the density of the high-light region, while the increase in density in the case of the higher densities is very marked. Here again the curve for the region between densities of .6 and 2.6 is practically parallel to the 45 deg. line, showing that in this region intensification is proportional, while for densities of less than .6 this is not true. Such an action of the chemical toning process produces a marked increase in the contrast of the positive, and undoubtedly results in a considerable change in photographic quality of the pictures thus treated. The behaviour, as illustrated by the curve in fig. 7, is typical of all of the toning chemical processes thus far examined.

Mean Transmission of Cinematograph Positives.

The question has frequently been raised as to the average transmission of various types of cinematograph positive. Since it is quite easy with the apparatus developed for the study of toned and tinted film to measure the mean or average transmission of such films, it was decided to select a group covering the entire range of subjects as completely as possible, and to measure the mean transmission of these films. From a stock of positives 41 different pictures were chosen, and the mean transmission values of each determined. In Table No. 4 are given the results of each measurement, and it will be noted that the highest transmission is 38.8 per cent., while the lowest is 3.2 per cent., the mean of the 41 being 14.5 per cent. It was interesting to note the coincidence occurring between the mean of this group and the particular picture chosen for making the toned and tinted samples. In order to convey a more concrete idea as to the mean transmission of various types of subjects, 6 of these are reproduced in fig. 8. Below each picture is the identification number with the mean transmission

value for the positive. We are indebted to Mr. Thomas H. Ince and to the Goldwyn Corporation for the original negatives from which these illustrations are made.

Fig. 8.

TABLE No. 4.—AVERAGE TRANSMISSION OF MOTION PICTURE FILMS.

Sample.	T. %	Sample.	T. %	Sample.	T. %	Sample	T. %
1 ..	19.46	11 ..	22.34	21 .	5.76	31 ..	14.50
2 ..	21.35	12 ..	7.20	22 ..	16.65	32 .	19.09
3 ..	10.18	13 ..	4.36	23 ..	16.65	33 ..	14.09
4 ..	22.34	14 ..	8.12	24 .	4.14	34 ..	37.90
5 ..	7.75	15 ..	8.30	25	10.00	35 ..	20.80
6 ..	4.36	16 ..	4.06	26	10.18	36 .	20.80
7 ..	26.87	17 ..	30.90	27	7.20	37	9.11
8 ..	17.33	18 ..	7.08	28	14.09	38 .	10.93
9 ..	18.19	19 ..	14.60	29 .	3.24	39 ..	38.85
10 ..	7.40	20 ..	14.50	30 ..	11.99	40 ..	16.65
						41 .	14.50

Average transmission	.. ..	14.50 per cent.
High transmission (No. 39)	.. ..	38.8 ,,
Low transmission (No. 29)	.. .	3.2 ,,

Summary.

An instrument suitable for the measurement of the transmission of toned and tinted motion picture film has been designed and constructed, and a satisfactory method for the measurement of the desired values worked out.

A large number of samples of toned and tinted film have been prepared and their transmission determined.

Results indicated that in the case of dye tinting no appreciable change in the photographic quality is produced, and while the transmission may vary over a wide range, depending upon the precise treatment, that in general the transmission is fairly high.

The various processes of dye toning in general produce a slight distortion in the photographic quality, this being in the direction of increasing the contrast especially in the region of the lighter half-tones.

Chemical toning processes also tend to produce some change in photographic quality, this also being in the direction of enhanced contrast.

The mean transmission of a representative group of positives has been measured, and the average found to be 14.5 per cent.

The authors wish to acknowledge their indebtedness to Mr. J. I. Crabtree for his co-operation in this work, and to Mr. Delos Rupert, who prepared all of the toned and tinted samples upon which measurements were made.

LOYD A. JONES.
C. W. GIBBS.

PHOTOGRAPHIC RAW PAPER BASE.

OPENING OF MESSRS. PIRIE'S ABERDEEN MILL.

ON Wednesday in last week, December 14, an interesting ceremony took place at Bucksburn, Aberdeen, when the new mills erected by Pirie's Photographic Paper Co., Ltd., were formally opened in the presence of a large company, which included Mr. E. D. Pirie, chairman of the parent firm of A. Pirie & Sons, Ltd., and Mr. A. H. Starnes, managing director of Pirie's Photographic Paper Co., Ltd. We are indebted to the Aberdeen press for the following account of the new enterprise.

The new paper mill has been designed and erected specially for the manufacture of photographic base papers, and marks another stage in the endeavours of this firm to establish a new British industry. Although British firms have always been pre-eminent in the manufacture of sensitive photographic materials, the base paper used had, previous to the war, been imported from the Continent, and, in fact, in 1914 there were only four or five mills in the world which had made a success of the manufacture of these base papers. As the most of these mills were in Germany, the whole photographic trade of the country was, naturally, at the outbreak of war, completely cut off from the source of supply of base papers.

Owing to the fact that photography, and more especially aerial photography, proved to be essential in warfare, the Government approached several papermakers—amongst them Alex. Pirie & Sons, Ltd.—with a view to getting them to undertake the manufacture of base papers, and this firm, who had been experimenting with these papers for several years previously, decided to make a big effort to capture the trade for this country. It was quickly realised that, to make a complete success of the manufacture, a new mill designed especially for the purpose was essential, but as the matter was so urgent, an endeavour was made to manufacture paper as a temporary measure in the present mill, a considerable portion of the machinery and plant being re-designed and altered for the purpose.

The results obtained, while not at first equal in purity and quality to the pre-war Continental makes, nevertheless showed considerable promise, and as experience in the manufacture was obtained improvements were constantly being made, so that at the present time many grades of paper are manufactured that bear comparison with present-day Continental makes. The amount of research work necessary to bring the paper to this standard in such a short time, and under such difficult conditions, was naturally enormous, and it was found necessary in 1917 to form a subsidiary company, which is known as Pirie's Photographic Paper Co., Ltd., and which has, since that date, been responsible for the manufacture and sale of these photographic base papers. This change had the advantage that the scientific and technical staff were in a position to give their undivided attention to the manufacture, testing and improvement of these papers.

Although it was found possible during the war period to manufacture more than 3,000 tons of photographic base papers with the existing plant, it was always realised that this was to be looked upon only as a temporary expedient, and designs for a completely new mill were proceeded with as quickly as possible. Building on the large scale required was, of course, impossible during the war, so that it was not until early in 1920 that the construction of the new mill started. This mill, which is now complete, is a steel-frame building filled in with brick and continuous steel windows, and has reinforced concrete floors and roofs throughout. The total length of the buildings is about 850 ft., while the floor area amounts to 20,500 square yards, or over four acres.

The first thing that strikes the visitor is the extraordinary precautions that have been taken to prevent the slightest possibility of the product being contaminated with dirt or other impurities. The whole of the buildings are practically dust-proof, filtered air only being admitted, and special rooms are provided for any machinery likely to cause dust. Metal has been replaced at almost every stage

by other materials or covered with substances that have no harmful action, and, wherever possible, tanks and other containers have been lined with tiles.

The manufacture of photographic base papers has always been recognised to be a particularly difficult one, and it has been found necessary to equip very large and elaborate research laboratories, together with a complete chemical and physical control plant, so that every consignment of paper may be tested on a practical scale before dispatch to the customer. By these means, and aided by scientific control throughout, it is hoped that the manufacture of these photographic base papers will be brought to such a standard of perfection that this country will in future be independent of Germany for supplies of raw materials.

Machinery for this new mill has been obtained from Messrs. James Bertram & Son, Ltd., Edinburgh, the electrical equipment from Messrs. Mather and Platt, Manchester, while the buildings have been designed and erected under the supervision of Messrs. Jenkins and Marr, civil engineers and architects, Aberdeen. It is understood that the total cost of the mill, when fully completed, will amount to between £300,000 and £400,000, and that it is the only mill in the country which undertakes the making of the base paper and also the baryta coating, and so prepares the paper that it can be taken in hand by the sensitising firms without further treatment.

Nine hundred and fifty tons of structural steel, 2,200 tons of Portland cement, and 1,400,000 bricks were used in the construction, while the roofs, which are made of reinforced concrete, covered with rock asphalt, have an area of nearly 10,000 square yards.

FORTHCOMING EXHIBITIONS.

1922.

January 11 to 27.—Camera Portraits, entitled "Men of Mark," by Walter Stoneman, at the house of the Royal Photographic Society, 35, Russell Square, London, W.C.1.

January 21 to February 4.—Partick Camera Club. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 11 to 25.—Scottish Photographic Salon. Latest dates, entry forms, January 23; exhibits, January 31. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

February 14 to 17.—Exeter Camera Club. Latest date for entries, January 30. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

February 18 to March 4.—Edinburgh Photographic Society. Latest dates, entry forms, February 4; exhibits, February 9. Particulars from the Hon. Secretary, G. Massie, 10, Hart Street, Edinburgh.

March 8 to 9.—Birkenhead Photographic Association. Latest date for entries, February 25. Particulars from the Exhibition Secretaries, Messrs. Longstaff and Trace, 33, Hamilton Square, Birkenhead.

THE LATE M. A. VILLAIN.—We are sorry to see the announcement of the death of M. Villain, a French textile chemist who took a great interest in photographic processes. He was the inventor, about 1892, of a process of printing on fabric, sensitised with a mixture of bichromate and a vanadium compound, followed by dyeing of the mordanting image thus produced. Several articles on this subject were contributed by him years ago to the "Photogram." He was also the originator of a photographic method of preparing cylinders for textile printing.

DEATH OF DR. MEYDENBAUER.—The death is announced of Dr. A. Meydenbauer, a pioneer in photogrammetry and at one time head of the photogrammetric institute established by the Prussian Ministry of Education. Dr. Meydenbauer was the author of numerous papers describing the application of a camera to the making of true scale records of buildings. He appears also to have been one of the first to employ the system of developing plates for a long time in a weak developing solution—the so-called stand development.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications December 5 to 10 :—

CAMERAS.—No. 32,700. Photographic cameras. A. J. Denniss, V. W. Edwards, and Houghton-Butcher Manufacturing Co., Ltd.

APPARATUS.—No. 32,819. Photographic apparatus. E. E. Fournier d'Albe and F. W. Warrick.

COLOUR STEREOSCOPY.—No. 32,810. Taking and projecting stereoscopic colour photographs. A. W. Wyatt.

CINEMATOGRAPHY.—No. 32,972. Apparatus for taking cinematograph views. A. de Brayer.

CINEMATOGRAPHY.—No. 32,942. Cinematograph apparatus. E. N. and J. E. Thornton.

CINEMATOGRAPHY.—No. 32,941. Cinematograph apparatus. H. M. Thornton.

COLOUR CINEMATOGRAPHY.—No. 32,631. Colour cinematography. D.C.L. Syndicate, Ltd., and F. W. Donisthorpe.

CINEMATOGRAPH-PHONOGRAPH.—No. 32,692. Method of synchronising gramophone with cinematograph. J., J. T., and W. F. Bruce and Bruce Patents Corporation.

CINEMATOGRAPH-PHONOGRAPH.—No. 33,092. Means for projection of cinematograph pictures and reproductoin of sounds synchronously therewith. H. B. and H. R. Stocks.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1s. each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

PORTRAIT LENSES.—No. 165,664 (June 28, 1920). The invention relates to improvements in photographic objectives, more particularly portrait lenses, comprising a single front lens and a compound back lens composed of a negative flint glass lens cemented to a positive crown glass lens.

It is the primary object of the invention to provide a photographic objective which combines high working speed with great depth of focus and good definition.

Another object is to produce an objective which, apart from the properties just mentioned, has the advantage of light weight and cheapness and is of general utility.

In the drawing I represents the front lens. The back lene is made up of a biconcave negative II and a biconvex positive III, forming together a fully achromatic lens. When used with an uncorrected front lens it is sufficiently corrected for practical purposes.

The front lens is a thin meniscus positive whose focal length is from three to ten times that of the back lens and whose diameter is about 50 per cent. to 60 per cent. larger than the diameter of the back lens.

While there is, of course, considerable latitude, an objective of the following characteristics may be considered as representative of the invention.

1 Front lens	
$r1 = 183.40$	$D = 1.5170$
$r2 = 261.10$	$\gamma = 54.3$
II Biconcave of back lens	
$r3 = 9017.00$	$D = 1.626$
$r4 = 288.40$	$\gamma = 36.6$
III Biconvex of back lens	
$r5 = r4 = 288.40$	$D = 1.517$
$r6 = 159.25$	$\gamma = 54.3$
$d1 = 5.5''$	$F1 = 56''$
$d2 = 4.75''$	$F2 = 18.7''$
	$E = 15''$

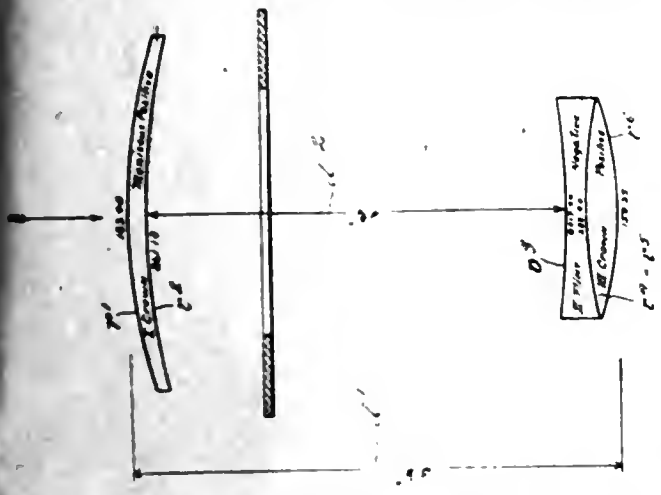
wherein r refers to radius of curvature, D to index of refraction, γ to power of dispersion, F1 to focal length of the front lens, F2 to focal length of the back lens and E to equivalent focal length of the combination.

All principal corrections are made on the back lens. Since this lens is relatively small, the quantity of expensive glass required

is small. The larger front lens may be of inexpensive glass. The cost of the objective is therefore relatively small.

By combining the highly corrected back lens with the uncorrected front lens, the disadvantages of the two neutralise each other. The aberrations in the front lens preclude the formation of a critically sharp image in a single plane. The blending of the circles of confusion of different size brings about greater depth and softness and yet of good definition. It is not necessary to stop down in order to obtain greater depth of focus, as with the present standard forms of portrait lenses for close range work, or to improve the definition as with the so called pictorial lens which with full aperture lacks that degree of definition required for portrait work.

Curvature of field and distortion are overcome by the long focus front lens of slight convexity. By the slight convexity of the front lens the virtual object plane is flatter and the rays are more uniformly and gradually brought in and focussed more



evenly on the plate than could be done with the customary front lens of shorter focus and of greater convexity.

By using a shorter focus rear lens (1/10 to ¼ of the focal length of the front lens) and of comparatively smaller diameter (approximately 65 per cent. of the diameter of the front lens) the rear nodal plane of the combination is brought near the rear lens whose aperture then acts partly as a diaphragm opening.

The nearness of the back lens to the rear nodal plane and its small size make it possible to use a larger stop which allows more light to pass in from the front lens and thereby affords a greater practical working speed. The slender light cones coming through the long-focus thin front lens reach the rear lens with greater actinic power than would be possible if the larger angle light cones collected through shorter focus front lenses of smaller diameter were reduced by cutting out the marginal rays by means of the stop. A reduction of the source of light whether by the front lens or diaphragm opening reduces the amount of light reaching the rear lens.

It is understood that the focal length of the front lens may vary within wide limits. The equivalent focal length of the combination may consequently be changed by merely using front lenses of different focal lengths, but in no case is the distance between the front and back lenses less than one-fourth of the focal length of the combination.—Lloyd Cassel Bishop, 508, Dean Building, South Bend, County St. Joseph, Ind., U.S.A.

Envelope Plate-Holders.—No. 156,564 (January 2, 1920). The invention relates to a protecting layer of paper designed to protect the emulsion-coating of photographic plates during the exchanging of the plates in a daylight change-packing. When the plates are being changed it happens frequently that the emulsion-coating gets injured when sliding along the succeeding plate or the lid. To avoid this, a protecting layer adapted to move with the photographic plates is inserted between the plates.

In the drawings the protecting layer (fig. 1) is preferably made from paper sheets piled up in a convenient manner to be cut or stamped into the proper shape.

Every single protecting layer 1 is folded so that at one end a triangle 2 is formed through the corners having been folded over along the dotted lines 3, 4, the edge 3—5 being placed along the imaginary line 3—6 which corresponds with the edge of the photographic plate. The gummed small triangle 7 is then folded along the line 6—8 and glued together with the corner 5 of the triangle 2, whereby a slitlike opening is formed between the lines 3—6

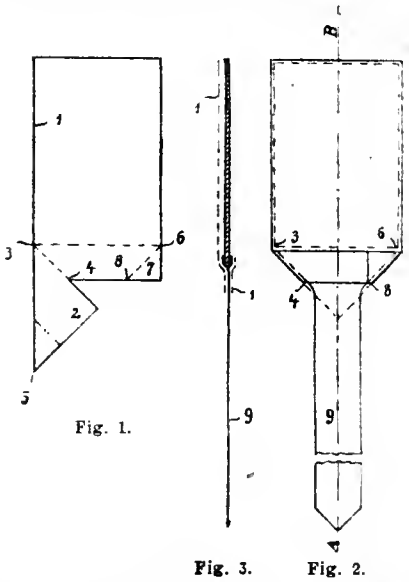


Fig. 1. Fig. 3. Fig. 2.

and 4—8, similar to a pocket into which the enlarged part of the change-strip 9 can be inserted.

In order to protect the emulsion-coating 11 of a photographic plate 10 during the changing and moving in a changing-box, the protector 1 (fig. 5) is placed with its pocket over the upper edge of the plate 12. Through the pocket the change-strip 9 is pulled which, as indicated in figs. 5 to 7, moves with the plate 10 attached to the same over the protecting layer 1 until the plate 10 stands over the plate 12. From now on (as shown in fig. 7) the plate 10 with the protecting layer 1 is pulled down by means of the change-strip 9 in the direction of the arrow, the emulsion-

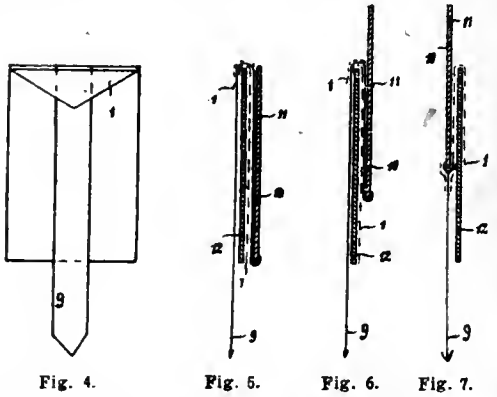


Fig. 4. Fig. 5. Fig. 6. Fig. 7.

coating 11 being well protected against scratching and injury owing to the protecting layer 1 which moves with the plate.

There can be changed in this manner any number of photographic plates with protecting layers stored up in a change box.—Michael Lesjak, F361, Oberes Kreuz, Augsburg.

The following complete specifications are open to public inspection before acceptance :—

Film Coating.—No. 172,280. Coating of photographic films, paper and so forth. Kino-Film Co. and C. Münch.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

Tintona.—No. 416,795. Photographic sensitised paper. The Leto Photo Materials Company (1905), Ltd., 1, Crutched Friars, London, E.C.3, photographic manufacturers. July 8, 1921.

New Books.

American Annual of Photography, 1922. Edited by Percy Y. Howe. New York: George Murphy, Inc., 57, East Ninth Street. 1.75 or 2.5 dollars.

THE "American Annual" occupies a place by itself among photographic publications by providing year by year an interesting miscellany of articles on current practical topics and by bringing together reproductions of photographs, creating or maintaining interest in different branches of work. Carroll B. Neblette leads off the articles with a review of progress during the present year, and it is notable that the items which he signalises are almost all of them of British origin, namely, the Impex X-ray plate, the Dye Impression process, the Carbine film tank and the D.50 developer. Other contributions touch upon such subjects as soft-focus *V* anastigmat lenses, stereoscopic photography, Bromoil, Kallitype, darkroom illumination, multiple gum, outdoor portraiture and the optics and mechanics of enlarging. A contribution of special interest is that by J. I. Crabtree, describing a systematic photographic series of tests for ascertaining the comparative value of developing substances. The volume contains a list of American photographic societies, admitted to be incomplete, and a collection of the formulæ for developers, fixers and toners most commonly in use in the United States. The illustrations are well printed, many of them as supplemental plates, but better advantage could be taken of the expense incurred in their inclusion by a higher standard in the choice of originals.

THE CHEMIST AND DRUGGIST DIARY, 1922.—In addition to the diary proper, this handsome volume, issued by our contemporary, "The Chemist and Druggist," 42, Cannon Street, London, E.C.4, contains working particulars of the present legislation respecting poisons, national insurance, Excise duties, etc., affecting pharmaceutical chemists. Another large feature of the volume is the directory of the chemical trade and the corresponding highly classified index to the suppliers of the hosts of chemical substances and proprietary articles on the market. This compilation and the very numerous advertisement pages together provide a most complete source of reference to the chemical trade.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

MONDAY, DECEMBER 26.

Walthamstow and Dist. P.S. "Enlarging." E. Willcocks.

TUESDAY, DECEMBER 27.

Hackney Phot. Soc. Chat Round the Fire.
South Glasgow Camera Club. "Finishing and Mounting the Exhibition Prints." A. T. Edgely.

WEDNESDAY, DECEMBER 28.

Accrington Camera Club. "How a Reflex Camera is Made." Miss B. Willian.
Croydon Camera Club Conversational Evening.
Dennistoun Amat. Phot. Assoc. "Stereoscopy." R. Rochead.
Forest Hill and Sydenham P.S. "Lantern Slide Making." C. H. Summers.
Rochdale Amateur P.S. Members' Lantern Slides.

THURSDAY, DECEMBER 29.

North Middlesex P.S. "Carbro." A. Dordan Pyke.

FRIDAY, DECEMBER 30.

Walthamstow and Dist. P.S. "Flashlight." A. Dordan Pyke.

ROYAL PHOTOGRAPHIC SOCIETY.

Meeting held Tuesday, December 20, the president, Dr. G. H. Rodman, in the chair.

Mr. C. Ralph C. Petley delivered a lantern lecture on "The Chamounix Valley," in which he described, with many admirable illustrations, the scenery of this famous part of the Alps, noted for its many views of Mont Blanc. On the proposition of the chairman a hearty vote of thanks was accorded to the lecturer.

CROYDON CAMERA CLUB.

Mr. C. P. Crowther would have paid a visit with a portable lamp for portraiture had the electric fluid been once again on tap, which was not the case, owing to a wholesale condemnation of the wiring by some fussy inspector. So in order to console all for the disappointment the secretary convened a special uplifting meeting for the purpose of raising the subscription.

It appears that the club's landlord, the Phœnix Assurance Co., true to the Egyptian tradition of its fabulous birth, is once again raising an improved rent out of the ashes of the old. To add to tribulations, a small tract society, who hired the club rooms one day in every week, can no longer afford to do so, and has left, harmonium, hymns, and all. Alas, and alack! has departed the spiritual once-a-week atmosphere which permeated the walls, and passers-by no longer look upwards attracted by pious strains descending. The harmonium, too, is missed, as it used to form an ecclesiastical background to the bar, emphasising Chesterton's "Christian touch."

As the treasurer, Mr. Ackroyd, rose, many must have conjectured things had arrived at a parlous state owing to his depressed expression, luckily merely due to a transient bilious attack. In a masterly way he disgorged himself of a mass of facts and figures, and appeared much relieved in consequence. Unanimously it was agreed to raise the subscription from half a guinea to fifteen shillings. Mr. B. J. Rose pointed out that the higher the subscription, in all probability, the better the attendance, as members would realise they would be losing their money's worth if they failed to turn up. Just a little bit optimistic is Mr. Rose.

Some experiments by Mr. Sellors on a diffusing device were then brought forward, any reference to which is postponed.

GLASGOW AND WEST OF SCOTLAND SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Mr. C. P. Crowther, F.R.P.S., lectured to members of this Society and their friends in the Glasgow School of Art, on December 13, on "Psychology in the Studio." Mr. J. R. Brinkley, President of the Society, occupied the chair.

Mr. Crowther dealt with the photographer's work in handling sitters in the studio, and insisted that only by repetition could they reach perfection and gain the command of their materials. Unless they could perform all the essential operations subconsciously they would not do them well. If they had to stop to consider all the details they would probably lose the picture. Pictorial portraiture was now being insisted upon and largely patronised by certain classes, but there were still others who wanted the orthodox picture that had been taken for so many years. He hoped the time was coming when people would like to see pictures in which they really looked like human beings. There were more people than even many photographers realised who liked to be depicted as they are. The lecture was illustrated by a number of lantern slides of Mr. Crowther's portrait work, several of which have been exhibited at this year's Salon.

At the close of the lecture, which was highly appreciated by the audience, Mr. A. Fairbairn expressed the great pleasure it had given the members to listen to Mr. Crowther's able and instructive lecture, and the deep debt of gratitude he had placed them under by coming to Glasgow to lecture to them, and on his motion the audience accorded Mr. Crowther a very hearty vote of thanks.

EDINBURGH SOCIETY OF PROFESSIONAL PHOTOGRAPHERS.

Mr. C. P. Crowther, F.R.P.S., London, delivered an interesting lecture on "The Psychology of the Studio" to the members on Monday, December 12. There was a large and appreciative audience.

At the outset, Mr. Crowther gave a number of valuable hints to photographers on the best methods of carrying on their business, the keynote of which was to avoid as much as possible the getting into "a rut." He spoke of the different ways of handling sitters, and said that the actions and conversation of the photographer and the easy manner in which the tactful operator did his work contributed to a large degree to his success in obtaining a correct expression.

Mr. Crowther further dealt with the lighting of the sitter, and showed excellent examples by lantern slides and prints illustrating the various methods now used. He strongly recommended the use of the three-quarter, or angle 45 deg. lighting, as being the safest, and from which the best results for general work were obtained. He showed examples of work done at home with one small half-watt lamp—the operator held the light in his hand and "painted" the face with the light, *i.e.*, he moved the light over the face as his judgment directed, giving an exposure of five to seven seconds at 45 degrees. The results were excellent and perfect modelling was secured.

Mr. Crowther also showed examples of large whole-plate heads done with a 12-inch lens, the head almost filling up the plate and showing no apparent distortion. The ears and top of the hair being out of focus was, in Mr. Crowther's opinion, an advantage.

A discussion took place regarding lighting and short-focus lens work.

Mr. Campbell Harper, the President of the Society, moved a cordial vote of thanks to Mr. Crowther for his inspiring and delightful lecture, which was heartily responded to by the audience.

PROFESSIONAL PHOTOGRAPHERS' ASSOCIATION.

A meeting of the Council was held at 35, Russell Square, on Friday, December 9, 1921. There were present: Messrs. Marcus Adams, A. Basil, A. Bennett, Frank Brown, W. B. Chaplin, H. Chapman, G. Chase, T. Chidley, A. Corbett, C. Dickinson, A. Ellis, R. Haines, G. Hana, W. Illingworth, H. Lambert, H. A. St. George, R. N. Speaight, F. Wakefield, H. Wheeler, and Lang Sims (Secretary). Mr. Alfred Ellis in the chair

Apologies for absence were read from Mr. Swan Watson (President), and Messrs. W. E. Gray, F. Read, H. C. Spink, and T. C. Turner.

The Secretary reported seven applications for membership, several of which were from Nigeria, through Messrs. Houghton's, Limited. He had made inquiries with regard to these candidates, and had been told that they were mostly small buyers of photographic material, and appeared to be native professional photographers. All the nominations were agreed to.

The Secretary read some correspondence with a country member with regard to photographs of a memorial which he had taken, and which had been made use of in an unauthorised way by two men who travelled about getting orders for enlargements, etc. After some discussion it was agreed that the whole matter should be referred to the solicitor for his advice with regard to a prosecution or other action

Mr. Speaight (as Treasurer) said that all members who were two years or more in arrear with their subscriptions had been written to, with the following result:—Number of registered letters sent, 170; subscriptions paid up, 35; resigned, 21 (of whom 4 paid arrears); promised to pay, 5; no answer, 113. He thereupon read the names of the 113 members from whom no answer had been received and the 21 who had resigned, and moved that they be struck off the list, in accordance with the decision of the previous Council meeting.

It was proposed that the Chairman defer signing this list, thereby authorising the names to be struck off, until the January meeting, but this was lost.

The motion to write off the names was carried, and the Chairman then signed the document, adding that there was no bar to the reinstatement of any of those whose names appeared in it.

Mr. Speaight said that it was gratifying that among the resignations, in not one case was the accusation made that the Association had failed in any action it should have taken, which could have given the member an excuse for resignation.

The 1922 Congress.

The Secretary read the reports of two meetings of the Combined Congress, Finance, and Exhibition Committees *re* 1922 Congress. He added that the written confirmation of the arrangements made with the manager of the Prince's Galleries had now come to hand, and the rooms were booked for the second week in September, 11th to 16th.

Mr. Speaight read the list of sub-committees which it was proposed should undertake the burden of work in connection with the Congress. The names of members suggested for each of the sub-committees were, so far, quite incomplete, for it was hoped to add to them various country members, as well as possibly other London members. But a Secretary or Convener for each sub-committee had been chosen as follows:—

Finance: Mr. St. George.
Trade Exhibition: Mr. Wakefield.
Home Exhibition of Photographs: Mr. Speaight.
Foreign Loan Exhibition: Mr. Adams.
Propaganda and Catalogue: Mr. Haines.
Entertainment: Mr. Ellis.
Musical: Mr. Lambert.
Assistants' Evening: Mr. Chase.
Lanternist Sub-Committee: Mr. Chaplin.
General Congress Committee: The Secretary (Mr. Lang Sims).

Mr. Frank Brown, as a provincial member, expressed the general indebtedness to the initiative of the London members, and said that the country members would co-operate as fully as they were able.

Some general conversation ensued on the advisability of holding the Congress and Exhibition in the early part of September, but Mr. Speaight and others pointed out that the decision of the Council on this point was taken at the last meeting, after a long and exhaustive discussion, when it was explained that this was the only time in the year in which the galleries chosen or any other suitable accommodation would be available. The resolution was carried by a large majority.

Charges for Electricity in the Studio.

The Secretary read a letter from the Westminster Electric Supply Corporation confirming an arrangement come to whereby, although they could not admit that photographers' current supply came in the category of power demand, they agreed to grant a flat rate charge of 4d. per unit (as against 8d. in the past) to take effect from October 1 last.

This announcement was received with much satisfaction, and Mr. Alexander Corbett, by whom the negotiations had been conducted, was highly complimented by the whole Council.

Mr. Corbett refused to take the credit to himself, saying it was largely due to the influence of Mr. Duncan Watson—a personal friend of his own—backed as he was by a representative society, and it was owing to this combination that the concessions had been granted. He hoped that photographers not yet members would take the lesson to heart, and join up without further delay. He pointed out that the stronger the P.P.A. was numerically the greater would be its driving power.

Special General Meeting.

A special general meeting of the members of the Association was held at 35, Russell Square, on Friday, December 9, 1921, at 6.30 p.m., to consider a necessary amending resolution in connection with the incorporation of the Association.

Mr. Alfred Ellis, Chairman of Council, presided. In addition to members of Council a number of other members attended.

The Chairman said that the notice convening the meeting sufficiently explained the reason why this special general meeting was called. The only business was to consider and vote upon a resolution, which he would formally move:—

"That the Council of the Association do construe and act upon the resolution passed at the general meeting on the 22nd April, 1921, as if the words 'not for profit,' which appear in the first paragraph of such resolution, had been eliminated from such resolution or had formed no part thereof, and that the Memorandum and Articles of Association as approved by the Council, be adopted for the purposes of the new Association, and that such new Association be registered under Section 21 of the Companies (Consolidation) Act, 1908."

Mr. Stoll Bailey (Putney) seconded the resolution.

On being put from the chair, it was carried unanimously.

The Chairman thanked the members for their attendance, and said that though no more formal business could be taken he would be glad to hear anything which any visitor had to say with regard to Association policy.

Mr. T. F. Nicholson (Ealing) said that the members, he felt sure, had unbounded confidence in their officers, and he had made

a point of attending to voice his appreciation of the work of the Council in the interest of their fellow professionals.

The proceedings then closed.

FOREST HILL AND SYDENHAM PHOTOGRAPHIC SOCIETY.—At the meeting on December 14, Mr. H. G. Fleck gave an instructive demonstration on gaslight printing for the benefit of beginners. He showed that by immersing the print in a weak solution of glacial acetic acid between development and fixing stains could be avoided and at the same time development arrested. After making a number of prints, the demonstrator invited a new lady member, who had never made a gaslight print, to try her hand, which she did quite successfully. The meeting on December 29, at Christ Church Schools, Forest Hill, will be devoted to lantern slide making, the demonstrator being Mr. C. H. Summers, a member whose slide gained for the Society the highest award in the Affiliated Societies' competition in 1914. The Society is making a special feature of helping beginners, and a large influx of new members has been in evidence recently. Local unattached photographers will be warmly welcomed as members

Commercial & Legal Intelligence.

NEW COMPANIES.

WITT AND WESTLEY, LTD.—This private company was registered on December 10, with a capital of £2,500 in £1 shares (1,000 10 per cent. cumulative pref.). Objects: To take over the business carried on by A. E. Westley, as "Witt and Westley," and to carry on the business of manufacturers of and dealers in photographic mounts, albums, frames, materials and stationery, cardboard articles, etc. The subscribers (each with one ordinary share) are: A. E. Westley, Osda House, 13, Bishops Court, Old Bailey, E.C.4, mount manufacturers' agent; A. V. Finch, 13, Oliver Road, Walthamstow, Essex, solicitor's clerk. The first directors are: A. E. Westley and three others to be appointed by the subscribers. Registered office: Osda House, 13, Bishops Court, Old Bailey, E.C.4.

News and Notes.

ONE PHOTOGRAPH IN 100 YEARS.—Miss Mary Robson, of Woodbine Terrace, Gateshead, who has just celebrated her 100th birthday, declares she has only once been photographed.

A BARNET SHOWCARD.—Messrs. Elliott & Sons send us one of their latest calendar showcards, produced in the striking style which characterises the work of their artist, Grimmond. Dealers should see that they obtain this most effective advertisement of Barnet plates and papers.

LANTERN SLIDES IN MURDER TRIAL.—During the closing stage of the sensational Kleppelsdorf Castle crime trial last Saturday in Berlin, the court was darkened to allow of the exhibition of photographic lantern slides made by a firearms expert (Herr Walter) to show wounds on the two murdered women.

ENSIGN FILM COMPETITION.—The first prize of £50 in this competition, which closed on October 31 last, has been awarded to Mr. P. Smith; the second prizes of £25 and £10 going to Dr. Walter J. McFeat and Mr. A. V. Loyns. In addition, Messrs. Houghtons, Ltd., have awarded 15 consolation prizes.

STOLEN ALDIS LENS.—An Aldis anastigmat enlarging lens, No. 105,288, of f/4.5 aperture and 6¾ inches focal length, has been stolen from the dark-room of the Birmingham Photographic Society. Any dealer to whom the lens may be offered is asked to communicate with the hon. secretary at Birmingham Medical Institute Buildings, Edmund Street, Birmingham.

PHOTOGRAPHY ON THE STAGE.—Photography is made to play an amusing part in the show now being run by the Co-optimists at the Palace Theatre. During the performance a photographer comes on to take a flashlight picture of the company. The lights are lowered, and after the usual blinding flash, the company is discovered with blackened faces, shaking tambourines and bones with gusto.

PHOTOGRAPHS THAT WOULD ENSURE PEACE.—Mr. D. W. Griffith, the famous film producer, says that if the United States Government will lend him the battleships it is proposed to "scrap," he would create such a picture as would make anyone afraid to start another war. To the Secretary of the Navy he writes: "We believe that the motion picture is more powerful than any other medium of expression; that this fleet serving dramatically in the films could bring to the world a message of peace as vigorous and convincing as it has always brought the story of war."

PORTRAITS BY MR. WALTER STONEMAN.—The forthcoming exhibition of camera portraits, entitled "Men of Mark," by Mr. Walter Stoneman, F.R.P.S., should be of special interest in view of the fact that Mr. Stoneman is now sole governing director of Messrs. J. Russell & Sons, the well-known photographers of Baker Street, who have now for seventy years been in close touch with the Royal and official life of the nation. With three or four exceptions, the photographs selected have been taken in the studio in the ordinary course of his profession during the last four or five years, and represent a straightforward attempt to convey through the camera a real likeness and true craftmanship.

SCOTTISH NATIONAL SALON.—The entry form for the fourteenth Scottish National Salon has now been published and may be obtained on application to the secretary, Mr. James F. Smellie, Braefindon, Allanshaw Street, Hamilton. The Salon will be held at Hamilton from February 11 to 25. Entries must be received on or before January 23 and pictures not later than January 31. Entry forms should be addressed to Mr. Smellie at the above address and the pictures themselves to the Parish Halls, Chapel Street, Hamilton. As in previous years, the Salon is open to the work of photographers resident in Scotland and to that of Scots residing in other countries. Pictures may be sent framed, unframed or in passe-partout mounting. The selection committee consists of Messrs. Arch. Cochrane, Robert Chalmers and J. Campbell Harper.

PHOTOGRAPHY AT MOUNT EVEREST.—A "Times" special correspondent has been having a talk with Colonel Howard Bury, of the Mount Everest Expedition. Colonel Bury, speaking of the natives, was asked what impressed them. "Photographs," he replied. "These and a camera they had never seen before. They took a huge delight in being photographed, and nothing pleased them more than being given a copy of the picture. There was an old man, a very old man, in fact, the head abbot of a monastery at Shekar Tchöde. He was a reincarnation—these people all believe in reincarnation—and we took a photograph of him. A hundred miles from the monastery we were asked for copies of that portrait. No present was so acceptable, for the people worshipped the abbot as a holy man, and the photographs of him we gave them they put in their shrines."

THE WELLINGTON £1,000 COMPETITION.—Messrs. Wellington and Ward announce the following awards of the prizes, amounting in all to £1,000, offered by them to professional photographers for the most beautiful portraits of women: 1st prize (£300), Mr. Angus Basil, 100, Tottenham Court Road, London, W.; 2nd prize (£200), Mr. Lionel Wood, 32, Preston Street, Brighton; 3rd prize (£150), Messrs. Foulsham & Banfield, 49, Old Bond Street, London, W.1. The judges were the Earl of Carnarvon, Lady Diana Duff-Cooper and Mr. Alfred Ellis. In addition to the prizes awarded to the photographers, the sitters receive respectively £200, £100 and £50. This is the first occasion on which a competition has been organised on these lines, and Messrs. Wellington and Ward report that the large entries demonstrate the very great impetus to the purchase of studio portraits on the part of the public which it has provided.

GEOLOGICAL PHOTOGRAPHS.—The British Association has issued the twentieth report of its Committee on Photographs of Geological Interest. Professor S. H. Reynolds, of the University of Bristol, as secretary of the Committee, is glad to receive unmounted copies of any photographs recording noteworthy sections or exposures, or illustrating the relations of geological structure to scenery in the British Isles, and the prints so sent are registered and preserved for reference at the Museum of Practical Geology, 28, Jermyn Street, London. The inquirer who desires a copy for his own use is referred to the author of the photograph. The list attached to the twentieth report includes a large series of half-plate and quarter-plate pictures from Gloucestershire by Professor Reynolds, mainly illustrating the famous carboniferous sequence in the Avon gorge, and forty-five half-plate views of glacial deposits in Suffolk by that keen worker, the late W. Jerome Harrison. Mr. J. Ritchie contributes a series illustrating the erosion due to a cloud-burst in Aberdeenshire in 1891. It is much to be desired that funds would allow of the issue with such lists of small photo-

graphic reproductions from the registered views; but this would, of course, be impossible at the present time. Geologists near London, at any rate, have the advantage of consulting a very valuable series of records in an institution which has always been a bureau of scientific information.—"Nature."

MAKING FABRICS FIREPROOF.—One of the most satisfactory methods for reducing the risks of fire in the home is to ensure that all curtains and other draperies are fireproof. The following method enables this to be done quite easily and cheaply. In one quart of boiling water should be dissolved two ounces of borax, one ounce of common table salt, and five ounces of sal ammoniac (the same harmless substance as is used for electric batteries). The fabrics which are to be fireproofed should be soaked in this solution for about a quarter of an hour, when they may be gently squeezed and hung up to dry. In most cases this fireproofing process does not affect coloured fabrics, but it is advisable to first "try-out" a small portion of the fabric. Where fabrics require stiffening a suitable amount of starch may be added to the fireproofing solution. Fabrics treated in this manner cannot be ignited by flying sparks and are almost non-inflammable.—"Textile Chemist."

HACKNEY SOCIETY'S PHOTOGRAPHS AT R.P.S.—At the request of the President and Council of the Royal Photographic Society a House Exhibition by members of the Hackney Society has been arranged at 35, Russell Square. The work which has won distinction in the strong annual exhibitions of this old-established North London Society has naturally been largely drawn upon, but there is a considerable leaven of new work also. The prints, which have been carefully selected, mounted and hung make a very favourable impression. Most have been made by the bromide process, the most popular in the Hackney Society, as in many others. Individual aims are, however, sufficiently varied to overcome any tendency to sameness. Bromoil work has been largely omitted on account of the danger of injury where prints are shown unglazed, as is the case in this exhibition. The collection is particularly strong in landscape and kindred subjects. Two of the leading workers of the Society, Messrs. Selfe and Capper, are very successful in their renderings of fine atmospheric effects. Mr. S. W. Shore shows some striking portraits, and the quality of Mr. R. H. Heath's architectural work comes near to perfection. There are some interesting, if small, photographs of birds by Mr. O. G. Pike. Mr. H. E. Wood's London subjects are numerous and well treated. Other members, whose prints are sure to attract attention, are Messrs. J. Caudle, W. H. Clark, J. Grice, H. Lamplough, A. J. Linford, and R. Mason. It must not be inferred from these remarks that the work of others is unworthy of notice, for the general level is high, and almost every branch of photography has skilled exponents in the Hackney Society. Members of societies and others will find the Exhibition, which will be open free on week-days from 11 a.m. to 5 p.m. till January 7, well worth a visit.

Correspondence.

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

INVENTIONS IN COLOUR PHOTOGRAPHY.

To the Editors.

Gentlemen,—My attention has been called to a letter from Mr. F. E. Ives, which appeared in your issue of December 2, in which he claims priority for type of a single exposure tricolour camera, of which one was the subject of a patent granted me in 1897.

I should say that I never heard of a camera of this type being patented by Mr. Ives, and think perhaps he refers to his invention of the Kromskop, an instrument which showed beautiful results in viewing three-coloured projected images superimposed on one plane.

If it is the Kromskop he has in mind surely he would not contend that was an exposure camera. It was a viewing instrument entirely, and neither designed for nor capable of taking tricolour negatives. Its essentials were solely and purely for the function of a viewing instrument and nothing else.

Honour and credit are due to Mr. Ives for his invention of the Kromskop; it marked a great advance in showing photographic results in natural colours, which were a pleasure to look at, but if in its construction he has utilised a well-known principle of a natural law, that coloured media will absorb rays of a complementary colour, that principle had still to be worked on and applied in the design and construction of a photographic taking camera, and I have never heard, nor can I trace, that Ives had a camera of the same type as the one I patented in 1897.

Shortly after (20 days) Mr. Ives had made application for patent for the Kromskop, he made application for a taking camera, Patent No. 3,784, 1895 (British Patent). He uses two transparent mirrors of plain glass, having plain surfaces placed at an angle with each other, to form a reflector wedge shaped to avoid double images.

The same camera is provided with four additional mirrors, which are opaque, and three object lenses, obviously an altogether different type of camera.

This much I am indebted to Mr. Ives: it was the charm of his results in the Kromskop that caused me first to turn my attention to the invention of a camera that should enable me to produce the necessary positives for viewing. Having purchased a Kromskop I endeavoured to buy a taking camera, but neither the Kromskop Company nor anyone else could supply me.

The elements of the "Kromograms" at that time were printed viewing positives, I was informed by the representatives of the company, from negatives obtained by successive exposures through suitable screens.

Having made a practicable instrument otherwise unobtainable, I applied for and was granted a patent in 1897. That was about a year after I had been having the camera in experimental use. I subsequently found that practically simultaneously White had been granted a patent for a camera on similar lines to those I employed. Apart from this I can find no trace of any of the same type, nor anyone having for the purpose of taking tricolour negatives simultaneously used the principle of which advantage is also taken in the Kromskop.

I have also read Mr. Hamburger's letter appearing in to-day's issue of the "Journal," in which he states that until its advent [the Polychromide Camera, Patent No. 28,722, 1912] "negatives in perfect register were not obtainable."

On February 16, 1906, some one else made a similar claim for his invention, and was equally sweeping in his endeavour to prove a negative. In correspondence in the "B.J." at that time I submitted negatives in proof of my assertion that I could produce sets of negatives from my single exposure tricolour camera identical in size and focus. In the "Journal" of March 9, 1906, you were pleased to state that the negatives submitted established the claim.

For upwards of eighteen years cameras have been made to my specifications producing negatives correct in register, focus and colour separation.—I am, yours faithfully,

EDWIN T. BUTLER.

26, Craven Park, N.W.10, December 9.

TANK DEVELOPMENT.

To the Editors.

Gentlemen,—With regard to your recent correspondence on the subject of tank development, as manufacturers specialising in the production of these tanks, both of teak and enamel, on a large scale for the photographic and cinema professions, we are interested in the matter. We have heard many discussions in favour of tank development, whether it be for plates, flat or roll films, and is our opinion, and we think it is very generally held, there is no need whatever to create movement in the developer, as the necessary stir is caused by the taking out and placing in of the different batches.

From our experience of the past twelve months we are of opinion that tank development is on the increase, especially for roll films, and we also find that the tanks made completely of teak are greatly in favour.—Faithfully yours,

For and on behalf of F. Brodrick, Ltd.,
C. BRABANT SMITH,
Director.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply; 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday), and should be addressed to the Editors.

F. A.—The only lamp of sufficient power, apart from electric current or gas, is the Blanchard oil incandescent lamp, made by Blanchard Lamps, Ltd., 151, Farringdon Road, London, E.C.1.

J. J.—For removing the film the most effective means is to dip the negative in a very hot solution of caustic potash or caustic soda. A second or two in this bath will remove the film from most negatives, whether hardened or not, or at any rate will soften it so much that it can be quickly scrubbed off with a hard brush.

S. F.—It is quite an easy matter to make lantern slides. You cannot do better than write to the Ilford Company, Ilford, London, E., for a free booklet entitled "Lantern Slides on Dry Plates," which they issue. The Wratten Division of Messrs. Kodak, Ltd., have also a free booklet giving instructions in the use of the Wratten lantern plates.

C. M.—For taking carte-de-visites in a studio of 22 ft. run you cannot afford to have a longer focus than 7 ins., that is allowing 5 ft. for the space required behind camera and behind sitter. With this lens, of course, you can take cabinets and other larger pictures. For covering a half-plate the lens would have to be a pretty good anastigmat. We suggest that you select one of about f/6 maximum aperture.

A. H.—(1) As a very rough approximation, owing to the differences between plates and the different degrees of density to which they are developed, suppose we say from 12 to 20 plates in 66 ozs. of 1 : 100 developing solution. Your tank full of developer is equivalent to a little over ½ oz. of the stock solution, which will not develop a great number of plates, however long you allow it to act. (2) The Brunswick black will not affect the developer, but it comes off after a while, probably owing to the action of the alkali in the developer.

C. R. O.—(1) Conditions are very much the same as regards cheap work as here. (2) So far as we know there are no restrictions as regards photography on board ship. (3) Sea-water can be used without ill-effects for washing plates and prints. The Ilford Co. published a result of tests on this point many years ago. (4) Amidol is one of the best developers, especially when a fairly large quantity of sulphate of soda (Glauber salts) is used in it. But the best recommendation we can make as regards developing in tropical climates is to use the Tropical hardener, worked out by the Ilford Co. a year or two ago, and sold by Johnsons, 23, Cross Street, Finsbury, E.C.

J. T.—The true-to-scale process consists in first making a blue print which, without having washed it or treating it in any way after removal from the printing frame, is laid down upon a jelly prepared with gelatine and a certain proportion of ferrous ammonium sulphate. We cannot give a formula for the latter, as the amount of ferrous ammonium sulphate varies with different qualities of gelatine. After contact for a while the blue print is removed, and then the impression which it leaves may be inked up with a greasy ink applied with a roller and impressions taken off. Under good working conditions as many as fifty satisfactory proofs can be pulled.

A. W.—The usual practice with sitters of the character you describe is to knife away as much of the surplus flesh as may be necessary. It is not uncommon to practically make a new outline in this way to both face and figure. Your best plan would be to send one of your negatives to a good retoucher, say, Mr. T. S. Bruce, 4, Villas-on-Heath, Vale, Hampstead, London, N.W.3, and ask him to make your sitter as refined as possible. Print a proof first and then you will be able to note the change. As far as lighting goes, we should be inclined to throw one side of the face into rather deep shadow. It is a good plan to take the heads of such sitters rather smaller than usual.

A. L.—We see no reason why you should not do good work with acetylene lighting, as the light is very white and actinic, but so far as we know, there is no special fitting made for using it for portrait work. Messrs. Thorn and Hoddle, 151, Victoria Street, Westminster, London, S.W.1, would make you one to order: they have fitted up several studios. We should think about 20 burners would be required. You cannot do better than to communicate your wants to Mr. D. Charles, 45, Beaufort Road, Kingston-on-Thames, who makes a very efficient flash lamp, and would doubtless make a fireproof bag for it. We do not recommend flashlight for ordinary studio work, although it is invaluable for restless children and home portraiture.

W. B.—(1) The address of the Premier Optical Co. is 63, Bolton Road, Stratford, London, E.15. (2) It is very doubtful if the lens would be improved by repolishing. Before having this done, we think it would be worth while to have all the interior of the lens thoroughly dead-blacked, say with "Nigrogene" made by the Vanguard Co., Maidenhead, as the inside is far from being dead black at the present time to an extent which with a lens of large glasses like this would have some effect in causing flatness. It is possible that the front and rear elements are not in absolutely correct position. The front element has a very peculiar kind of fitting, and the rear element looks as though it had had a fall, sufficient to upset the centering and to account perhaps for some veiled definition.

G. N.—For fairly close-up exposures of football play and other sports' subjects a speed of about 1-250th of a second is about the average. This probably means that you want to use a focal plane shutter at a speed marking of about 1-500th or 1-600th. In our opinion you had best use either an ordinary folding-focal plane, or a box reflex, such as the "Soho." For fast work, especially if you have a reflex, the lens aperture should be *f*/4.5, but with an ordinary folding focal plane, especially with close-up subjects, it is very difficult to be certain of focus when using this aperture, and we daresay many pressmen work with the lens at *f*/6, or even *f*/8, whenever the light allows them a reasonable chance. For the studio lighting we suggest about 4,000 c.p., distributed among four half-watt lamps, each of 1,000 c.p.

J. N.—For colouring with oil colours, which are those usually employed by professional slide colourists, you cannot do better than have the best tube oil colours of Winsor and Newton, or Rowney, from any artists' dealer. For colouring with dyes, you can obtain a very convenient set of tints from Johnson & Sons, 23, Cross Street, Finsbury, London, E.C.2, or the Vanguard Co., Maidenhead. (1) It is best to avoid all use of alum if prints are to be coloured with dyes, but we do not think it matters as regards using oil colours. (2) The dyes are quite effective in use, though not of the same degree of permanence as the oil colours. (3) No special preparation of the gelatine film is necessary. You should get the little book, "Colouring Photographs and Lantern Slides," by R. Penlake, published by Iliffe & Sons, 20, Tudor Street, London, E.C.4.

THE BRITISH

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Contents.

SUMMARY

The index to the sixty-eighth annual volume of the "British Journal" and to the fifteenth volume of the "Colour Photography" Supplement is published with this issue.

We give a new formula for the hypo-alum toning bath worked out by the Kodak Company, and recently embodied in the instructions for Kodak bromide paper. The new feature is the method of ripening, which is done by incorporating a definite quantity of silver iodide with the hypo and alum. (P. 773.)

Dr. Marcus G. Lovelace, in a paper in the "American Annual of Photography," gives very practical instruction in the oil colouring of lantern-slides, particularly in the production of an even tint of colour by fingering. (P. 776.)

In a contributed article Mr. A. H. Hall describes experiments on the range of tones obtained on gaslight paper by the method of bleaching, partly re-developing and following with the sulphide bath. (P. 775.)

The report of the Croydon Camera Club emphasises certain important points in the Carbro process, recently demonstrated there by Mr. Braham, and proceeds to some speculations regarding methods of producing diffused definition in enlargements. (P. 783.)

In a leading article on the equipment of a small studio for the beginner in professional portrait photography we refer to the choice of lenses and camera and to the fitting of the dark-room. (P. 774.)

In the case of many sitters the advantage of using a panchromatic plate for portraits which are to be coloured is very considerable. (P. 773.)

In making full-length portraits by flashlight, as frequently is done of sitters in fancy dress at this time of year, the proper use of a diffusing screen will greatly help in obtaining even illumination. (P. 774.)

A delicate case respecting ownership of copyright in photographs of similar subjects is the subject of an answer to a correspondent. (P. 784.)

We publish this week the comprehensive list of publications relating to the origins of aerial photography appended by M. L. P. Clerc to his recent Traill Taylor lecture on this subject. This compilation provides a key to the successive steps taken in many directions as a result of the wide employment of aerial cameras very soon after the outbreak of war. (P. 778.)

The first volume of "Photographic Abstracts" has been completed by the Scientific and Technical Group of the Royal Photographic Society. A notice of this work and of others on optical projection and pictorial photography appears under "New Books." (P. 782.)

Particulars of a method of stereo-cinematographic projection are contained in a recent patent specification. (P. 780.)

EX CATHEDRA.

Portraits for Colouring. Even those who are most prejudiced against the use of panchromatic plates for ordinary portrait work must acknowledge their valne when the object is to produce a hand-coloured portrait. A sitter with blue eyes and bright golden hair is an ideal subject for colouring, and at the same time one which it is almost impossible to render decently without faking during printing. If the hair is shaded with matt varnish or colour on the back of the negative the scale of tones, bad as it is already, is further falsified by the hand-work. If, however, a panchromatic plate, with a fairly light filter, which need not require more than double the exposure, be used, a print giving a close approximation to the visual value of the colouring will be obtained without trouble. Even without the filter a great improvement will be manifest, but the use of the filter is to be recommended. A rather soft-working paper should be chosen to avoid heavy shadows, and liver of sulphur or hypo alum toning should be adopted, as these do not block up the shadows of a strong print or give a foxy colour to a delicate one. Carbon is the ideal process for colouring, though many less skilled colourists avoid it, as the surface does not take the tints as freely as a bromide or P.O.P. does.

* * *

Hypo-Alum Toning. The progress which has been made of late in the manufacture of development papers exhibiting more widely marked characteristics, is perhaps one of the causes of the varying experience in the use of the hypo-alum toning bath. As is well known, the manner of "ripening" the bath by introducing into it a certain quantity of silver compound has a good deal to do with its proper toning action, and is found variously to influence, according to the nature of the paper on which the prints are made, the particular tone which is obtained. The method of ripening a bath by addition of clippings of waste P.O.P. or bromide paper is certainly a plan which is preferable to the addition of silver nitrate, sometimes recommended. But a still better system, so it seems to us, from the point of view of standardising the hypo-alum toning process is that which has just been embodied by the Kodak Company in the instructions for toning Kodak bromide paper by the hypo-alum method. Probably many who have had difficulty in the process will be interested in making trial of this new bath the instructions for making which are as follows:—Dissolve 1 lb. (400 gms.) of hypo in 80 ozs. (2 litres) of hot water, then add 3½ ozs. (90 gms.) of ordinary alum; stir well and boil for two or three minutes; cool down to about 150 deg. F. (65 deg. C.) and add the following silver ripener:—Dissolve 20 grs. (1 gm.) of silver nitrate in 1 oz. (30 c.c.s.) of water and add, drop by drop, .880 ammonia until the precipitate first formed is just re-dissolved; (stir vigorously while adding the ammonia). Add this to the hypo-alum mixture and stir well. In a further ounce (30 c.c.s.) of water

dissolve 40 grs. (3 gms.) of potassium iodide; add this to the hypo-alum mixture and stir well. This bath can be used over and over again. It may be kept up to its original bulk by the occasional addition of fresh solution, and when it ceases to tone satisfactorily it should be thrown away. Prints for toning by this method should be fixed as usual, briefly rinsed in water, soaked for ten minutes in a saturated solution of alum, rinsed, and then toned at a temperature of 140 deg. F. (60 deg. C.). After toning, sponge the prints with lukewarm water to remove sediment, and wash as usual.

* * *

The Annual Index. With this issue is presented the index to the sixty-eighth annual volume of the "British Journal," together with that of the fifteenth volume of the "Colour Photography" Supplement. The work of preparing this A.B.C. pointer to the contents of the two publications is perhaps greater than many people imagine. Indexing, unfortunately, is one of those arts, the practitioners of which obtain plenty of criticism for any faults which their work may exhibit, but little credit for the care and labour which they expend in making a large miscellany of information quickly accessible to those who are studying a subject or seeking a particular item. We think we can say, on behalf of our indexers, that no subject matter, which is likely to be of permanent interest, escapes inclusion in their compilation. It may be worth while to point out that an indexer naturally does not assume familiarity with the volume on the part of those who will use his index, and, therefore, drafts his entries in accordance with the actual subject-matter, largely disregarding titles given to articles or paragraphs if these are non-descriptive. On no other plan would it be possible to compile an index of general usefulness both to immediate users and to those who may refer to the volumes in years to come.

* * *

Fancy Dress Portraits. At the present season, when there are many orders for fancy dress portraits which are usually taken as full lengths, a hint or two on overcoming one of the most serious difficulties attendant upon this class of work may be useful to some of our readers. The difficulty we have in mind is that of securing adequate illumination of the lower part of the figure, which arises from the fact that the source of light is so much farther from the sitter's feet than from his head. With the light at a height of 8 feet it may be assumed that it is only 4 feet from the head of the subject, while it will be nearly 9 feet from his boots, which will therefore receive less than a quarter of the light compared with that which falls upon the face. In the case of a single lamp the remedy is to use a diffusing screen covered with stout muslin to shade the upper part of the figure only, and to give just enough exposure to render the lower part properly. Here the despised head-rest, better used as a back-rest, will serve to keep the sitter steady. If several half-watt lamps are used, one or two may be lowered to 4 or 5 feet from the floor, and a diffuser placed so as to prevent the shadows in the face from being destroyed, that is to say, to intercept any upward rays.

* * *

Flashlight Apparatus. The occasional worker with flashlight is rarely properly equipped for his job, and therefore usually approaches it with some degree of trepidation. Many of the lamps designed for use with explosive powders have the mechanism exposed to the flame, with the result that they become corroded and unreliable, the springs losing their resiliency and failing to ignite the match or cap. It is a wise precaution to clean all moving parts as soon as possible after use and to wrap the lamp in waxed paper before putting it away, thus saving valuable time when the call comes. In case of failure it is advisable to be provided with an alternate means of ignition, and there is none better than a tuft of guncotton, which can be embedded in the powder and touched off with a lighted taper fixed at the end of a long rod or walking-stick. Touch-paper is quite effective if bone dry, but as it takes several seconds for the sparks to reach the powder, there is a risk of the group being spoiled by some of the members watching the lamp. Guncotton or pyroxyline can be obtained from such firms as Johnsons or Hopkin & Williams. For safety's sake each tuft, about the size of a nutmeg, should be carried in a separate corked vial or short test tube. Tin boxes should be eschewed, as there is the possibility of a spark being struck when opening or closing.

EQUIPMENT OF A SMALL STUDIO.

II.

It is to be presumed that a small studio must be equipped with due regard to economy both of money and space, so that large and costly apparatus is not desirable. In few modern businesses are direct portraits larger than whole-plate size sent out, and therefore a studio camera with lenses suitable for that size should be chosen. It should be fitted with central swings, horizontal and vertical, and preferably have a repeating back, although this latter is not essential. In fact, if the camera has to be used occasionally out of doors it is better to sacrifice this fitment and select an ordinary parallel bellows field camera, which will answer as well as a special studio camera for portrait work and yet be quite portable. It is possible to fit such a camera with a removable repeating back, but as a rule the framework is hardly heavy enough to make this safe, so that it is better to be satisfied with the ordinary slides.

If much outdoor work is anticipated a separate camera should be provided, and should be for 12 x 10 plates, as this size is most useful for wedding and football groups, architectural or engineering subjects, and commercial work generally. It may be argued that enlargements could be supplied from whole-plate negatives, and that is true of some subjects, but for groups in which a number of faces require retouching, and for machinery which has often to be blocked out, full-sized negatives are most satisfactory.

It should be kept in mind, when selecting lenses, to choose such as will serve for more than one size of plate. For example, an anastigmat of 8 inches focal length will answer for rapid outdoor work on a half-plate, for cabinet full lengths in a very short studio, and will give a sufficiently wide angle for most purposes upon a 12 x 10. Bearing this in mind, a useful outfit to work both in-doors and out would be a 16- or 17-inch anastigmat for large groups and general work, on 12 x 10 outdoors and for cabinet and whole-plate work in the studio; the aforesaid 8-inch anastigmat, both with an aperture of $f/5.6$ to $f/6.3$; and a very rapid portrait lens of $10\frac{1}{2}$ or 11 inches focus for children and other quick work in the studio only. Other lenses may be added as opportunity offers, but a good start may be made with these three.

The studio camera stand should be of the Semi-Centennial or Hana type, in preference to the ordinary three- or four-legged patterns. Few of the latter will go near enough to the floor for children's portraits, and as a rule are not so steady. For outdoor work the tripod should be of generous size, a 10- or 12-inch head not being too large. The legs should have a good range of sliding movement, as a low stand is often wanted.

Every effort should be made, in fitting up the dark-room, to utilise every inch of space to the best advantage.

It is impossible to indicate how this may be done, as the dimensions and shape of the room will have to be considered. As a general instruction we suggest that as much space as possible should be devoted to sinks, which can easily be covered when a dry bench is required. It should always be possible for plates or prints to be washing while development or printing is being carried on, and this cannot be done conveniently in a small sink. It may be possible to work with one small sink, but it means many wasted hours in the course of a week, a consideration to the single-handed worker. Cupboards for exposed and unexposed plates should be fixed at a convenient height over the filling-in bench, and hooks provided for hanging spare inner carriers. Under the sink a rack for dishes and a waste box or tub should find places; an empty hypo cask will answer for the latter. An efficient printing box is a *sine quâ non* in any up-to-date dark-room, and, although electric light is the most convenient, gas, or even oil, may be used as the illuminant. If these are used it is necessary to work by reflected light, a mirror or even a white card serving to deflect the rays. If constructing a home-made box, the movable yellow shutter should be made as small as possible and close up to the light. If so arranged and properly balanced, no more effort will be required to make the exposure than is exerted upon an electric switch. In the workroom a strong bench should be constructed to carry the dry-mounting press, and this should not be too high. In most cases the press is fixed too high to be worked without an effort. The trimmer may find a place on the same bench, but only if there be a good light, which is also necessary for the "tacking on" process.

The retouching desk will probably have to be placed in the workroom. It should be of adequate size, not less than 20 inches square; the cover should be smooth and arranged so that it can be shut down to form a slope for spotting and colouring.

An almost indispensable item in even the smallest business is a good enlarging lantern, as it allows of prints of any size being made without delay. The half-plate size, with 8½-inch condenser, is the most generally useful, and a small half-watt lamp of, say, 250 c.p., the most convenient illuminant, failing which, an incandescent gas burner or acetylene can be used. Oil lamps are troublesome and odorous, and not to be recommended; if acetylene be objected to, the spirit incandescent lamp will be found most satisfactory. The enlarger should be fixed in a position in which it is always ready for use. In a small dark-room this may be done by means of a strong bracket for the lantern well above the sink, the easel being suspended from a wooden gantry upon which it can be moved to and fro.

VARIOUS WARM TONES OF GASLIGHT PAPER.

It is not always easy to get good tones on gaslight paper by sulphide toning, and the writer recently carried out certain experiments to see what range of tones he could obtain between the cold black of a normally-developed print down to a sepia with rather less yellow than is generally found in a print toned in the usual method by bleaching and darkening in sodium sulphide.

A test was made by the method advocated by Messrs. Kodak for Kodura paper, by bleaching in the usual ferricyanide bath with potassium bromide, partial re-development in a dilute developer, with subsequent immersion in sodium sulphide.

A negative was chosen and prints made on Novex gaslight paper, this paper being selected as development is rather slower than with most brands, and consequently the deposit forming the image might be expected to be in a specially suitable condition for toning.

The exposure was such that a good print was obtained in 30 seconds with D 50 developer, standard formula, at 62 deg. F.

The whole of the prints were exposed under identical conditions but developed for 90 seconds each to make some allowance for any apparent loss in depth due to the subsequent colour.

The prints in the set were practically indistinguishable from each other.

The prints were then bleached singly, washed in running water for 90 seconds, and immersed for various times in Wellington metol-hydroquinone borax developer of 10 per cent. normal strength.

The standard formula is as follows:—

Metol	1 gm.
Hydroquinone	2.5 gms.
Sodium sulphite (cryst.)	10 gms.
Borax	10 gms.
Water	500 c.c.s.

This developer was chosen as being slow working without the addition of bromide.

The whole of the operations were conducted by the electric light of a 60-watt half-watt lamp.

The following operations consisted in rinsing the print for 30 seconds in running water, and sulphiding in a bath of sodium sulphide of normal strength. Each print was developed in a separate portion of the dilute developer.

The attached table gives the results and also some alternative methods of obtaining the warmer sepia tones. Plain bleaching and sulphiding was not attempted as the results are too yellow to please the writer.

Print No.	Time in Developer	Colour on Removal from Developer.	Resulting Colour of Finished Print.	Remarks.
1	—	—	Black.	Normal print.
2	Till blackened	—	Warm Black.	Full strength developer used and no sulphiding.
3	30 mins.	Chocolate Red with tinge of Violet.	Warm Black—Brown Black.	
4	20 mins.	Chocolate Red	Cool Sepia.	The most useful range.
5	15 mins.	Red	Messotint Sepia.	
6	12 mins.	Lighter Red.	Sepia.	
7	9 mins.	Pale Red	Warm Sepia	
8	6 mins.	Very Pale Red	Warm Sepia, with distinct tinge of Yellow	

ALTERNATIVE TESTS.

Print No.	First bath.	Second bath.	Third bath.	Fourth bath.	Remarks.
9	Presulphide for 5 mins.	Bleach	Sulphide	—	Intermediate between 10 and 11
10	Bleach	10 secs. in carbonate of soda	Sulphide	—	Most yellow
11	Presulphide for 5 mins.	Bleach	10 secs. in carbonate of soda	Sulphide	Least yellow

NOTE.—9, 10 and 11 all lie between 6 and 7 in Colour, and exhibit rather more red and less yellow.

The writer was more interested in getting practical results which appeared to be capable of being repeated than in the scientific side of the experiment, and consequently omitted print No. 6 from the first series. This print was made subsequently, and dried, and was, the next evening, bleached and treated in the developer for a period half-way between the times given for prints No. 5 and 7. The resulting tone would enable anyone to place the print in its correct sequence in the set, which appears to be a striking commentary on the reliability of the method.

Print Nos. 9, 10 and 11 do not show any striking differences, but the colours are all pleasing, No. 11 being perhaps the best, and No. 10 showing more yellow than the other two. The use of carbonate of soda was suggested by the experiments recorded in the "British Journal" for July 29, 1921, by Mr. E. R. Bullock.

I will leave the editor to comment on the tones, but prints 2—7 bear a close resemblance to carbons of the colours described in the table. A. H. Hall.

[Of the series of prints which Mr. Hall very kindly sends for our inspection Nos. 2 and 3 represent the importation of just a trace of warmth into the black of the original print. No. 4 has distinct warmth of tone; No. 5 a little more. The remaining prints, Nos. 6 to 11, do not exhibit very appreciable difference as regards colour. All of them would, perhaps, be described as a pleasing sepia brown. Without exception the scale of tones in the original print is excellently retained. Eds., "B.J."]

COLOURING LANTERN SLIDES.

[In the 1922 volume of the "American Annual of Photography," just issued by Messrs. George Murphy, of New York, is the following exceedingly practical article on the colouring of lantern-slides. Dr. Lovelace does not attempt to teach the æstheties of this branch of work—and very wisely so, since that is entirely a question of individual taste and aptitude—but he deals in the clearest way with the technique of the oil colouring of slides. In view of the commercial opportunities which frequently occur for the supply of coloured slides, we give his very practical directions a place in our pages.—Eds. "B.J."]

Lantern slides, to my mind, are one of the most beautiful forms of the photographic image, and when properly coloured are even superior to the plain slide. I have heard many people express preference for the hand-coloured slide to the Autochrome or Paget, although the writer cannot agree with them on this point, for to my mind there is no form of photograph that will compare with a good colour plate.

Many miles of direction have been written about the colouring of lantern slides, but, with one exception, I have never seen any that were really practical. Most people use water colours. While it is possible to use them so that they do not look like the terrible things we see in the theatres announcing "The Perils of Pekin in 5 reels, with George Manleigh and Lovine Sweet," it is not often that they are anything but a warning to young slide painters.

Nothing is more pleasing to the beginner than to get his colour eight shades too dark, using some of the various aniline colours, and then try to get the colour out. It can be done—sometimes. Usually your slide is spoiled. With the use of oil colours all these troubles are avoided, and there is really only one difficulty to contend with—what this is I will explain at length.

For materials I am going to give specific names, as I have found that all brands of paint do not work the same, and some will not work at all. Get enough colours—life is too short to spend time mixing shades all the time. The outfit that I am giving here will only cost three or four dollars at the most, and will paint upward of a million slides—easily.

The colours I use are "Winsor and Newton Transparent Oil Colours"—a special colour made for transparent work. Get the following colours:—Gamboge, Chinese Orange, Mars Yellow, Alizarin Crimson, Crimson Lake, New Blue, Prussian Blue, Brown Pink, Italian Pink, Burnt Sienna, Vandyke Brown. For medium to mix them with I must acknowledge my indebtedness to Mr. Alfred H. Saunders, for a formula given in the "Annual" some years ago, and which I reprint here. It is the best medium I know, and I have tried them all, or nearly all.

Transparent gold size	...	...	4 parts.
Pure linseed oil	...	...	2 parts.
Pure turpentine	...	...	1 part.

Get these from a dealer in artists' materials, or you will *not* get linseed oil or turpentine, but some villainous compound which will ruin your work. Mix these well, and you are ready.

Dust is the prime enemy of the slide painter—guard against it as a plague by whatever means is necessary. Do not paint by daylight—use a light of the same colour as the one by which it will be shown, or as near as possible. A half-watt bulb—a white one—is first rate: then use a piece of opal glass, not ground, but opal for an easel. Put it at an angle of about 45 degrees, and your easel is ready. For a palette nothing is better than another piece of glass, not opal, but clear, prepared as follows:—Arrange your colours in a row, all reds together, all blues together, etc.; then take a brush, and put a small dab of each colour (mixed with a little of the medium given above) on the top edge of the glass. After they are all on, make a list, and paste it on the back of your palette, so that it can be read from the front. By merely looking at the row of colours on the top edge of your palette, you will know what colour you want to put out and use. This may seem a small item, but, after painting slides awhile, it will be found very valuable as a time saver.

Brushes are a big item. If they are good you will have little trouble in doing good work, but if they are poor they are an endless nuisance, as a hair from a brush ruins a slide if left on, and usually you will spoil the slide if you try to remove the hair.

The brushes used are called flat top, camel's hair, china painters' shaders, round, in quills. That is the full name, and Devoe and Reynolds make an excellent grade. Get some handles for them when ordering. You will need about four—ranging from an eighth to a little more than a quarter of an inch in diameter. They are round stubby brushes like a short cylinder of hair, but when filled with colour they will fan out until they will draw a line as fine as a hair. *Do not try* to use the ordinary pointed water colour brush if you want success.

The most difficult thing to learn in slide painting is the operation called fingering. It is not possible to put large tints on a slide by means of a brush. Streaks will show in spite of all that can be done to prevent them. Large tints are put on in this way:—A small amount of colour is put on the palette and mixed with a little medium. It is then painted on the slide and then fingered. This is done by polishing the second finger of the right hand with a piece of pumice stone, under water, until the finger is smooth as glass, taking care not to rub until finger is raw. Dry the finger, and then finger as follows:—Start at the bottom of the tint

to be fingered, and dab with the ball of the finger that has been polished. Roll the finger as you do so, so that each dab is a short roll of the finger on the smooth part. Do not dab without rolling the finger: it's a waste of time. Do not drag the finger, the paint will smear. Dab lightly, do not press heavily. Roll the hand from the thumb side *toward* the little finger. Each dab must overlap the last one made, and the pressure must be even.

Much depends on the consistency of the paint. If the mixture of paint and medium is too thin—that is, there is too much medium—the mixture will remain in little mottled puddles after each finger dab. If the mixture is too stiff or too dry, you will have prints of the finger at each dab. When the paint and medium is working right, and is just dry enough, each dab will leave a little mark, and these will run together, and as fingering goes on will gradually form an even tint. Note the two conditions:—1st: If paint and medium mixture is too thin, it will leave little puddles of paint after it, like footprints on a wet floor. 2nd: If mixture is too thick, it will stick to finger, and leave imprints of the finger on the slide.

This may seem a little unnecessary attention to detail, but fingering a slide is one of the most important things, if not the *most* important of the whole process—without it it is hardly possible to paint any kind of a slide whatsoever.

If you do not succeed at first—and it's almost certain you won't—have some benzole handy, wash the colouring off, and you are ready to try it again.

Now for a slide—get a seascape, if possible—it's easiest—and proceed as follows:—Take a small quantity of Prussian Blue on the palette, and mix with a little medium. Take your slide and paint it all over with this colour. Lay your brush down and start to finger the colour even, watching for the faults I have just told you of. You may have to wash the slide off four or five times, but it will not be hurt if you are careful. Read the directions on fingering again. Finger from left to right along the bottom edge, wipe the finger clean, and start to finger the next section higher, being sure that the upper rows of dabs always overlap the one below it, and wiping finger clean at end of a row of dabs. You must learn to finger an even tint before you can do anything else, so have patience, and after a little, without any change in your method of working, you will find that you can put on a tint as smooth as can be. Remember what was said about the paint being too thin or too dry, keep trying, and soon it will be easy.

Suppose that you have had good luck the first time, and you have an even blue shade all over the slide. If it is too light you should have used a darker colour to start with—if it is too dark the original colour should have been lighter. If it is too dark, keep on fingering and wiping. If it is too light, dab on some more colour and finger again. When the colour is the right shade take a chamois stump (from a dealer in artists' materials) and wipe out all the places where you do *not* want blue—for instance, in a seascape—wipe out your beach, flecks of foam, boats, etc., leaving the blue over the sky and sea. Do *not* use cloth or anything but chamois, or you will have lint on the slide, which ruins it. Wipe the stump clean with benzole and a rag, and it will last a long time. Remember, if you spoil the slide in wiping out blue where it is not wanted, wash the whole slide with benzole and paint it again. Should you run over the edge, say, of a sail or a whitecap, and take some of the sky away, it can be fingered with a little care and blended so that it will not be necessary to paint the whole slide over.

After the blue is put on, and all detail where you will use other colours is wiped clean, put the slide into a tin box, say, about 8 × 10 × 2—made without solder, and with a tight-fitting lid. This is called the stove, and is for drying the paint hard. The slide must be heated to about 200 deg. for several hours in order to bake the paint dry and hard, which must be done between each painting. 200 to 250 deg. Fahrenheit for about three hours is enough: too *much* heat will cause paint to turn brown.

When slides are cool go ahead and paint in your detail as much as possible, taking care that wherever one colour goes over another the first one is baked before the other is put on. After you have painted your first slide, put it in the lantern and learn your mistakes. It will probably be too dense, too dark, have dust on it, hairs from the brush, etc., so do not be discouraged: just make it over again.

Many people like to blend a sky from a deep blue at the top to a fine red at the bottom—why, I don't know, but it is done, and this is the way it is done with oil colours. Start at the horizon with a sweep of Crimson lake, above that a strip of Prussian blue or New Blue, then above that a sweep of Vandyke brown.

Now start at the bottom and finger, blending them together, and the trick is done. Another combination of this sort is Italian pink, then Prussian blue, then Vandyke brown above that.

In painting waves, water, etc., coat entirely with blue, fingered on, and then put on light touches or coats of yellow and brown in order to make the green shades wanted. Grass is better made this way than by mixing colours. I would advise the slide painter to buy a few oil coloured slides; it will teach him more of what a well fingered sky and sea should look like than pages of description could ever do. In putting in clouds, they should be wiped clean of paint in this way. Take a small piece of chamois skin, and roll up into a small cylinder—wipe out the clouds with a circular motion and then finger smooth so that the sky blends into the clouds in order to avoid the "hole in the sky" effect that is all too common.

I am not going to attempt to tell you what colours to mix to make definite shades; it would take too long. The object of the glass palette with the sample colours on the top is to enable you to see what the colours look like when light shines through them, and with a little practice one can get shades that will fit any picture. An artist friend tells me that with the colours I have mentioned in the list a man could paint any picture that has ever been painted, so there you are.

Another word and I am done—oil colours are as permanent as can be made. Any water colours suitable for slides will (in time) bleach out when used in a powerful lantern. Why spend time to make them if they will bleach out in a short time? I am sure that anyone seeing a good oil slide will never use any more water colours, and I can assure you that if you will practise the above-given directions faithfully, you cannot help but succeed. I dislike giving rules exceedingly, but possibly these brief rules will help the young painter.

(1) Put in your largest tint or your blue first—that which must be fingered and then bake dry.

(2) Put in your reds next, and your yellows last, baking after each one.

(3) You can paint all over a slide with all sorts of colours, without baking in between each application, if they do not touch each other. Small detail in various parts of a slide, such as a large group, can be painted all at the same painting, if you don't let separate colours touch each other.

(4) Never try to paint over a colour until it has been baked dry. It cannot be done.

(5) You will save time by following these directions exactly and by trying the slides in the lantern until you get a good idea of how dense they ought to be—it is impossible to judge by the eye until you have had considerable experience.

(6) Much time is saved by painting several slides at once—putting in all that is possible on each and then baking them all at once. Painting single slides except at first is a terrible time-killer. It takes no longer to paint a dozen slides with oils than with water colours, except that all of one colour is put in at once with oils, and with water colours you paint the slide with all the colours at once.

MARCUS G. LOVELACE, M.D.

LITERATURE OF AERIAL PHOTOGRAPHY.

When M. L. P. Clerc delivered the Traill-Taylor Memorial lecture on aerial photography he appended to it on publication in the Journal of the Royal Photographic Society a bibliography of this new branch of photographic technics. In the ordinary course we cannot devote space to bibliographical compilations such as this, which to many of our readers, as we realise, are so much dead weight. In the present instance, however, we make an exception to this rule, on account of the very great value which this detailed analysis of the origins of aerial photography should have for historians, inventors, patentees and others in the future.

It is to be observed that the list does not include the works mentioned in M. L-P. Clerc's "Applications de la Photographie Aérienne" (Paris, 1919), or in the bibliography reprinted p. 682 of the "B.J." (vol. 68, November 5, 1920, No. 3,157).

The date in brackets given for each patent is that of the first application under the International Convention.

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HILLIAMSON, C. M.—Aerial Cameras (Automatic camera). Eng. Pat. 123,997, 123,998 (May 13, 1916) 130,685 (March 14, 1918), 133,450 (October 18, 1918). "B.J.," vol. *66*, No. 3,083, June 6, 1919, pp. 309-311 (3 figs.); vol. *67*, No. 3,117, January 30, 1920, pp. 71-72 (1 fig.); vol. *67*, No. 3,126, April 2, 1920, p. 205 (5 figs.).

HOLE, A.—Aerial Cameras. Eng. Pat. 128,593 and 128,609 (January 3, 1917). "B.J.," vol. *66*, No. 3,096, August 29, 1919, pp. 506-507 (7 figs.).

I. E. M. ENGINEERING Co.—Automatic apparatus for aerial photography. Eng. Pat. 128,637 (August 20, 1917). "B.J.," vol. *66*, No. 3,098, September 19, 1919, p. 552 (1 fig.).

UELLER, F. W.—Panoramic camera applied to aerial photography. Eng. Pat. 119,516 (October 1, 1917). "B.J.," vol. *65*, No. 3,060, December 27, 1918, pp. 584-585 (1 fig.).

WORKMAN, H.—Automatic apparatus for aerial photography. Eng. Pat. 121,526 (December 20, 1917). "B.J.," vol. *66*, No. 3,071, March 14, 1919, pp. 131-132 (4 figs.).

Opt. Anst. C. Zeiss.—Roll film container (suction at the back of the film). Eng. Pat. 147,110 (February 24, 1918). Eng. Pat. 149,615 (July 26, 1919).

AUBRY, R.—Appareil photographique d'aviation à pellicules. Fr. Pat. 503,179 (March 12, 1918).

BAES, E. Ch.—Perfectionnements à l'obturateur focal (connection between focal plane shutter and film feeding). Fr. Pat. 501,641 (December 10, 1918).

AÉRONAUTIQUE MILITAIRE (France). Instruction pour l'emploi de l'aérophote B (Booklet of directions for using the Aerophote). September, 1918.

PIERRARD, L.—Chassis magasin pour pellicules (Improvements to the Aerophote). Fr. Pat. 500,556 (June 7, 1919) and 500,709 (June 18, 1919).

EASTMAN KODAK Co.—Directions for operating the Eastman Topographic Aerial Camera K 1. Booklet issued by the E. K. Co., Rochester. November, 1919.

EASTMAN KODAK Co.—Instruction for operating the Model C 2 Aero Camera, 4 in. by 5 in., for aerial mapping. Booklet issued by the E. K. Co., Rochester. 1919.

EASTMAN KODAK Co.—Eastman Aerial Cameras. "The Aeroplane," vol. *19*, No. 18 November 3, 1920, pp. 736-738 (3 figs.).

ELLIOTT, A. J.—Aerial cameras (Coupling of three cameras, of which two are panoramic cameras). Eng. Pat. 165,281 (March 19, 1920). "B.J.," vol. *68*, No. 3,197, August 12, 1921, pp. 480-481 (2 figs.).

FAIRCHILD AERIAL CAMERA Co.—Aerial Camera. "B.J.," vol. *67*, No. 3,144, August 6, 1921, p. 483.

III.—SENSITIVE MATERIALS AND LIGHT FILTERS.

MEES, C. E. K., and CLARKE, H. T.—A new yellow dye and light filters made from it. "B.J.," vol. *66*, No. 3,065, January 31, 1919, p. 48 (2 figs.). See also U.S. Pat. 1,293,039 (July 1, 1918).

BELLIER, H.—Etudes sur quelques plaques photo. effectuées pendant la guerre. "Bull. Off. Dir. Recherches et Inventions," vol. *1*, No. 1, November, 1919, pp. 22-27 (4 figs.). "Bull. Soc. Fr. Phot." [3], vol. *7*, No. 1, January, 1920, pp. 15-20 (1 fig.).

GIBSON, TYNDALL & MCNICOLAS.—The spectral transmission of filters used to detect camouflage or improve visibility (U.S. Bureau of Chemistry). "B.J.," vol. *67*, No. 3,113, January 2, 1920, p. 9 (3 figs.).

BURKE, S. M.—Hypersensitising commercial panchromatic plates (appl. to aerial photography). "J. Franklin Inst.," vol. *189*, No. 1, January, 1920, pp. 25-46. "B.J.," vol. *67*, Nos. 3,144-3,146, August 6-20, 1920, pp. 479, 481, 496, 499, 514 (22 figs.).

CLERC, L.-P.—Le voile atmosphérique et la photographie des lointains. "Rev. Fr. Phot.," vol. *1*, Nos. 4-5, February 15 and March 1, 1920, pp. 42-43 and 58-59.

IV.—STEREOPHOTOGRAPHY.

KEARTON, Lieut. C.—Photographic apparatus for aerial stereoscopy. Eng. Pat. 12,758 (September 6, 1915).

ENGLISH, D. A.—Aerial stereophotography. Eng. Pat. 128,022 (June 26 1918). "B.J.," vol. *66*, No. 3,097, September 12, 1919, p. 535.

CORADIN, E. L. E.—Stéréoscope à grille. Fr. Pat. 523,275 (March 19, 1919). See also "La Nature," vol. *47*, (2), No. 2,365, July 26, 1919, pp. 52-55 (2 figs.).

OPT. ANST. C. P. GOERZ.—Stereoscope for aerial photographs. Eng. Pat. 159,192 (February 23, 1920).

JAFFÉ, Haupt. A.—Die Stereoskopie aus der Luft. "Phot. Korresp.," vol. *57*, Nos. 720, 721, September-October, 1920, pp. 235-239 and 261-266 (11 figs.).

V.—AERIAL PHOTO-TOPOGRAPHY.

INT. AERO-GEODATISCHE GES.—Stéréophotogrammetrie Aérienne. Fr. Pat. 457,236 (September 25, 1915).

ROLLET DE L'ISLE.—Utilisation des photographies prises en avion pour compléter une carte. "Annales hydrographiques," 1916.

ROUSSILHE, H.—Applications de la photographie aérienne aux levés topographiques de précision. "Annales hydrographiques," 1917. [This paper was written in 1918.]

ROUSSILHE, H.—Aerial photo-topography. Eng. Pat. 160,869 (November 21, 1918). "B.J.," vol. *68*, No. 3,190, June 24, 1921, pp. 375-377 (7 figs.).

HUGERSHOFF, R., and CRANZ, H.—"Grundlagen der Photogrammetrie aus Luftfahrzeugen" (128 pp., 34 figs., 11 plates). Stuttgart, 1919 (K. Wittwer).

PULFRICH, C.—"Uber Photogrammetrie aus Luftfahrzeugen und die ihr dienenden Instrumente" (46 pp., 16 figs.). Jena, 1919 (G. Fisher).

DE VANSSAY.—Note sur l'emploi pour les travaux cartographiques des photographies prises en avion. "Annales hydrographiques," 1917 (issued February, 1919).

OPT. ANST. C. P. GOERZ.—Aerial photo surveying. Eng. Pat. 150,304 (August 29, 1919). "B.J.," vol. *67*, No. 3,160, November 26, 1920, p. 724.

COOKE, F. L.—Photo surveying. Eng. Pat. 154,219 (November 24, 1919). "Rev. Fr. Phot.," vol. *2*, No. 31 (Supplement), April 1, 1921, p. 32.

VOLMAT, J.—Applications de la Photographie Aérienne aux levés hydrographiques. "C. R. Ac. Sc., vol. *169*, No. 17, October 27, 1919, pp. 717-718. See also "L'Illustration," vol. *78*, No. 4,023, April 10, 1920, pp. 216-218 (7 figs.).

DE LARMINAT, E.—"La Topographie chez l'Ennemi" (96 pp., 27 figs.). Paris, 1920 (Lavanzelle).

LUSCHER, H.—"Photogrammetrie" (128 pp., 78 figs., 2 plates). Leipzig, 1920 (Teubner).

POIVILLIERS, G. J.—appareil destiné au tracé automatique des cartes . . . à l'aide de photographies terrestres ou aériennes. Fr. Pat. 523,428 (January 19, 1920).

HUGERSHOFF, R.—Topographische Aufnahmen aus Luftfahrzeugen. "Geographischer Anzeiger," vol. *21*, Nos. 1-2, January-February, 1920, pp. 1-13 (19 figs., 2 plates).

SEVE, P.—Restitution photographique d'une image semblable à un objet plan d'après une perspective de cet objet. "Bull. Union des Physiciens," vol. *14*, Nos. 132-133, April-May, 1920, pp. 137-145 (4 figs.).

GUILLEMET, Capt. A.—La photographie aérienne appliqués aux travaux topographiques de précision. "Revue Gen. des Sciences," vol. *31*, No. 10, May 30, 1920, pp. 313-319 (3 figs.).

CANTACUZENE, S. G.—Procédé graphique et appareil pour levé de plans topographiques à l'aide de deux photographies aériennes. Fr. Pat. 521,341 and 521,342 (July 29, 1920).

LAWRENCE, Lt.-Col. T. E.—Map-making by air photography. "The Daily Telegraph," No. 20,449, October 5, 1920, p. 5. See also "B.J.," vol. *67*, Nos. 3,158-3,159, November 12-19, 1920, pp. 685-686 and 714-715.

LEE, W. T.—Aerial photography; an auxiliary to geography. "Geographical Review," November, 1920.

MOFFIT, F. H.—Aerial photo surveying. "Geographical Review," November, 1920.

(Abstracts of the two last-named papers have been published in "Progresso fotografico," vol. *28*, No. 4, April, 1921, pp. 99-102 and 102-103.)

WINTERBOTHAM, Lt.-Col H. S. L.—The development and present possibilities of air photography for mapping. "B.J.," vol. *68*, No. 3,167. January 14, 1921, pp. 16-20.

X * * *.—La photo-topographie par avion au Maroc "L'Aéronautique," vol *3*, No. 24, May, 1921, pp. 209-212 (9 figs.).

MALLOCK, A.—Atmospheric Refraction. "Nature," vol. *107*, No. 2,693, June 9, 1921, pp. 456-457 (1 fig.).

C. ZEISS.—Stéréautographe (a new model permitting the use of abnormal stereograms). Fr. Pat. 525,313 (July 9, 1918), and Fr. Pat 528,208 (not yet granted)

FORTHCOMING EXHIBITIONS.

1922.

January 11 to 27.—Camera Portraits, entitled "Men of Mark," by Walter Stoneman, at the house of the Royal Photographic Society, 35, Russell Square, London, W.C.1.

January 21 to February 4.—Partick Camera Club. Particulars from the Hon. Secretary, James Whyte, 51a, Peel Street, Partick, Glasgow.

February 11 to 25.—Scottish Photographic Salon. Latest dates, entry forms, January 23; exhibits, January 31. Particulars from the Secretary, James F. Smellie, Braefindon, Allanshaw Street, Hamilton.

February 14 to 17.—Exeter Camera Club. Latest date for entries, January 30. Particulars from C. Beauchamp Hall, Hon. Exhibition Secretary, Exeter Camera Club, "St. Denys," Bellevue Road, Exmouth.

February 18 to March 4.—Edinburgh Photographic Society. Latest dates, entry forms, February 4; exhibits, February 9. Particulars from the Hon. Secretary, G. Massie, 10, Hart Street, Edinburgh.

March 8 to 9.—Birkenhead Photographic Association. Latest date for entries, February 25. Particulars from the Exhibition Secretaries, Messrs. Longstaff and Trace, 33, Hamilton Square, Birkenhead.

March 28 to April 1.—Hackney Photographic Society. Hon. Secretary, Walter Selfe, 24, Pembury Road, Clapton, London, E.5.

April 5 to 8.—Leicester and Leicestershire Photographic Society. Particulars from the Hon. Secretary, W. Bailey, Cank Street, Leicester.

May 1 to 6.—Photographic Fair. Horticultural Hall, Westminster. Secretary, Arthur C. Brookes, Sicilian House, Southampton Row, London, W.C.1.

Patent News.

Process patents—applications and specifications—are treated in "Photo-Mechanical Notes."

Applications, December 12 to 17 :—

CAMERAS.—No. 33,643. Photographic cameras. E. Fisher.

PRINTING-FRAMES.—No. 33,974. Photographic printing-frames. H. W. Harrington.

FOCUSSING-DEVICES.—No. 33,901. Focussing-devices for photographic apparatus. J. Krone.

STEREOSCOPY.—No. 33,363. Means for obtaining stereoscopic effects on photographic plates, films and prints and projections therefrom. H. Newbold.

PHOTO-SCULPTURES.—No. 33,600. Means of producing sculptures and reliefs from photographs. E. J. Clifford.

PROJECTION APPARATUS.—No. 33,680. Optical projectors. A. A. D. Lang and A. D. Lang, Ltd.

PROJECTION APPARATUS.—No. 33,346. Producing pictures by projection. E. J. Marston and H. A. Smith.

PROJECTION SCREENS.—No. 33,344. Screens for exhibition of projected pictures. E. J. Marston and H. A. Smith.

OPTICAL PROJECTION.—No. 33,334. Optical apparatus for projecting pictures, reading matter, etc. J. T. Tussaud.

CINEMATOGRAPHY.—No. 33,406. Apparatus for exhibiting cinematographic pictures, etc. J. W. Hasselkus, H. Moore, and Ross, Ltd.

COMPLETE SPECIFICATIONS ACCEPTED.

These specifications are obtainable, price 1/- each, post free, from the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.

The date in brackets is that of application in this country; or abroad, in the case of patents granted under the International Convention.

STEREO-CINEMATOGRAPHY.—No. 159,991 (December 10, 1919). The apparatus provides for the photographing of scenes wherein two moving picture films are placed parallel one to another and are exposed simultaneously by the operation of a single handle. After the films are developed they are placed in projecting machines which project the individual exposures of the films on to substantially the same space of a screen. The individual exposure of one film as projected is followed by the individual exposure of the other film which was taken at the same time as the first individual exposure. The observer is provided with an optical box which will allow the observation of these alternately pro-

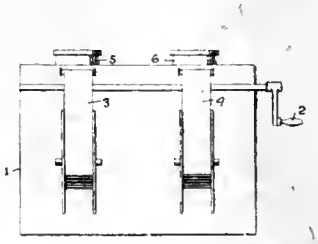

Fig. 1

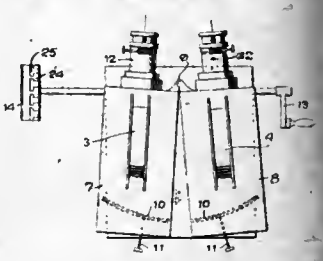

Fig. 2.

jected exposures so that one eye of the person will perceive the projections of one film and the other eye will perceive the projections of the other film. Certain connections between the optical box and the projecting machine provide for the operation of the various parts of the optical box in synchronism with the operation of the projecting machine.

In the drawings, the camera 1 is shown with the handle 2 which operates the camera to expose simultaneously films 3 and 4. The films placed are shown as parallel, and, when exposed, are substantially in the same vertical plane. Good results have been obtained by this method but various modifications of apparatus and positions are possible. These films will be marked "right" and "left" or any other distinguishing mark which will deter-

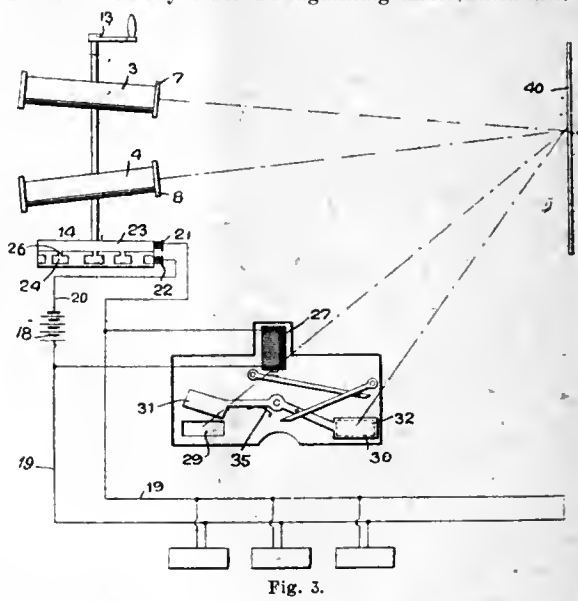

Fig. 3.

mine the position in which they were located during the photographing of the scenes. This will provide means by which the films may be properly placed in projecting machines.

In projecting the pictures, as recorded on films 3 and 4 to produce the stereoscopic effect, individual exposures of a film are projected alternately on a screen and on substantially the same area of the screen. It is, however, possible to produce a satisfactory picture when the centrelines of the projected pictures are not coincident on the screen. These centrelines may vary considerably. A projecting container operating two films at the same

time is illustrated in fig. 2 where films 3 and 4 are shown in position in machines 7 and 8 respectively, which are pivoted at 9 and may be oscillated about this pivot by means of racks 10 and pinions operated by thumb screws 11. These machines are provided with the necessary projecting portions 12 which are telescoping in order to obtain the proper focus. Any desired rack and pinion arrangement or other apparatus may be used for telescoping the parts of the projecting portions. The containers 7 and 8 may be oscillated about pivot 9 in order that the projections of the films may be thrown on to the same portion of a screen. The handle 13 is employed to move the necessary operating parts of the projecting machines and any form of universal

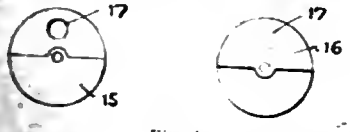

Fig. 4.

joints may be employed to allow the oscillation of the projectors. Mounted on the operating shaft is the electrical circuit interrupter or commutator 14. Referring to fig. 4, the two shutters 15 and 16 which are used on the projecting machines and their paths of revolution are illustrated. The exposures on the films are projected through holes 17 and the shutters cover and uncover the holes alternately. Generally, the shutters are made semi-circular, but the contour of the straight edges across the centre may be changed so that the projection of an individual exposure of one film may be thrown on to the screen a little after a projection of the other film has been cut off.

An electric circuit and necessary electromagnets have been employed to operate the parts of the optical box and reference is made to figs. 3, 5, 6 and 7 in connection with the electrical system as herein employed. The battery 18 provides the necessary electrical power and has the leads 19 and 20 therefrom which are connected to the brushes 21 and 22 respectively. These brushes contact with the electrical circuit interrupter or commutator 14, the brush 21 pressing against the continuous annular conducting metal 23 and the brush 22 contacts with electrical conducting segments 24, which are mounted in any well-known insulator 25 and are connected by conductors 26 to conductor 23. Connected in parallel with this circuit are various electromagnets 27 which are excited when the brush 22 contacts with one of the segments 24 as there is a complete electric circuit from battery 18 through lead 19, brush 21, annular conductor 23, lead 26, segment 24, brush 22, lead 20, back to the other connection on the battery 18. There can be a large number of optical boxes placed in the electrical circuit.

The optical viewing boxes as illustrated in fig. 7 are made of any light material and are employed to be placed in front of the eyes and they are recessed at 28 for receiving a portion of the observer's nose. The boxes are provided with openings 29 and 30 which may take the form of circles or slots, the latter being preferable in order to accommodate the average range of distances between eyes of various people although other means may be employed to allow for the varying distances between the eyes. The operating parts as designed and illustrated show that opening 29 has cover 31 and opening 30 has cover 32 for covering and uncovering these openings. The covers are mounted on rocker

Fig. 6.

Fig. 5.

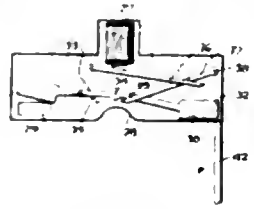

Fig. 7.

arm 33 pivoted at 34 and held normally in position with opening 29 uncovered by means of spring 35. The electromagnet 27 when excited draws upward arm 36, which in turn carries arm 37, about its pivot 38; this arm 37 contacting with rocker arm 33 at stud 39. When arm 36 carries arm 37 upward, the rocker arm 33 is moved against the spring 35 and opening 30 is uncovered while opening 29 becomes covered. The design of the operating parts in the optical box may be varied in any desired manner; the main object being to cover and uncover the openings alternately.

In fig. 3 the centrelines of the projected pictures are shown as meeting on the screen 40 at 41 and the scenes projected may be observed from any position of the theatre; in this particular diagram there is shown an enlarged optical box as being operated at the right of the projecting machines. The position of the shutters as shown in fig. 4 will be considered as being the position of the shutters in projecting machines 7 and 8 of fig. 3, the shutter 15 being located on projecting machine 7. For purposes of description it will be considered that the optical box is held by an observer so that the opening 29 will be in front of the left eye. Since this opening is uncovered and the shutter 15 is not obstructing the projection from projecting machine 7, the observer will see a certain scene with his left eye. As the operating crank 13 is rotated, the brush 22 will contact with one of the segments 24 and thereby complete the electrical circuit from the battery through the commutator and the electromagnet, which in turn being excited will move the operating parts of the optical box and uncover opening 30 and cover opening 29. At the same time shutter 15 is moved in front of opening 17 on machine 7 and shutter 16 uncovers opening 17 on machine 8 so that the scene on film 4 will be projected on screen 40 and will be seen by the right eye of the observer.

It is well known in the moving picture art that individual exposures will not be clearly projected unless moved at a rate of speed greater than about 16 times per second. It is found that by projecting alternately the two films on the same area of the same screen the individual exposures of pictures which have been photographed simultaneously and having one eye observe projections made by one projecting machine and the other eye observe projections made by the other machine, that the image of a scene will be retained by one of the eyes and the image impressed upon the other eye will, in connection with the retained image, form the picture as actually enacted and as it would have been observed by the observer's eyes had he been on the scene; and this composite image will be appreciated as though the observer was present at the actual scene. Observations of moving pictures by the use of the optical box are desirable to produce more effectively the stereoscopic effect and if desirable the openings in the box may have magnifying glass or lenses as desired.—Ramon Gantes Arestizabal, Van Court Inn, Roselle, New Jersey, U.S.A.

Trade Names and Marks.

APPLICATIONS FOR REGISTRATION.

DUPLI-TIZED.—No. 420,051. All goods included in Class 39. Kodak, Ltd., Kodak House, Kingsway, London, W.C.2, dealers in photographic materials. October 31, 1921.

MARKS PLACED ON THE REGISTER.

The following marks have been placed on the register:—

KOTINIC.—No. 418,037. Flashlight powders and other preparations for flashlight purposes, all being for use in photography. Kodak, Ltd., Kodak House, Kingsway, London, W.C.2, dealers in photographic materials.

KALO.—No. 418,129. Photographic paper, photographic albums, and photographic mounts included in Class 39. Ilford, Ltd., Britannia Works, Roden Street, Ilford, Essex, manufacturers of photographic plates, paper and films.

TELERADIOGRAPHIC WORK.—Some experiments have been carried out by a Commission appointed by the French Academy of Sciences to determine how far under differing conditions X-rays can penetrate. The tests were radiographic, and in one instance a negative was taken at a distance of 6 ft. from the X-ray tube, the rays having to penetrate 1 in of lead, a marble slab, some wooden boards, and a floor 12 in. thick, and yet these rays were no stronger than those commonly used in X-ray photography. With the same strength a photographic plate was reached by rays after passing through a brick wall 20 in. thick, and a radiograph of a skull taken at a range of 85 yarda is comparable to one taken at short range. With a much more powerful ray than is commonly used in radiography these experiments proved that negatives could be taken at hundreds of yards' range. The long-distance radiographic experiments were carried out in two buildings, one on either side of a city square, with a distance of 85 yards between them. This space was traversed by the X-rays, and the result was negatives from which good prints were made of a skull, a bottle, a crab shell, and other objects. This long-range X-ray photography has been called "teleradiography."

New Books.

Photographic Abstracts. Vol. 1. Edited by B. V. Storr, M.Sc., F.I.C. Royal Photographic Society. 10s. net.

THE publication of the fourth quarterly part of "Photographic Abstracts," by its completion of the first volume of this commendable enterprise of the Scientific and Technical Group of the Royal Photographic Society, invites all the attention which can be directed to the services which have thus been rendered to the photographic student, experimenter and inventor. The complete volume, although it consists of only 163 pages, contains abstracts of photographic communications, patent specifications, etc., which reach the number of 871. This latter figure, however, by no means represents the number of individual pieces of subject matter which have come within the survey of Mr. Storr and his colleagues, for one meets with compound abstracts which include many separate items. There is, for example, in Part 4, one which is a list of patent specifications occupying more than three closely-printed pages. The result of the year's work has been to bring within a small compass the means of ascertaining the main outlines of practically every paper which has been published during the past twelve months on the various branches of photography, and on those departments of chemistry and physics relating to it. That is a very important work, the further prosecution of which is deserving of every encouragement. Inasmuch as the abstracts in each issue of the publication are arranged under one or other of eleven descriptive headings, there is not the necessity which there is in a less systematically compiled work for a subject index. We can readily understand that Mr. Storr could hardly contemplate as desirable or possible the compilation of such an appendix. However, he has done the next best thing by providing the volume with a name index, which itself occupies five pages. Those with any experience in the tracing of subject matter in scientific literature will acknowledge that the name index often provides the most certain clue, since it can be compiled with a precision which no subject index can equal. Mr. Storr and the publication committee, Messrs. K. C. D. Hickman, E. K. Hunter, T. Slater Price, and F. F. Renwick, are to be congratulated on the completion of the first year of their exacting labours. They have established on a solid foundation a work which inevitably must grow in importance with the development of photographic processes from the technical and scientific standpoints.

Pictorial Landscape Photography. By The Photo Pictorialists of Buffalo. Boston: American Photographic Publishing Co., 428, Newbury Street. 3.50 dollars.

THE amateur in pictorial photography in the United States is nothing if not serious. One has only to think of Mr. Stieglitz's intense career to realise that. Members of the Buffalo Camera Club seem to be particularly serious. If we understand the first sentence of the preface to this work correctly, they regard the formation of a "pictorial group" within this club as approximately the beginning, in the year 1905, of pictorial photography in America. In that view we think they are somewhat too serious. The Stieglitzes and Steichens, Clarence Whites and Holland Days, had surely made American pictorial photography known in other countries before the light of art began to radiate from Buffalo. Some of us remember the mild sensation which was created in this country when the late Snowden Ward introduced the "American School" to us. Members of the Buffalo "pictorial group" may have been represented in it; we are afraid we do not remember, but we are inclined to think that the striking and beautiful work which Mr. Porterfield has shown here is of later growth. However, this is all beside the fact that the pictorial photographers of Buffalo have now thought it well to embody their pictorial practice definitely in print, and the present volume, written by them collectively, is the result. An admirable project certainly, yet it is not easy to discover wherein precisely their text differs in its general character from other works on the same subject. Apparently our Buffalo friends are essentially landscapists, and are of the view that the broad, open effects at which they aim are best secured by pigment printing, either carbon, gum-bichromate, or a combination of the latter with bromide printing. Here they have much in common with the saner exponents of pictorial photography in Germany. They have strong views on the amenities which should be observed in the making of prints, but we fear they depart from historical accuracy in repudiating with some heat the American origin of the method of multiple mounting, which reached its technical zenith at the hands of Mr. Frederick H. Evans. Therefore, it is really too bad of them to disparage the practice by reference to a particular example of Mr. Evans's. But this is the only item which calls for challenge in the many pages of the book. Pictorial photographers will certainly be interested in what the Buffalo pictorialists have to say, and to show in the shape of numerous plate reproductions of their work.

Optic Projection. By Simon Henry Gage and Henry Phelps Gage. Ithaca, New York: Comstock Publishing Co. 5 dols.

IN this large manual of over 700 pages the authors have treated the subject of optical projection with a degree of comprehensiveness and a superabundance of detail which has not previously been allotted to the subject in any text-book in any language. They include within the scope of their text not only ordinary lantern projection, but the use of the projection microscope, cinematograph projection, and the employment of projection systems for the purpose of making drawings, the latter a branch of work for which many special appliances have been designed, chiefly by Continental constructors. Throughout, these various branches of projection are dealt with fully from the practical standpoint, and particularly in respect to the methods and precautions incidental to the use of electric current as the source of light. The authors are evidently trained scientific men, and it is equally evident that they are thoroughly familiar with the practical employment of the innumerable instruments which they describe. Their manual gains a very great deal in practical usefulness by the numerous detailed descriptions and drawings of actual appliances on the market. These are chiefly those by American constructors, but the models of British and Continental firms come in for a full share of notice.

In arrangement the manual is highly sub-divided into numbered paragraphs, the cross references from one to another of which must have entailed a great deal of extra work. Also, each of the twelve chapters which deal with practical manipulation has appended to it a table summarising the things which it is of chief importance to observe or avoid for successful practice. In those dealing with the ordinary optical lantern, chief attention is given to the use of direct or alternating electric current, and the difficulties to be overcome in employing arc lamps with the latter specially considered. The practical details of every form of light-source are the subjects of special sections, in which we can discover only one omission, namely, the pastille system of employing oxy-acetylene, which no doubt was introduced in practical form after the authors had completed their text. The lanterns for the projection of opaque objects and of objects in a horizontal plane occupy a special chapter, in which are described the instruments ranging from the elaborate epidiascope to the cheap lanterns sold for showing postcards, etc., on the screen. Micro-projection is one of the chief parts of the book, in which the importance of correct adjustment of illumination is specially considered. Incidentals are so fully treated in other places that the chapter on cinematograph projection is shorter than might be assumed, and is largely confined to the special conditions as regards handling of film and avoidance of flicker. In considering the arrangement of a projection theatre, the authors deal very thoroughly with the balance of advantage between screens having a completely diffusing surface and those producing partially specular reflection. They discuss the relative merits of these screens from the points of view of college lecture theatres and those for commercial cinema shows. One point which is not touched upon is the relation of the arrangement of the auditorium as regards designating those parts of it where the audience obtains the best perspective rendering of the projected scene. We think it was a German professor who some years ago, in giving formulæ for calculating these places in the viewing space, insisted that the prices charged for admission should be upon a corresponding scale. We fear that a public which exhibits such indifference to the character of the subjects which it pays to see is not very susceptible to refinements of perspective. Messrs. Gage's treatise contains a chapter on electric currents, lamps, wiring and measurements, which is in itself a manual of the electrical knowledge which the lanternist should have. Concluding pages contain a brief historical summary of the evolution of projection, a directory of manufacturers and dealers in projection appliances, an alphabetical list of the chief works on projection, and a comprehensive index worthy of the enormous mass of technical information contained in the volume.

New Materials.

ENSIGN POWDER MOUNTANT.—Messrs. Houghtons, 88-89, High Holborn, London, W.C.1, have just introduced a mountant in the form of a powder, which has simply to be mixed with cold water in order to form a mountant ready for use. We dare say that in this age, when manufacturers conspire to relieve the amateur photographer of every occasion for thought or trouble, there is an advantage in a mounting mixture which is even easier to prepare than starch paste. Certainly nothing could be simpler than the preparation of this mountant, which we find to make a beautifully smooth and adhesive paste, resembling well-made starch mountant in its behaviour. We have no hesitation in commending it to the amateur worker, who will find that there is nothing to complain of in the tenacity with which prints adhere to the mounts. The paste is supplied in tins, price 1s.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK

MONDAY, JANUARY 2.

Bowes Park and Dist. P.S. "The Valley of the Arno." W. E. Walker.
Bradford Photographic Society. Whist Drive.
Forest Hill P.S. Print and Lantern Slide Competition.
Kidderminster P.S. "Through the Grecian Archipelago and the Near East." W. Butcher and Sons.
Leeds Camera Club. Annual Outing.
Optical Society. Exhibition of Scientific Instruments.
South London P.S. "Telephotography." T. W. Derrington.
Walthamstow and Dist. P.S. "Personality in Pictorial Photography." E. W. Brooks.

TUESDAY, JANUARY 3.

Belfast C.P.A. Camera Club. "How a Reflex Camera is Made."
Exeter Camera Club. Affiliation Competition Prize Slides.
Hackney P.S. "How a Reflex Camera is Made." W. Butcher and Sons.
Morley Photographic Society. Whist Drive.
Mottingham P.S. "A Loan in London." W. L. F. Wastell.

WEDNESDAY, JANUARY 4.

Catford Camera Club. "The Value of Failure." E. C. Perry.
Croydon Camera Club. "Chemical Methods in Photography." C. M. Thomas.
Dennistoun Amat. P.A. A Movie Night. W. S. Shepherd.
Edinburgh P.S. "The Gentle Art of Control." E. F. Spaven.
Leicester P.S. Ladies' Night. Social and Concert.
Partick Camera Club. "Through the Grecian Archipelago." W. Butcher and Sons.
Rochdale Amat. P.S. A.P. and P. 1921 Prize Slides.
South Suburban P.S. "Psychic Photography." Society for the Study of Supernormal Pictures.

THURSDAY, JANUARY 5.

Gateshead Camera Club. Social.
Hammersmith Hampshire House P.S. "Dark Room Dodges." G. C. Weston.
Ilford Photographic Society. Dance.

FRIDAY, JANUARY 6.

Wombwell P.S. "Colour Photography." C. B. Howdle.

CROYDON CAMERA CLUB

Mr. A. C. Braham, of the Autotype Co., paid one of his ever welcome visits with a demonstration of "Carbro," including the latest modifications and improvements which add to certainty and ease of working. The procedure having been fully outlined in a recent report of a demonstration at the R.P.S. need not be referred to again.

However, there are a few points which may usefully be mentioned. Those who have the printed instructions should substitute "waxed paper" for "blotting paper" mentioned on page 2, and note that a weight is superfluous. Mr. Braham never uses one. It was also interesting to hear that a Carbro records more gradation than the eye can see in a bromide print, invisible gradation in the high lights, and buried detail in the shadows appearing for the first time in the carbon picture and adding greatly to its beauty. For the best results a vigorous and somewhat over-developed bromide print is desirable. Members expressed the most appreciative opinions regarding the process, especially its capacity for alteration in any desired direction.

The week before, the secretary, Mr. J. M. Sellors, showed some instructive tests made by him, with a device for softening definition brought forward some time ago, and then stated shortly to be placed on the market. No doubt ultimately it will get there. A series of densities and a negative were employed, from which bromide paper enlargements were made.

The device consists of a photographically-produced image on glass of fine black lines crossing each other at right angles, and protected by a cover-glass, the contrivance being placed on the lens like a cap. The enlargements showed a pleasing diffusion, perhaps slightly too pronounced for some tastes, closely resembling that afforded by Mr. H. P. C. Harpur's original method of placing separated layers of black or white tulle, of about 1/16-in. mesh, in front of or behind the lens. (The degree of separation is not important, ¼ in. works well.) Mr. Harpur maintains that white tulle gives slightly less contrast than the black, which is denied by Mr. Sellors. One deplores the lack of observation in the other, who, in turn, attributes the alleged difference purely to a softening of the perceptive faculties.

In each case three exposures were made: One with no diffuser; one with six layers of white tulle placed behind the lens; and one with the glass diffuser in front of the lens; the exposures respectively being in ratio 1 : 2 : 3. The latter two seemed a shade more exposed than the first exposure; and slightly less contrast and slightly more diffusion existed in the second compared with the third.

In the discussion Mr. A. F. Catharine said that the irregular structure of tulle gave diffraction in all directions, which was what was wanted. With the regular square formation of the glass diffuser he would expect star-like radiation. In his opinion a more pleasing diffusion was obtained in direct portraiture, and in the making of enlarged negatives, as then the high-lights spread into the shadows, whereas in direct enlargements the reverse held. Mr. L. J. Hibbert said that the diffusion produced by each transparent square on the glass device was in the nature of a disc, not a star.

Mr. Harpur said not only was the tulle irregular, but it possessed fine fringes, which enhanced its virtue in the desired direction. The idea of using tulle in front of the lens occurred to him many years ago at the Zoo, when observing the wire-netting of the cages in the monkey-house. In reply to a question he stated that his observations were made from the outside of the cages. Recently he had tried imparting a vibratory motion to the tulle and would communicate results later.

Mr. E. A. Salt said that by a curious coincidence he had just thought of mounting the tulle in swinging pendulum fashion, and in strict confidence had imparted this brain-wave to the president. He had been implored to preserve strict silence by Mr. Keane, who, it transpired, was experimenting with the fabric mounted on a rotating wheel. A combination of the three methods should meet the most exacting requirements. Mr. Sellors agreed, but expressed the opinion that a tennis racket waved in front of the lens would equally meet the case.

News and Notes.

DEATH OF MR. C. W. BURROWS.—We regret to have to announce the death of Mr. C. W. Burrows, a very well-known member of the United Stereoscopic Society, who died on December 24, 1921, age 68. He had been in failing health for many years, but up to the last maintained his great interest in stereoscopic work, and will be very much missed by the members of the U.S.S.

FOUR THOUSAND NEGATIVES OF SNOWFLAKES.—Mr. W. A. Bentley, of Jericho, Vermont, U.S.A., an American scientific journal states, has spent the best part of the past thirty-five winters photographing snowflakes, and his collection now consists of four thousand negatives, and no two are alike. This labour has all been done with a primitive photographic and microscopic apparatus. He was, we are told, the first to devise a means whereby a snowflake could be photographed and enlarged with exactness with such simple equipment. The rigorous winters of his native State were, of course, in his favour. But, even in the intense cold of Vermont, great speed is required in this work, for, once a snowflake is isolated, although there may be no danger whatever of melting, it is subject to evaporation, a process that is just as destructive, in the case of such a fragile object as one flake of snow.

ENLARGING DENSE NEGATIVES.—Messrs. Hewittic Electric Company, Limited, 80, York Road, King's Cross, London, N.1, write:—"We notice in your "Answers to Correspondents" that you have had an inquiry from a reader who is anxious to know the best form of lighting for dealing with dense negatives. As you are doubtless aware, we are manufacturers of a mercury-vapour type of lamp which is largely used by the leading trade houses for enlarging work, and the general opinion of these users is that it is the best known form of illuminant for this class of work. We have also a small quartz type of mercury lamp coming into use, particularly where small dense negatives have to be dealt with. If any of your readers are interested we shall be pleased to demonstrate these outfits to them at the above address.

Answers to Correspondents.

In accordance with our present practice a relatively small space is allotted in each issue to replies to correspondents.

We will answer by post if stamped and addressed envelope is enclosed for reply: 5-cent International Coupon, from readers abroad.

Queries to be answered in the Friday's "Journal" must reach us not later than Tuesday (posted Monday) and should be addressed to the Editors.

B. T. G.—If there had been anything of the kind we think we should have heard of it. We always regard these reports with a good deal of suspicion. As a rule, the lay Press is very imperfectly informed on photographic matters, particularly on colour photography.

M. S.—As the photographs were taken to your customer's order, the copyright in the prints is solely your customer's property. You are not entitled to any reproduction fee, and if you had submitted photographs you would simply have been offering to sell something that you haven't got.

A. A. E.—For the general account of the origin and principles of photographic processes there is no better book than "Photography of To-day," by Chapman Jones. It chief chapters are on light, lenses, colour, colour photography, motion photography, and reproduction processes. Our own publishers supply it, price 9s. 6d., post free.

F. K. L.—Yes, if you divided the focal length of the lens by the *f* number, the result (providing the *f* numbers are correctly marked on the lens) is the diameter of what is generally called the "effective aperture" or "entrance pupil." In the case of any lens which has a positive element in front of the diaphragm aperture, this diameter is slightly larger than the actual diameter of the stop.

P. H.—The features you describe are fairly common among enlarging apparatus. On looking at advertisements and catalogues of 15 and 20 years ago we see that they figure in a number of commercial enlarging lanterns. We think the best thing you can do is to look through the advertisements of past volumes of the "B.J. Almanac," which you can see in the library of the Patent Office, 25, Southampton Buildings, Chancery Lane, W.C.

E. G. P.—You can have a negative lens fitted to your R.R. so as to give an image twice the size at the same camera extension, but the F. No. will then be twice its value for any particular stop, e.g., *f*/8 will be *f*/16, and the exposure will be four times. So far as we know there is no means of obtaining an equivalent focal length half the camera extension, and, at the same time, preserving the full working speed of the positive lens. The North Middlesex Photographic Society meets at Mount View Congregational Church, Stroud Green. It is one of the best of the societies in London, and is no doubt sufficiently accessible to you. The secretary is E. C. Ridge, 88, Ambler Road, Finsbury Park.

P. T. M.—The belief that a process of photography was invented by James Watt in conjunction with his partner, Matthew Boulton, towards the end of the eighteenth century, attracted a good deal of interest many years ago, but a very full investigation which was made by the Royal Photographic Society about the year 1863 showed that the claim could not be substantiated. We had some articles on this subject in the "B.J." of January 12 and January 19, 1917, on the occasion of the claims being revived in the daily Press in connection with the death of the son of Fox Talbot. If you look up Vol. I. or Vol. II. of the "Photographic Quarterly," you will find an article on the same subject by W. Jerome Harrison, who, as a Birmingham man, had special opportunities of examining the evidence.

G. W. C.—A hypo bath can be made considerably more rapid in action by adding to it a certain proportion of ammonium chloride (sal ammoniac). A formula for a bath of this kind is—hypo, 4 ozs.; ammonium chloride, ½ to 1 oz.; water, 20 ozs. This bath will fix in about half the time of one made up without ammonium chloride. We do not think there is any real advantage in such extra-rapid fixation. It is of service in making negatives in the shortest possible time, as, for example, in while-your-wait portraiture at bazaars, or under other conditions where a print is required in a few minutes. We do not recommend it for general use, because a bath of this kind is less likely to fix satisfactorily as it becomes exhausted than one which is made up with hypo only or with hypo plus the usual constituents of an acid fixing bath.

COPYRIGHT IN SIMILAR SUBJECTS.—I recently made some photographs for a local firm, to be used as advertisements. They had to be of a girl holding certain goods in her hand. I engaged a model specially for the job, and after I had taken the photographs for the advertisements, I took a few negatives for myself. Of course, the model wore the same costume as for the others. Having made several enlargements from the latter negatives and shown them in my window, I have been told by the firm that they object to the exhibition of them, as the pictures were made to their order, and therefore the copyright is theirs. I ought to add that I made a charge (separately on the invoice) of 10s. 6d. for the services of the model.—G. F. S.

You should have sent us a pair of the photographs. If those which you made subsequently are altogether different in pose from those which you made for the firm, there cannot be any objection to your showing them or making other use of them. We suppose that the objection of the firm must be based on some close resemblance between the photographs you made for them and those which you made for yourself. If that is so, a very delicate point of copyright law is involved. Strictly speaking, under copyright law, there is nothing to prevent you making a second negative identical with one which you made for the firm and regarding the former as your own copyright. But we think this view, while it may not conflict with the letter of the Copyright Act, is opposed to its intention, and we certainly believe that in these latter circumstances the firm would be able to restrain you from making use of a photograph which, for practical purposes, is indistinguishable from the one which you made for them.

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THE BRITISH JOURNAL OF PHOTOGRAPHY

MONTHLY SUPPLEMENT

ON

Colour Photography.

CONTENTS.

A FORGOTTEN PAGE IN THE HISTORY OF COLOUR PHOTOGRAPHY.

I was always under the impression that Hillotype was a big swindle, and this idea seemed to be prevalent also elsewhere, if one may judge from the following definition from Cassell's "Encyclopedia of Photography," 1911, p. 293. "An alleged process of photographing in colours claimed to have been invented by the Rev. Levi L. Hill, of Westkill, New York State, in 1852." Quite recently I have acquired a copy of Hill's book, entitled "A Treatise on Heliochromy, or the production of pictures, by means of light, in natural colours. Embracing a full, plain, and unreserved description of the process known as the Hillotype, including the author's newly-discovered Collodiochrome, or natural colours on collodionised glass. Together with various processes for natural colours on paper, velvet, parchment, muslin, porcelain, wood, etc., and elaborate essays on the theory of light and colours, the chemistry of heliochromy, and the entire range of the author's nine years' experience in sun colouring. By L. L. Hill, of Westkill, Greene County, N.Y. Published by Robinson and Caswell, 57, Chambers Street, N.Y. 1856."

The work is an octavo volume of 175 pages, and was originally adorned with three photographs—of the house, the village, and the author—but these are missing from my copy. The first 37 pages are an account of his life, which is rather funny reading in spots. Then we have a treatise on light and colour, which proves that at least the author had some conception of his subject, and that he was fairly well acquainted with the work of others is proved by the fact that he sums up, though rather cursorily, the work of Biot, Daguerre, Nicephore, Niépce, Sir John Herschel, and Sir (sic) Robert Hunt, Scheele, Bérard, Seebeck, Berthollet, Sir Wm. Herschel, Talbot, Niépce de St. Victor. Twenty-four pages are filled with quotations from daily papers, photographers and others, including the U.S. Senate, as to the beauty and perfections of his results. With regard to Niépce's work, he speaks in no uncertain terms, for on p. 98, after quoting Niépce's paper in full, from the London "Athenæum," he says "the reader may judge how far M. Niépce is entitled to credit for originality. After all the fuss that has been made about his great discovery, I, for one, can see but one original idea in it, namely, the imaginary relation between the action of the coloured rays and the colours of certain flames. The idea of chloridising a silver plate he borrowed from Becquerel. He owns this in his memoir. What then has he originated? Here is the indisputable answer:—He has originated the use of various chlorides, for doing what Becquerel did with a few chlorides. I defy any man of sense to make any more than this out of his famous 'Memoir.' Yet this document has been paraded before the public in the natural colours which usually embellish envy and spite, with a view to depreciate an American invention. This has been done by men who became my enemies because I would not become their bosom friend, and let them have a bite at the loaves and fishes."

His notes on the natural and artificial colorific agents is decidedly good reading, and he seems to have been fairly well acquainted with the action of light on the silver salts. His methods for producing colours on "collodio-chrome" and on velvet, etc., are quite feasible, and are practically nothing more than the Seebeck process, and he had the ingenious idea of obtaining silver in a fine state of division by collodionising a plate, exposing to light, developing and fixing, and then chlorising.

In Chapter 14 he describes in full his process, and it would seem to me that it really deserves to be rescued from the class of swindles and placed amongst the true heliochrome processes. In order that those interested may judge for themselves, this chapter is printed verbatim:—

This name—"The Hillotype"—was first given to my process by S. D. Humphrey, Esq., editor of the "Daguerrian Journal." He did so on his own responsibility. I called it, from the first, "The Heliochrome." Mr. Humphrey's godfathership has, however, been universally adopted by the public. I am now to detail the process known by Mr. Humphrey's cognomen, and will do so.

I.—As a Formula.

1. Thoroughly clean a good Daguerreotype plate by means of rotten-stone and alcohol. Polish with buckskin and calcined lampblack. Rouge is detrimental. For ordinary experimenting you may omit the polishing.

2. Electrotype the plate till its surface assumes a deep blue. The ordinary cyanide of silver solution is far inferior to the following:—Mix solutions of the cyanides of silver, copper and zinc, in the proportion of 8 parts of silver, 2 of copper, and 1 of zinc. Use two pairs of Daniels batteries, and proceed in every other respect as for electrotyping an ordinary Daguerreotype plate.

3. Rinse and dry the plate. If you use artificial heat to dry the plate let the latter get cold before the next operation.

4. Place the plate on a level support, and cover it with a well-filtered solution of nitrate of mercury—1 grain of the salt to 20 ozs. of water. Let this remain on about half a minute. Pour it off and thoroughly rinse the plate, then cover it with a solution of sel d'or (hyposulphite of gold),

20 grains to one quart of water, and let this remain on the plate for about one minute. Rinse and dry, and again place the plate in the silver solution until it is slightly changed—say, from one to five minutes—according to the strength of the solution. Rinse and dry, and buff to a polish, using calcined lampblack instead of rouge.

5. Now coat the plate over a jar of chloride of iodine—1 oz. chloride to 8 ozs. water—until it assumes a bright pink colour. Expose the plate a moment to diffuse light, or place it in a camera directed to a white screen as long as you would for a portrait, and then place the plate over mercury, heat to 170 deg. Fah. for about three minutes. Wash with hyposulphite of soda, or, what is better, cyanide of potash, as you would for a Daguerreotype picture; rinse with water, and gild in the usual way with chloride of gold, or sel d'or. Rinse and dry. If you have exposed long enough to light your plate will now have a bluish cast, or solarisation, similar to overdone linen in a Daguerreotype.

The whole of the above process will occupy but little more time than is required for producing and finishing an ordinary Daguerreotype picture.

6. Expose the plate, prepared as above, in a jar of chlorine gas, until it takes on a faint yellow the second time. Keep the plate in this state in total darkness until wanted for use. It greatly improves by keeping. The chlorine for the above coating I conveniently procure as follows, viz.:—I wet several folds of cotton cloth with dilute sulphuric acid, and place them in the bottom of a deep jar. On these I spread one thickness of cotton flannel, dry, and over that I sprinkle about a teaspoonful of dry chloride of lime, and immediately close the jar. In a few minutes a sufficiency of chlorine gas will be evolved to coat the plate. The action will be mild and uniform.

7. Prepare the following "Singular Compound":—In a quart bottle place 4 ozs. of common salt, 4 ozs. of blue vitriol, each well pulverised, and add 16 ozs. of water heated to 122 deg. to 140 deg. Fah. Shake well for five minutes with the bottle well stopped. Set it aside to cool. When perfectly cold there should be a deposit of sulphate of soda. If there is not, place the mixture in an evaporating dish, and by means of a water bath slowly evaporate, until, on cooling, a deposit of sulphate of soda takes place. Then decant the clear liquid into a clean bottle with a wide mouth. Fit into the mouth of the bottle the beak of a lead retort. In the retort place 2 ozs. of fluoride of calcium, and 4 ozs. of sulphuric acid, and apply a gentle heat. The beak of the lead retort must dip into the liquid in the bottle, and the stem passed tightly through a well-fitted cork. In a few minutes the liquid in the bottle will become saturated with fluo-hydric acid. The fumes of this acid are intensely poisonous, and the operation should be conducted with extreme caution. When the operation is over let the retort cool, and immediately wash it with abundance of water. To preserve the liquid it should be transferred to a gutta-percha bottle. After the transfer add to the liquid 4 ozs. of pure muriatic acid, and ½ oz. black oxyde of copper. Cork tight, and let it stand at least 48 hours with occasional shaking. Now mix, in an evaporating dish, 1 oz. of peroxyde of iron (common rouge), 5 ozs. pure muriatic acid, and ½ oz. of yellow ochre, and apply heat until a deep yellow liquid is formed. Filter into a glass bottle, and add ¼ oz. of boracic acid, 60 grs. of phosphate of soda, 30 grs. of permanganate of potash, ½ oz. of the fuming liquid of Libavius (made by saturating nitro-muriatic acid with tin by the aid of heat), 5 drops of pure bromine, and 3 grs. of iodine. Agitate the mixture for about ten minutes, and add it to the other bottle. Shake well and filter. Place the clear liquid in a large earthen glass, or gutta-percha, platter, and keep it in sunlight till the watery portion has evaporated. The bottom of the dish will be covered with clusters of brilliant green, needle-form crystals. Collect, and keep these in a well-stopped bottle. When you wish to form a bath for coating plates dissolve 2 ozs. of these crystals in 4 ozs. of water, and add 1 oz. of pure muriatic acid, 1 grain of bichromate of potash, 3 grs. of sel d'or, and ½ oz. of hydrofluoric acid. Shake well and filter. Place this in an earthen glass, or gutta-percha, platter—tilt the platter so as to gather the liquid in one end of the dish, lay the plate prepared as in Sec. 6, on the bottom of the platter, and lower the latter in such a way as to secure an even flow of the chemical over the plate. Suffer the plate to remain from three or ten minutes, or until it appears nearly black. This should be done by the light of a candle only. Now rinse the plate freely with water, and dry it off with a spirit lamp, as you would finish a Daguerreotype. In this state the plate will reproduce the colours, by a prolonged exposure to light, as you will see by pressing upon it a coloured engraving by means of a plate of glass, and placing it in sunlight. Many of my experiments were performed in this stage of the process.

8. To render a plate, prepared as above, exquisitely sensitive, you have only to immerse it a few seconds in the following preparation, rinse and dry. In 1 oz. of aqua ammonia dissolve 6 grains of gallic acid, add to this 1 drachm of hydrosulphuret of ammonia, ½ oz. common salt, 1 drachm each of strong essence of lavender, cassia, and cloves, 2 drachms of grape sugar, 50 grains of fluoride of potash, 10 grains hyposulphite of copper, and a quart of water. This preparation may be used in a platter like the preceding. When not in use it should be kept well corked. Its use gave me a great step in advance. It not only quickens the process, but adds greatly to the strength and truthfulness of the coloration.

9. A further great improvement in the strength and brilliancy of the pictures results from modifying the coating of the plate, as above prepared, by the application of heat, or by the action of the orange rays of light, or by both combined. If the plate is heated until it assumes red, it gives the colours more brilliantly, and the whites are always good. A plate which would not give yellow and green will give both after being exposed under a deep orange glass, in the sun, for a few seconds.

10. In forming a coloured image on these plates direct, without a developer, a prolonged exposure is required—from five minutes to half an hour, in sunlight. Your true way will be to use the process thus, by means of superposing coloured engravings, or other transparent objects, until you have thoroughly tested your chemicals and mastered the process of coating. Then you may proceed to the work of developing the latent coloured images, which, you will soon be convinced, are formed almost instantaneously. Phosphuretted and sulphuretted hydrogen, and especially a mixture of carburetted hydrogen, phosphuretted ether, and ammoniacal gas, have the property of developing these images. So, also, with hot aqua ammonia, nearly saturated with hyposulphite of silver, and the combined vapours of burning copper, zinc, lead and antimony. I make an alloy of these metals, and vaporise this alloy in a mercury bath, heat over a small charcoal having a blast. The plate should be raised about 18 in. from the bottom of the bath. My apparatus for heating is an upright furnace, 10 in. in diameter. Attached to one side is a 2-ft. balance wheel over which passes a band which turns a small shaft, and gives a rapid motion to a fan wheel 8 in. in diameter. The wheel is in a hollow disc having an opening in its sides to let in air. This disc discharges the blast through a tube entering the furnace. A common bellows, of good size, will answer.

The ammonio-hyposulphite of silver, named above, I use in a platter, placed over heat. It must be used at the temperature of 150 to 160 Fah. The plate should be immersed in the liquid for a few minutes only. In this way I have produced some very fine results.

I use the mixed gases, above named, as follows. In a deep jar I place a few sticks of phosphorus, and cover them with sulphuric ether. The fume arising from it is phosphuretted ether. In the same jar I place a small bottle of aqua ammonia, and into the lower part of the jar I inject a small stream of carburetted hydrogen, made by mixing in a retort 4 parts of oil of vitriol with one part of alcohol, and applying a gentle heat. The plate should be held over this mixture for a period ranging from five minutes to half an hour. You may

observe the progress by the light of a candle, screened by yellow glass or paper.

Phosphuretted and sulphuretted hydrogen (for the process of making which see chapter on chemicals) I employ in a similar manner, only the exposure need not be so long.

11. The final fixing and finish is given to these pictures as follows:—

Dissolve in 1 quart of water,

15 grs. chloride of zinc,
30 grs. hyposulphite of gold,
20 grs. sulphate of soda,
1 oz. sulphuric acid, pure.

Immerse the picture for a few minutes, or until a slight change is apparent. Then rinse the picture, dry, and rub it with a buckskin buff. A little sweet oil will heighten the polish. If you wish a dead surface, you have only to observe extreme cleanliness in the whole process, and omit the final polish.

II.—The Formula Explained.

1. The first preparation of the plate has for its object the production of a peculiar molecular arrangement in the particles composing the surface. On this one thing—molecular arrangement—the whole phenomenon of colouration depends. Those who work the process are urged to keep in view the fact that this preliminary method greatly conduces to the final result.

2. The "Singular Compound," described above, I will not attempt to explain chemically. I will simply urge the absolute necessity of a strict adherence to the formula, both as regards manipulating and the character of the chemicals. Lengthy as the process may seem, it is very simple.

3. The action of heat and of red light, in modifying the surface is, I think, to disintegrate the coating, and to give it a different structure. The result is an increase of sensitiveness, and this alone would seem to account for the superiority of the results as to strength and brilliancy, and for the more certain reproduction of yellow and green.

4. The quickening agents I have named may be greatly varied. The object of their use is to aid in reducing the silver compound formed to that condition at which colours are formed. It is difficult to tell what the compound on the plate is, but it is a peculiar compound of silver. Anything that will tend to reduce this salt to the state, or to the point where colour forms, will quicken the process. Aldehide (sic) is one of the substances which deserve a thorough trial.

5. The action of the developers may be explained in a similar manner. I do not suppose that they produce colour, but that they continue the molecular transformation of the surface commenced by the coloured rays.

6. The fixing agent acts by way of deoxydising the chemical surface. It also effects a partial decomposition of the surface, and those combined chemical agents, such as chlorine, fluorine, etc., which would otherwise react upon the picture and destroy. All the pictures which I have treated thoroughly have remained fadeless. Those which have been carelessly done have faded very much, and some of them have deteriorated in darkness

There is, no doubt, some buncombe in the formula, and it is, to me at any rate, a great disappointment that Hill did not state the final composition of his "Singular Compound." That there is great similarity in many of the steps of his process and those used by Becquerel and others is apparent to all familiar with the same, and possibly some of his volatile gases and essences are but put in to make the process appear more scientific. When it comes to his ambrotype methods and printing on velvet and other fabrics he is sane enough, and they differ not at all from ordinary practice.

E. J. Wall, F.C.S., F.R.P.S.

Cambridge, Mass.

NEW BLEACH FORMULÆ FOR THE IVES MORDANT DYE-TONING PROCESS.

[Mr. F. E. Ives, who for some time past has been engaged in developing the chemical procedure in colour toning by the bleach mordanting dye process, sends us the following communication describing modifications in the formula for the bleach. In the issues of the "Colour Photography" Supplement for January, 1919, p. 1, June 4, 1920, p. 24, and November 5, 1920, p. 43, will be found notes on the successive stages through which the process has passed to its present formula.—Eds. "Colour Photography" Supplement.]

Heretofore I have recommended bleaching baths containing either equal parts of potassium ferricyanide and chromic acid or a still larger percentage of chromic acid.

I find that, beyond a certain point, the advantage gained by increasing the percentage of chromic acid is due to the increased acidity of the bath, and other acids may therefore be in part substituted for chromic acid.

A bath containing a greatly reduced percentage of chromic acid can, by the cautious addition of sulphuric acid, be brought to duplicate the action of baths made by my older formulæ.

This discovery pointed the way to overcoming the only weak points in the process, which were: (1) A teadency so to harden the image in the shadows of an over-dense positive that it would resist the absorption of dye; and (2) the necessity for considerable washing between the bleaching bath and the dye bath, which, if carelessly done or overdone, was apt to make uneven or relatively weak dye images.

With the following bleaching bath and sufficient acetic acid in the dye baths, much denser positives can be successfully converted to pure dye images, and only a thorough rinsing of the bleached print is necessary before transferring to the dyo bath:—

Water	30 ozs.
Potassium ferricyanide	20 grs.
Chromic acid	5 ,,
Acetic acid, glacial	1½ ozs.

It was also obvious that another oxidiser might very probably be successfully substituted for chromic acid, and as the result of further experiment I am now using the following formula:—

Water	30 ozs.
Potassium ferricyanide	20 grs.
Ammonium bichromate	10 ,,
Acetic acid, glacial	1½ ozs.

If the yellow stain is thoroughly washed out of the high-lights after bleaching and before dyeing, much less washing is required to clear the high-lights after dyeing, but if this procedure is preferred the washing before dyeing should be done in slightly acidulated water to secure against the production of uneven or relatively weak dye images.

F. E. Ives.

LOUIS DUCOS DU HAURON.

THE following German appreciation of the founder of processes of three-colour photography is published as a translation from "Photographische Industrie," by "Photo-Era":—

Although Eder in his "History of Photography" points out expressly that the foundations of the theory of colour-photography were laid entirely by a single person, namely, the Frenchman, Louis Arthur Ducos du Hauron, nevertheless the name of this extremely meritorious investigator is but little known in outside circles. The greater part of the various colour-processes are always known under the names of other men, and yet Ducos du Hauron, over whose work an unlucky star seemed to shine from the beginning, was the first to mention this particular process. Only one year afterward, no less a person than the clerk Maxwell took hold of the problem of colour-photography, and as one may readily suppose, without knowing anything of his investigations, the twenty-five-year-old Ducos du Hauron, on July 14, 1862, sent to his friend L. Lélut, of the French Academy of Sciences, a treatise with the request to lay it before the Academy. This treatise, in its fundamental features, contained the additive process for producing in colours photographs, projections and individual views—in short, the whole process as it was brought into practice in the nineties of the last century by Ives and Miethe with the aid of the then recently developed photo-chemistry. Even the half-pervious mirror was not omitted, by means of which two diaposi tives, placed together at an angle of ninety degrees, could be examined in the viewing-apparatus. That the idea of coloured pictures viewed simultaneously with stereoscopic effect was also mentioned, shows that Ducos du Hauron allowed nothing to pass without observation in order to follow up the problem to its last offshoot. He was not satisfied, however, with the one solution, but also mentioned (and here he stands without a forerunner) colour-photography by means of a screen, such as Joly and Lumière later constructed. Lélut gave the treatise to one of his colleagues outside the circle of the Academy, who rejected it with absolute lack of comprehension. Who it was that gave this unfavourable decision we cannot know to-day. In his valuable book, "La Triplice Photographique des Couleurs et l'Imprimerie," in 1897, Ducos du Hauron himself speaks of an anonymous colleague. It said that the deductions were not sufficiently strong, the conclusions were altogether too audacious—"hasardée" it was called—its practicability appeared doubtful! That upon this death-sentence of the expert, Lélut advised his young friend to withdraw the treatise, cannot be wondered at. Another series of works, in the year 1869, in which Ducos du Hauron treated subtractive colour-photography, and in which he came into competition with Ch. Cros, was also unable to obtain the attention it deserved in wider circles. When he had an opportunity to exhibit a few simple proofs to the French Photographic Society, the colour-sensitive plates were lacking, without which colour-photography could not possess a living existence.

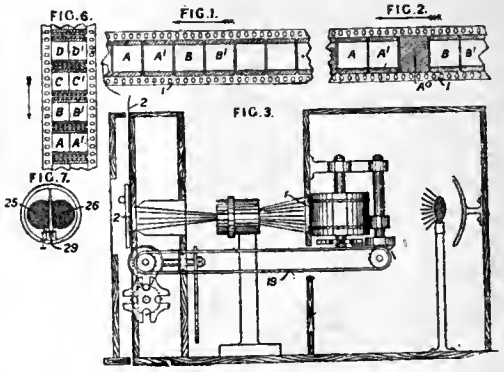
Ducos du Hauron laboured tirelessly with his brother Alcide in the further development of colour-photography, and in 1878 he was able to say that every photographic process could be utilised in three-colour printing. In order to spare him the bitterest pangs of poverty in the evening of life, the French Government granted him a niggardly pension of twelve hundred francs a year, and the Vienna Photographic Society in the year 1904 raised for him an honorary gift in the interested circles of technical photo-mechanical printing.

Still less attention than the colour-photographic work of Ducos du Hauron received, was given to another proposition of his—made in the year 1864—by which he stands at the head of the development of the cinematograph. He received at that time a French patent for a photographic camera for producing consecutive pictures. This apparatus, which presumably could not have been completed, was to have had the following arrangement: There were, side by side, two sets of sixteen similar lenses, each set joined in four horizontal rows. On the light-sensitive plate, therefore, there were thirty-two fields of exposure. The exposure, made by means of a cloth-roll, begins in the first set in the upper row, passing to and fro to the inner field of the lowest row; from here it springs to the adjoining field of the second set and ends in the upper inner row again. In this Ducos du Hauron had just as little success, which was also denied to his countryman Dumont, who in 1861 tried to make pictures with a single lens on plates arranged consecutively on a band and changed rapidly. Here, also, it must be conceded that he was the pacemaker of a technique that has now become very important.

News and Notes.

HYPERSENSITISING AUTOCHROME PLATES.—In a short note, published in the current "Bulletin" of the French Photographic Society, M. Jové gives some particulars of his recent experience in hypersensitising Autochrome plates. In pre-war days it had been his custom to use for this purpose the hypersensitising solution prepared and sold by MM. Poulenc, which, up to the year 1914, yielded most satisfactory results. But now the same preparation, when employed with Autochrome plates of recent manufacture, is found to be unsatisfactory, a failure which M. Jové ascribes to improvements in the panchromatic quality of the Autochrome emulsion. As it appeared that the present-day plates are not susceptible to the hypersensitising formula which previously worked well with them, M. Jové has fallen back upon the method of hypersensitising worked out and described by M. Ch. Simmen ("Bulletin Société Francaise de Photographie," 1910, p. 275; "Colour Photography" Supplement, September 2, 1910, p. 66). By adjusting the formula, as directed by M. Simmen, the quality of added colour-sensitiveness can be varied according to requirements. The basis of such adjustment is that pinachrome sensitises for the yellow; pinaverdol, for the green, and pinacyanol for the red. At a recent meeting of the French Photographic Society M. Jové showed a series of comparative Autochrome transparencies in demonstration of the effective use which can be made of hypersensitising.

COLOUR CINEMATOGRAPHY.—Brief particulars are given in the "Patents Journal" of the specification (not yet accepted) of C. Parolini and G. Perron for a process of cinematography in natural colours. To obtain a film for projecting in colours, a negative is taken with an ordinary camera but used sideways so that the film is moved horizontally. A rotating orange and green filter is used so as to obtain successive pairs of images A . . A^1, B . . B^1, etc., Fig. 1, and the film is fed as shown in Fig. 6. The negative 1, Fig. 3, moves at right angles to the positive 2, the feed mechanisms being appropriately adjusted for the necessary film movements and connected by an endless chain 19. The positive film is projected in an ordinary projector fitted with two coupled objectives 25, 26, Fig. 7, which are provided with corresponding green and orange filters and are adjusted by a micrometer screw 29 so as to superpose the images on the screen. If the negative has to be taken at a greater speed, say three times the ordinary speed, the camera is fitted with a rotating at double the ordinary speed. The negative is reproduced in such a way that the successive pictures are reproduced in pairs side by side as screen having an orange, a red and an opaque sector so that blank spaces A, Fig. 2, occur on the negative film between the pairs of images A . . A^1, B . . B^1, etc. In copying the negative the intermittent displacement of the film is correspondingly increased.



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Colour Photography.

CONTENTS.

SPOTTING AND TAKING OUT DEFECTS FROM SCREEN-PLATE COLOUR TRANSPARENCIES.

The films of all screen-plate colour transparencies are very delicate, particularly the Autochrome, which calls for very careful handling. Many of the colour pictures that I have seen bear witness to the fact that this essential was not fully realised by the photographer, for not only do spots, pinholes, and other defects manifest themselves, but many workers quite fail to take them out in a satisfactory manner, or ignore their presence altogether. Nothing tends to detract so much from the beauty of a colour transparency than defects of the kind mentioned, and it is, to my mind, more important that they should be avoided, or at least touched out even than is the case in ordinary photographic work.

I must first point out that the taking out of defects in a screen-plate colour transparency must be adapted to suit the character of the image formed upon the plate; and, except under the most favourable conditions, involves some risk of making the last state of the transparency worse than the first. The photographer has therefore, on account of the peculiar delicacy of the plate, to make his choice of leaving the defect alone, or of risking the total spoliation of the plate; but it should be added that this is not very likely if the work is approached carefully and in a commonsense way. It cannot be too strongly emphasised however, that the photographer must keep carefully before him how very delicate and easily injured the surface of an Autochrome plate really is, when compared with what an ordinary plate will permit in the way of wrong treatment without harm resulting. Further, even the simplest spotting, no matter how carefully done, will still be visible on the finished picture; and a bad defect, no matter how skilfully treated, is almost impossible to eliminate entirely. From this it will be seen how important it is to *prevent* the possibility of such making their appearance, by careful, systematic methods of working, and by an implicit following of instructions.

One of the commonest defects met with among Autochromes is the green spots of various sizes, caused by the abrasion of the film, the varnish coating allowing moisture to penetrate the screen. The effect of water, or even moisture, upon the more soluble dyes composing the screen is very rapid; and I have known a plate taken from its final brief washing, after the film has been lightly scratched, which developed a circle of intense green as the drying was in progress. It is quite possible for the film to be broken, and no harm result unless the varnish protecting the screen becomes perforated as well, allowing the admission of moisture. These green spots are troublesome defects to get rid of, as they are often of quite a large size; and, by reason of their intensity, ordinary spotting is of very little use at all. There are two or three suggested methods of minimising these defects, though I have yet to find one that is satisfactory, and not easily detected. The late Mr. McIntosh recommended that the spot be clean cut out—a job that I must confess that I have never yet succeeded in doing very successfully. A lantern, or other slow plate of the same size as the transparency is exposed behind the latter for a very brief period; developed in the ordinary way to obtain a faint grey image; and fixed and washed in the usual way. The spot is then worked up with transparent water colours, and registered with the Autochrome, serving it for a cover glass. It must be kept in mind that it is difficult to "match" with hand work a chemical image. This applies more to colour transparencies by the screen-plate methods than to ordinary methods of working up.

We now come to consider the taking out of defects caused by the damaging of the photographic film, without the screen being injured or discoloured. It is sometimes possible to repair a scratch or vacant place in the picture by fixing upon it another piece of film of the same colour taken from another spoilt plate. This latter is cut out very carefully with the point of a sharp pen-knife or an old safety-razor blade, keeping to the shape of the original defect as closely as possible. This latter is then given a fine coat of clear gum, the piece of new film gently coaxed into position and allowed to dry; after which any irregularities may be very much minimised by careful working up with suitable transparent water colours. The majority of beginners make the mistake of using too large a brush; most of my own work is done with a No. 2 sable. The colours should be used very dilute, for it is better to secure additional density by means of two or more applications than to risk matters by over much hurry or by the application of too much colour at once. It should be kept in mind that these colours are really stain; and, once applied, are not removable like ordinary colours, even if the film of the plate would stand such treatment. No attempt must be made to wipe off the colour if too much has been applied, for such would only injure the film. If any difficulty is found in making the colour "bite" on the smooth surface of the film the brush should be moistened with a little clear, thin gum water prior to taking up the colour. All spoiled Autochromes should be saved, for they are most useful for testing the effect and correcting the density of an application of colour before

experimenting upon a valuable transparency. If, however, an Autochrome is not available, an old negative may be employed for testing colours.

We now come to consider the spotting-out of simple defects such as pinholes; and there are very few plates indeed that do not call for some attention in this respect, no matter how careful the photographer may be. It is most important that, even for simple spotting, the transparent water-colours be used, and not the ordinary artists' tale colours, since these are quite opaque and useless for the purpose. I have seen many colour transparencies which were completely spoilt by these being used. Though almost all plates require a little spotting, it is a mistake to run the risk of overdong this. The screen of an Autochrome plate itself will often allow small pinholes to be almost invisible, especially when they come against the sky or other brightly lighted part of the composition. In colour work, in common with other forms of photographic spotting, it is far easier to take out or render less evident defects in the darker parts of the subjects than when these appear against a light portion. When spotting an Autochrome plate the beginner often works with his eye too close to the transparency, and then obtains a false sense of the amount of colour needed to make the defect invisible. The larger the transparency the farther it is held from the eyes in the case of a person of normal vision, and a minute touch of the *right* colour may have the effect of hiding an ordinary pinhole far more effectively than would a much deeper application. Too little care is often taken in adjusting the *depth* of colour to suit the surrounding area; and in the proper observation of these details will be found the secret of success in spotting colour plates. The actual spotting differs in no way from that employed on negatives and prints. A small pinhole should be completely blocked out with one touch with the point of a nearly dry brush, while a larger defect may be considerably modified with several touches. The idea is to fill out the defect with just enough harmonising colour of the same transparency; this grasped, there is little to add. Of course, no attempt must be made to alter existing colours or effects. Such may seem possible in theory, but, apart from being quite illegitimate, are unsuccessful in practice.

So far, I have mentioned the Autochrome process mainly, though much that has been written applies also to the Paget process, though I must say in my own experience spotting is less frequently necessary with this method, since the films of both negative and transparency plates are much harder; and, provided reasonable care is taken, the negative, or positive, should require little or no spotting. When this is required, however, great care must be taken not to carry things too far in the matter of spotting, by reason of the fact that a Paget colour picture is much more transparent than an Autochrome. Also, very careful mixing of the colours is essential, or the result will be that the pin-hole shows as a spot of intense colour. My own plan, when a Paget colour transparency requires spotting, is to attebpt to do this on the negative, so that none whatever will be needed upon the transparency; and if this is done carefully, it will not he found a very difficult matter. As with Autochromes, the transparent colours must be used, for the additional reason that if the ordinary opaque artists' water-colours are used their somewhat gritty composition is almost certain to scratch either the viewing screen or the transparency when registering. This trouble need not be anticipated with the transparent colours, though the two plates should not be moved about upon each other more than is necessary, or the slight irregularity created upon the film by spotting may cause scratches upon the surface of the viewing screen. It will be found best to register the transparency prior to spotting, so as to gather some idea of the tint required; the two plates being clipped together while the colours are mixed and their effect tried upon a spoilt plate. The two may then be separated, any grit or dust removed, and the spotting done. Care must be taken to see that the colour is thoroughly dry before re-registering. During this stage the photographer must be careful to avoid removing the spotting by the friction between the glass; the movement should be very gently done, or scratches to one or other of the surfaces may result. So far I have only mentioned the spotting of the transparency plate, but it sometimes happens that a tiny pin-hole in the viewing screen may be profitably filled in with a spot of colour. It is only fair to add that this should be very gently done.

I believe that few workers varnish their Autochromes other than those required for lantern projection, owing to the difficulty that beginners always experience in getting an even application of the varnish. There is really no need to varnish colour transparencies, from the point of view of protecting them, though varnishing will protect any spotting during the fixing of the cover glass and binding up the picture. Paget colour transparencies should not be varnished, as the interposition of even such a thin film between the plates would tend to prevent the perfect contact between them upon which depends the production of a perfect colour result.

ROBERT M. FANSTONE.

COLOUR TRANSPARENCIES AT THE NORTHERN EXHIBITION.

THE room at the Northern in which the colour transparencies are shown is of considerable size, and so has allowed of the exhibits being displayed in frames round the walls. At very few exhibitions have transparencies been arranged with such a degree of comfort to the visitor examining them. The illumination is by light directly transmitted through the transparencies; apparently it is of a slightly yellowish tint, no doubt of advantage to transparencies which err in the direction of coldness of rendering, although we can imagine that some exhibitors will be inclined to criticise its effect upon nuances of colour. However, a scheme of illumination which is uniformly satisfactory as regards showing to the best advantage each single transparency in a miscellaneous collection has yet to be devised. Generally speaking, the exhibitors have no fault to find, but every reason to be satisfied, with the arrangements made at Liverpool. And it must not be forgotten that the collection is a large one, including 282 separate transparencies. The compilers of the catalogue may, however, be criticised in respect to the heading describing the colour section, viz., "Natural Colour Lantern Slides." Most of the exhibits are by the Autochrome process, but they are not all lantern slides.

Some exceedingly fine work, including that by notable exhibitors, is shown. H. C. Messer has a most pleasing picture of a quiet English village street (409), the atmosphere of which is well rendered. We do not like so well Mr. Messer's 401 and 410, which appear too green, but his 400 has just the right quality of mellow colour. In 405, by A. Reid, the colour is hard, but 408, by the same worker, is an excellent version of the colour in rhododendrons. D. Mischol shows a beautiful autumn scene (412), in which the distance is contrasted with a vivid sunlit foreground.

R. G. W. Bush has a fine piece of work in No. 384, but the predominance of viridian in No. 387 is wholly untrue and unpleasing. No. 388, however, by the same worker, is a much better rendering of greens. N. E. Luboshez shows his technical triumph in the shape of the Autochrome of a soap bubble enclosed in a glass case (392). Louis J. Steele's two nude studies (Nos. 372 and 375) are probably the best things yet accomplished in this field of work; in 372 the flesh tones in sunshine are particularly well done.

Henry Irving's work is in the sphere of Nature photography, in which Mr. Irving has practised with such great success for many years. No. 377 is a set of birds' eggs in strong relief and most faithfully rendered. No. 325, which receives a plaque, is a remarkably colour-correct rendering of apples; it is a technical exercise pure and simple.

Another transparency (363), by R. G. W. Bush, is an extremely fine rendering of a flood of sunshine taken against the source. More work of this description should be attempted by makers of colour transparencies. Miss Gladys Openshaw has an excellent rendering of nasturtiums in No. 349, and of iris in No. 350a. Among the landscapes a special note must be made of the open view with cumulus clouds (336), by J. C. Warburg, which very strongly con-

vays the feeling of open air. No. 339, by the same worker, has this quality in lesser degree.

Snowscapes being rarely attempted subjects in colour photography, G. S. Sansom deserves special commendation for his transparency (313), which has the true iridescence of snow, and is entirely successful. R. M. Fanstone has two studies, both charming in colour (306 and 307), but No. 285, by the same exhibitor, has the rather unpleasant viridian hue, which appears to be a somewhat prevailing defect. A fruit study (247), by A. Walburn, is exceedingly fine colour, and the pair of transparencies (243 and 244) by R. Rigby deserve a mention for their artistic colour selection. F. G. Tutton is another worker who, in No. 235, scores a high measure of success in a study of strong sunshine. Still life and flowers form the subjects of a fairly large proportion of the exhibits, and among these must be mentioned No. 192 by P. R. T. Garnett, Nos. 169, 175 and 179 by A. Benson Ray, and No. 162 by W. Scruton.

Correspondence.

*** We do not undertake responsibility for the opinions expressed by our correspondents.*

*** Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

THE HILLOTYPE PROCESS OF COLOUR PHOTOGRAPHY.

To the Editors.

Gentlemen,—The reason why Mr. Wall and many others have looked upon Hillotype as being one of the colour photography swindles of the past is because of the way writers of the period looked askance at and described the claims of Mr. Hill. This early experimenter appears not to have had a fair hearing, and our thanks are due to Mr. Wall for putting us wise, and to yourselves for publishing his article in the "B. J." Colour Supplement dated January 7.

Modern writers on photographic history have apparently taken their cue from the old and slighting reports of the early writers, for the "Cyclopædia" (not "Encyclopædia"), published by Cassell's, is not the only work of reference that speaks depreciatorily of Mr. Hill's work; the reference named is, in fact, very kind in comparison with others.

A volume to which most people go for their historical facts is Harrison's "History of Photography" (1888), and the comments concerning Hillotype are particularly severe. The writer, under the heading of "Pretended Discoveries of Photography in Colours" (page 122), deals with deliberate frauds, and goes on to say: "In 1851 an American preacher named Hill obtained almost general credence for his statement that he could produce photographs 'glowing with all the colours of Nature!' Naturally, so wonderful a process was to be called Hillotype. The Rev. Mr. Hill obtained a considerable sum of money by inducing photographers generally to subscribe—payment in advance, of course—for a book which should contain all the details of this startling discovery. After many delays the promised book appeared; but what was the disappointment of the subscribers to find it a mere twopenny pamphlet containing the outlines of the Daguerreotype process, with complications and additions just sufficient to render the obtaining of any picture at all a very important matter." The "octavo volume of 175 pages" in the possession of Mr. Wall, and dated 1856, may be the one the writer of the "History" refers to, or it may be a later edition, enlarged and illustrated.

I always look upon John Werge as having been the best and most reliable chronicler of American photographic affairs of half a century or more ago, for the simple reason that Werge left England in March, 1860, to open a studio in New York, and while there made the acquaintance of most of the early American workers. Werge, however, tells us very little about Hill. Writing of Messrs. Gurney and Sons' studio in New York, he says: "This house was the oldest in connection with photography. Mr. Gurney, senr., was one of the most eminent 'professors' of the Daguerreotype process, and was one of the committee appointed to wait upon the Rev. Wm. Hill, a preacher in the Catskills, to negotiate with the reverend gentleman (?) for his vaunted secret of photography in natural colours." That is all. The house of Gurney in later years boomed a Hallotype (not Hillotype) process, which appears to have been based upon "the application of Canada balsam" in some way, possibly a kind of crystoleum process. Werge's remarks may be found in his "Evolution of Photography" ((1890), page 71.

I have before me a pile of photographic instruction and reference books bearing dates between 1851 and 1870, and there are several brief references to Hill's work in them, but not a single one of them is complimentary, but rather the reverse. The best attempt to describe Hill's experiments is made by W. Sparling in his "Theory and Practice of the Photographic Art" (1856). Says the author:—"Mr. Hill had undertaken a series of experiments . . . . but for a long time with little prospect of success; but in one of his experiments certain phenomena presented themselves which greatly surprised him. . . . . One colour—red—in the figure of a vestment, developed itself in the most brilliant ruby colour; he repeated his experiment many times, but without meeting again the same result. . . . . Believing, however, that in certain circumstances the latent colour of the image was present, he proceeded with his experiments, and found that the vapour arising from many metals, such as arsenic, cadmium, zinc, selenium, bismuth, potassium and sodium, possessed the power of developing latent images with their lights and shades. The same result was obtained with different gases. . . . . In January, 1851, he obtained forty-five designs, which presented all the different colours and with perfect gradations. Mr. Hill has not described his process further than that it neither resembles that of Daguerre nor Becquerel."

Mr. Sparling's comments were written in the year of the appearance of Mr. Hill's book, but no copy of the volume appears to have reached this country. Mr. Sparling probably gleaned the details he gave from the periodical and scrappy reports of the discovery which came from America.—Yours faithfully,

L. Tennant Woods.

THREE-COLOUR AND DIRECT HELIOCHROMY.

To the Editors.

Gentlemen,—After reading Mr. Wall's paper in the January "Supplement," some of your readers may be wondering why he should take the trouble to send such a long letter such a long way, regarding it as of only antiquarian interest. But it is much more than that.

Some years ago I was assisting at a demonstration of a three-colour process (it doesn't matter which). Mr. Wall was standing beside me while I went through the usual conjuring these processes require to get a decent result.

Turning to me he asked pointedly, "Do you really believe in the future of colour photography?" He could see I hesitated, having still a sneaking regard for truth, so he added, with emphasis, "Because I *do*."

It struck me forcibly that afternoon, as the little crowd watched my movements, that though they were so eager, and inquisitive about colour photography, he alone had expressed a living faith in it.

This "Hillotype" Mr. Wall describes is evidently one of the very earliest attempts to obtain colour by the direct method. I think a search among the records of later French or German experimenters might produce more definite instructions. At any rate, we know they obtained "something," and he also has got "something," and in thanking him for his paper, we should be still more grateful if he would send us over some of his results to examine.

Poitevin and his successors spent a lot of time endeavouring to add colour to their positives, and claimed to get some fair results. They only dropped it when the indirect "three-colour" method arose because in that there seemed to be "money right away."

Now that we have seen what three-colour can do (and it serves for some things), it seems time we turned leisurely back to the work of these early experimenters. Physical science has been almost revolutionised since those days, and it seems reasonable to suppose we should soon improve on their efforts. Every photographer should be dissatisfied with his art, even if he looks on it only as a means of earning a more or less honest living. If he thinks, he must see

it as an art that has struck half-way. Every time he looks on the focussing screen he sees two things, viz., form and colour—every time he develops a negative he has but one form. Until this other half has been captured, satisfaction with the art is incomplete, because in the "colour" half lies the greater proportion of life and beauty.—Yours truly,

S. G. YERBURY.

35, Fairholme Road, Baron's Court, W.14.

News and Notes.

GRAIN COLOUR SCREEN PLATE.—A patent specification, No. 152,002 (open to inspection, but not yet accepted), by P. Faulstich, describes methods for producing multi-colour grain screens in which the colours are produced partly by spraying a base with coloured dyes and partly by immersing the film in other dye baths. The immersion treatment may affect the parts already coloured by spraying or the sprayed colours may be utilised as a resist and subsequent to immersion in another coloured bath be washed away, and all the colours produced by such successive treatments.

AUTOCHROMES OF SANDRINGHAM.—A supplement to the "Illustrated London News" of January 8 last contains two reproductions of Autochromes of York Cottage, Sandringham, which are part of a much larger number recently taken by Messrs. J. Russell & Sons. Messrs. Russell, as is perhaps well known, have given the Autochrome process a prominent place in their business for a long time past. The present series of Autochromes taken at Sandringham were carried out by Mr. Stoneman of that firm, whose work received very cordial interest and appreciation on the part of H.M. Queen Mary.

THE UVACHROME PROCESS.—In "Photographische Korrespondenz" for December last a somewhat flowery report appears of a lecture delivered in Vienna on the Uvachrome process of colour photography devised by Dr. A. Traube, and at present in process of introduction to the Continental public. From the remarks of the lecturer it is evident that Uvachrome is a variation of the process of making and printing three-colour sensation negatives on the simplified lines which Mr. F. E. Ives originated a few years ago in his Hi-block. But the lecturer dealt in generalities, and apparently said so little on the essential technique of the process that the editor of "Photographische Korrespondenz" appends a brief description, derived from the English patent specification, which was published in this Supplement in November last.

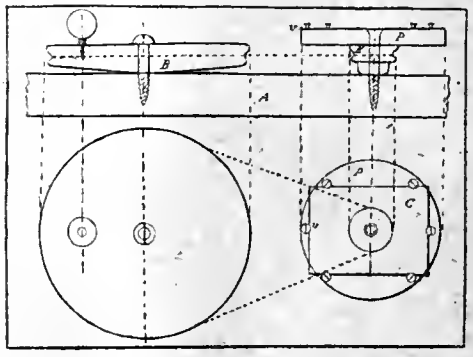
AUTOCHROME DEVELOPMENT.—In a recent issue of "Photo-Revue" M. M. R. Espitallier writes of his satisfaction with diamidophenol for Autochrome work, both as a developer in the first instance, and also for re-development. The adoption of the developer for this latter purpose was the means, in his experience, of avoiding frilling of the film. M. Espitallier works as follows:—A red light is used in the dark room, and is covered for the first minute or two whilst the plate is immersed in a desensitising bath consisting of

Potass bromide	1 gm.
Soda bisulphite lye	2 c.c.s.
Water	100 c.c.s.

At the end of about two minutes the plate may be exposed to red light; it is rinsed for an instant, and then developed in the ordinary diamidophenol solution made up according to the Lumière formula. Development is stopped at the point when the negative image, which in the initial stage shows very plainly by transmitted light, begins to disappear. The plate is then again rinsed, reversed in a bath of acid permanganate or bichromate, and re-development carried out with the same diamidophenol solution. M. Espitallier finds this process simple, practical, and economical.

A COLOUR CAMERA.—According to an American cinematograph journal, "Shadowland," a new process has just been announced by Hiram C. Deeks, of Sea Cliff, L.I., who claims, with the aid of a new pigment discovered by him, to have evolved a process of colour photography in a practicable and workable form. Mr. Deeks has devoted several years to investigation and development work in this interesting field. Following the three-colour-separation theory, which involves taking three separate negatives of the image through colour screens, Mr. Deeks conceived it possible to take them in rapid succession upon different sections of a single plate. To this end he built several cameras and finally perfected an instrument which, it is claimed, meets all requirements by being rapid enough to take the complete exposure in a fraction of a second; absolutely automatic and precise so that the three separations were correctly balanced, and simple, making it possible for it to be operated like an ordinary camera, *i.e.*, by setting the time of exposure, winding and pressing the button. Mr. Deeks next turned his attention to the chemistry of colour, and later announced a colouring matter which had the peculiar qualities necessary to make the final step of the process possible. Several other, but less important, difficulties had to be overcome before Mr. Deeks obtained results which he was willing to show.

A WHIRLER FOR AUTOCHROME PLATES.—A correspondent of the "Photo-Revue" describes the following simple construction of a whirler for the rapid drying of Autochrome plates:—On any convenient solid base A a grooved wheel B is pivoted, and is provided with a small handle for rotation. A pulley E is likewise pivoted on the base, and carries the platform P to hold the plates. The two pulleys are connected by means of an endless length of twine, which



is wetted at the time of use, as it then grips better. The plates are kept in position on the platform P by means of six flat-headed screws, inserted in positions so as to hold the plates at points near to their corners. Of these screws, five are fixtures; the sixth *v* is removable, and allows of the plates being slid into position. Similarly, by removing it, they are readily withdrawn when dry. The pulley E being of small diameter relatively to the wheel B, a high rate of revolution is readily obtained.

STEREO-AUTOCHROMES WITH A HAND CAMERA.—At a recent meeting of the French Photographic Society, M. Ch. Adrien showed a camera of the folding pattern adapted for the making of stereoscopic Autochromes. A special lens-board carried the two short-focus lenses, mounted at a separation of 60 mm. M. Adrien arranged the baseboard in a position inclined below the horizontal in order to avoid cut-off when using lenses of this short focus. He fixed a wooden partition between the back frame of the camera and two slots in the lens front, and in this way was able to keep the front and back in the necessary position. Moreover, a groove in the front edge of the partition allowed of the latter being lengthened by utilising a black card folded on itself when employing the single components of the doublet lenses at twice the customary focal distance. M. Adrien showed his method of mounting the negatives (made on 9 × 12 cm. plates) so as to obtain a stereoscopic pair 8.5 × 17 cm. For this purpose a strip of 5 mm. width was cut from the upper or lower edge of the plate, and the two images then separated. Templates of card may be readily made for carrying out the cutting accurately, and when assembling the two separate negatives on glass, a strip of card of 5 mm. width is placed between the two, whilst two others of 25 mm. compensate for the difference of length. M. Adrien showed a fine collection of stereoscopic Autochromes taken with the camera which he had adapted in this way. At the same meeting M. Schitz mentioned the use which he had made of various light-filters during a single exposure of the Autochrome plate for the purpose of avoiding general blue-green predominant tint. In addition to the customary Autochrome light-filter, he employed during a variable fraction of the time of exposure a deep yellow screen and a red screen, *e.g.*, the Wratten G (yellow) and A (three-colour red). He employed the first for about 10 to 12 per cent. of the total time of exposure, and the second for about 5 to 8 per cent. of the time. The results obtained were excellent in all respects.

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THE BRITISH JOURNAL OF PHOTOGRAPHY

MONTHLY SUPPLEMENT

ON

Colour Photography.

CONTENTS.

A SUGGESTION FOR A NEW METHOD OF PHOTOGRAPHY IN COLOUR

(A paper in the recently issued 1921 volume of "Penrose's Annual.")

The following method of obtaining a coloured photograph occurred to me about twelve years ago, but as I have never made any attempt to carry it out I can only put it forward for what it is worth.

Probably most readers of "Penrose's Annual" are aware that if two clean lenses are placed together there is at the point of contact a system of coloured rings which are known as "Newton's Rings." If the system is lighted by monochromatic light the rings are much more numerous than they are with white light; the size of the rings varies with the colour of the light. If O, fig. 1, is the point of contact, and

Fig. 1.

if rings are seen at A A', B B', C C', the distance apart of the surfaces at A, B and C respectively, will each differ from the other by half the wave length of the light used, i.e., if A is the first dark ring as seen by reflected light the distance apart at A is a half wave length, at B it will be a whole wave length, and at C a wave and a half. The rings themselves get closer together as they get larger, owing to the curvature of the surface. If, instead of two lenses, two plane surfaces are used, which meet along a line at O (fig. 2), the light and dark lines (still called Newton's rings) will be straight and parallel to the line of contact through O.

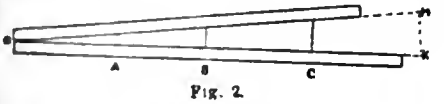

Fig. 2.

In this case the lines will be equidistant, i.e., O A, A B, B C, etc., and each is equal to $\frac{1}{2}\frac{OK}{HK}$ since, again, the distance apart of the surfaces increases by half a wave length from one line to the next.

A photograph of such a system of lines formed by monochromatic light could evidently be used as a diffraction grating. The distance apart of the lines formed depends upon the wave length, their number depends upon the purity of the light, for the light transmitted by a coloured glass or reflected by a coloured object, being a mixture of light of a great range of wave length, will only form a few (say, ten) lines, and will only form these close to the line M of contact O. The fringes are situated close to the surfaces producing them.

Suppose, now, that a film of celluloid could be formed consisting of a great number of tiny wedges as shown in fig. 3

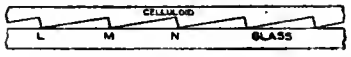

Fig. 3.

at L M, M N, etc., each of which was just about wide enough to form ten lines, and this be placed in contact with a glass plate, then even with ordinary coloured light, fringes would be formed all along from L to Q. The distance apart of these fringes will depend, for a given angle of the wedges, upon the colour of the light used. By semi-silvering the lower surface of the celluloid film and the adjacent surface of the glass plate the fringes will be rendered much more distinct. If the film so mounted is pressed against the sensitised surface

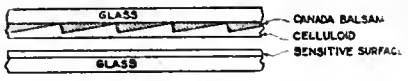

Fig. 4.

of a photographic plate, and coloured light is allowed to pass through it on to the plate, the latter will, on development, be made into a diffraction grating, of which the ruling is determined by the colour of the light. The plate can then be examined by slightly oblique light, and at a certain angle will appear coloured with the colour of the light used. Lastly, if such a film be placed in contact with the front surface of an orthochromatic plate, and the plate exposed in a camera in the ordinary way, a combined photograph and grating will be produced, which, printed and viewed at a certain angle,

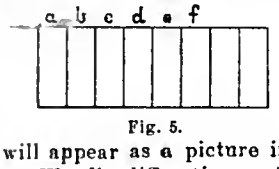

Fig. 5.

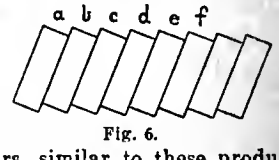

Fig. 6.

will appear as a picture in colours, similar to these produced by Wood's diffraction method. Provided, therefore, that the wedged film can be obtained, the production of coloured photographs by its means is perfectly simple; moreover, the photographs can be multiplied by printing in the ordinary way.

Several ways suggest themselves for the production of the wedged film. For instance, Wood described recently an "echelette" which he made by ruling a soft metal with a carborundum crystal, which gave him a series of parallel wedge-shaped grooves. A cast in celluloid of such a surface could be taken, the grooved surface of the celluloid semi-silvered, and then mounted, grooved side down, in Canada balsam on a sheet of glass previously semi-silvered, as shown in fig. 4. The thickness of the celluloid would probably not be enough to matter much (though this is, perhaps, the most doubtful point in the method). Instead of ruling the grooves in soft metal they might be made by clamping together a bundle of this glass or steel sheets *a*, *b*, c, *d*, *e*, *f*—each about one-thousandth of an inch thick (fig. 5). The upper and lower surfaces should be optically polished, and then the whole bundle inclined as in fig. 6. The celluloid cast could then be made as before.

REGINALD S. CLAY, D.Sc.

MONOCHROME, TWO-COLOUR OR THREE-COLOUR CINEMATOGRAPHY.

[In a recent Patent Specification, No. 154,150, of Zoechrome, Ltd., and T. P. Middleton, a process is described for the production of cinematograph negative film serving for monochrome positive films, and also for two-colour or three-colour positive films. The negative is taken at twice the usual rate, *i.e.*, at 32 pictures per second, and the section-exposures for monochrome film are alternated with those for the two or three colour-sensations. Composite colour positive films are printed from these latter. The following text of the specification describes variations of this system. Elimination of colour fringing is claimed to be one of the advantages of the process.—ED. "Colour Photography" Supplement.]

THE invention relates to that class of process for producing colour effects in cinematography in which each component picture of the film for projection is a miniature colour rendering of the subject, and does not rely on superimposition by means of filters in the projector to reproduce the colour effect on the screen.

The negatives for producing the films can be produced in various ways; but the invention relates to such negatives as are taken through one or more lenses successively through recurring colour filters.

Hitherto it has been found impossible in films for projection produced from such negatives to avoid "colour fringing," and one of the objects of this invention is to minimise this defect. Another object is to produce a negative film from which ordinary black and white films may be produced when required; and from which at the same time a colour film for projection may be prepared in such a manner that it can be exhibited through an ordinary projector at the usual speed, and interchangeable with black and white films without material alteration to the apparatus.

In short the invention consists principally in the production of a single negative cinematographic picture-film band, taken at the rate of 32 pictures per second, in which different colour elements alternate with the elements of an ordinary black and white film, and from which black and white and colour picture films can be produced that are susceptible of projection at the ordinary speed employed for exhibition of black and white pictures.

The normal negative taking speed of 16 pictures per second is increased to 32 pictures, and the colour filters are not consecutive but alternate with spaces which may or may not be filled with yellow or orange filters as usually employed in black and white photography in conjunction with a panchromatised base. Thus a negative, taken on panchromatised base, is obtained in which alternate pictures form elements from which an ordinary black and white film can be printed, while the remainder, being exposed through appropriate colour filters, form the component elements of a negative from which by subsequent printings a heliochrome can be prepared from a black and white positive.

When the negative pictures are combined by superimposition a colour film can be made which possesses the evenness of motion, sharpness and want of rainbow of a "hand-coloured" or "stencilled" black and white film, with the purity and detail of colour of a veritable heliochrome.

The negative is conveniently printed in the type of machine described in Patent Specification No. 16,353 of 1913. The machine therein described is, however, modified in detail to suit the aforesaid conditions. For example, the black and white film pictures must always be printed so as to close up the open order of the negative. The negative having been pulled down two pictures, one print is taken. Two picture shifts are made on the negative and one on the positive, and one further print is made; and so on. Thus a print is made which in all respects resembles an ordinary black and white film.

As, in colour films having colour images combined with black and white images, in order to further reduce the colour fringing, it is advisable to have the colour images slightly out of focus,

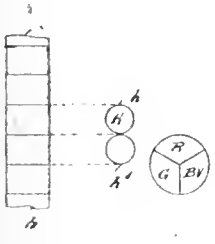

Fig. 1a.

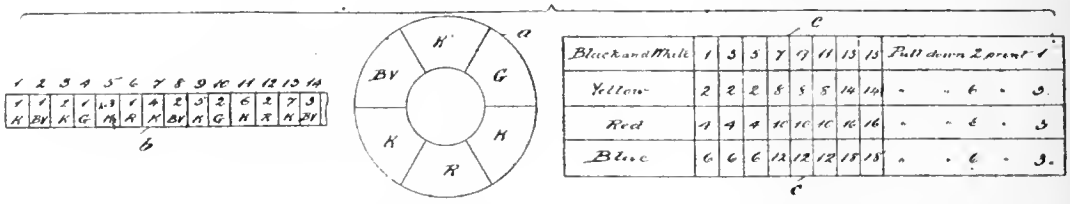

Fig. 1.

arrangements are preferably provided in the printing machine aforesaid for moving the lens and positive film in relation to the negative side.

This enables the want of sharpness of the colour images to be controlled. In addition, the less sharp methods of preparing colour images become available, and so the colours can be applied not only by recoatings of the black and white film, but also by the various methods of dye and colour transfer from gelatine reliefs. The colour images themselves can be transferred on to the black and white film by a suitable adhesive from a suitable support allowing transfer.

Whatever method of assembling the colour images be adopted the printing machine is discriminative and selects all the images of one colour from the single negative band, and as there must be as many images of each colour as there are black and white pictures it necessarily follows that in a three-colour process three separate images are printed from each colour element of the negative on to a black and white film; whereas in a two-colour process only two such impressions are necessary. Thus in a three-colour process on a black and white film the negative will, for printing the colour images, be pulled down six picture shifts, and three pusitive prints will be made; whereas in a two-colour process on a similar film only four picture shifts of the negative and two positive impressions will be necessary.

Three modifications of the process are shown in figs. 1, 2, and 3, in which *a* represents the colour screens, *b* the negative film, and *c* a development of the positive film presuming the use of one lens only. In these figures the numerals on the negative side and on the positive side represent the successive or consecutive motion phases. Figs. 1*a*, 2*a*, and 3*a* show the application of two lenses A A^1 and colour screens for the purpose of making negatives.

Referring now to fig. 1, or the former case, the negative *b* is taken through six screens.—Three yellow (K) such as are usually employed in black and white photography in conjunction with a panchromatised base, one blue-violet (B.V), one green (G), and one red (R), the yellow alternating with the other colours; whereas in the latter case, fig. 2, four screens would be used; two yellow (K), one red (R), and one green (G), the yellow alternating as before. These colours are only given by way of example, the yellow may be omitted altogether if desired; but it would then be advisable to substitute clear glass dummy filters of equal thickness for the colour screens.

Referring now to fig. 3. In certain cases, as where it is desirable to have very bright colours, the black and white positive film can be toned blue and thus form one of the colour elements. The negative *b* is then preferably taken through the four screens *a*, which consist of two red (R) alternating with blue-violet (B.V) and green (G) filters. Such a negative filter is not broadly new, but, in accordance with the invention, it is then printed, as in the case of the "two-colour or black and white film" already described; but the black and white film is toned blue in the manner well known to photographers. Such a film can be considered as being in technical parity with the others described, as the human eye is much less sensitive to blue than to either yellow or red, and thus a blue image appears dark and being sharp produces the desired optical effect on being projected. Advantage is taken of this in the well-known Sanger-Shepherd process, where a sharp blue is associated with two non-sharp dyed gelatine reliefs. The method of printing the positive film *c* in each of the above described methods is clearly shown in the respective developments of the positive film *c* in the diagrams, but, of course, out of step printing is to some extent possible.

For example, instead of the combination shown in the positive in fig. 3, it is equally possible to have the following combination:—

Blue, 1 3 5 7 9 11 and so on,
Yellow, 2 2 6 6 10 10 and so on,
Red, 4 4 8 8 12 12 and so on,

in which case the red is always in the middle as regards motion, the other individual exposures each picture being those immediately prior and subsequent to it, and these are alternately red and yellow, and yellow and red respectively.

In assembling the various colours on the black and white or toned film, care should be taken that the individual colour elements that constitute each composite unit of the complete film should as far as possible be those immediately prior and subsequent to the individual member of the base film.

Obviously coloured films prepared as above described are capable of being run through an ordinary projector at the ordinary speed, and, therefore, interchangeable with the common black and white film, thus obviating the use of special apparatus for the exhibition of the colour picture.

When using two lenses to make the negative film, one of the lenses may have a stationary colour screen associated with it, and the other may have rotatable screens, as indicated in figs. 1*a*, 2*a*, and 3*a*, the exposures being made alternately through the two lenses.

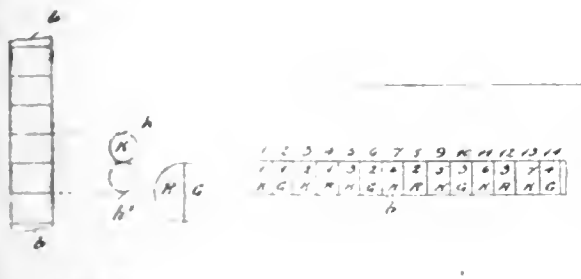

Fig. 2a.

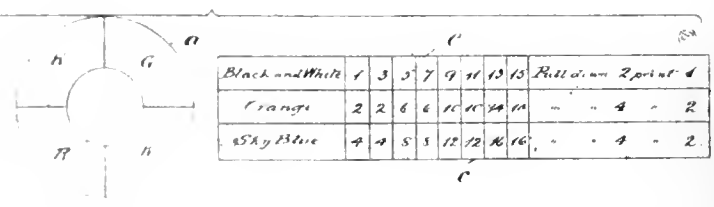

Fig. 2.

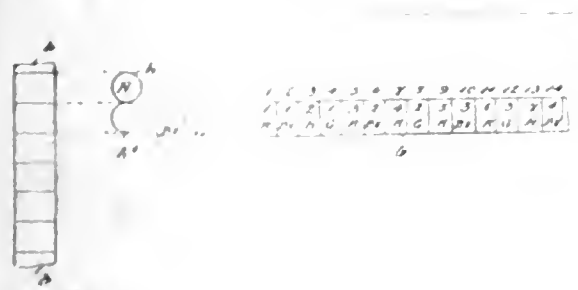

Fig. 3a.

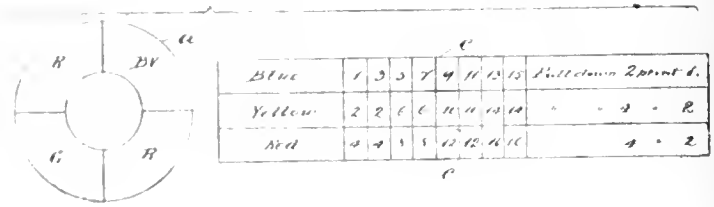

Fig. 3

THE AUTO COLOUR CAMERA.

By courtesy of Mr. F. Donisthorpe, 4a, Iliffe Yard, Crampton Street, Walworth, S.E., we have recently had an opportunity of seeing a camera for three-colour work which he is just putting upon the market under the name of "Auto." When one calls to mind the mechanical or optical complexity of cameras which have been designed for making the three colour-sensation negatives, Mr Donisthorpe's instrument appears as of extraordinary simplicity. It is, in fact, modelled upon the mechanism of the cinematograph camera, a simple cam movement serving to move the film into successive positions for exposure. Unperforated panchromatic film is employed, and the cam movement is such that the longer dimension of the picture is about 2¼ ins., whilst the shorter dimension is almost the width of the film. The three light-filters form part of the shutter mechanism, and are mounted in a vertical frame which operates, in conjunction with the film-winding cam, in the manner of a drop shutter. Thus, by means of a very simple outside adjustment, the three exposures can be made in very rapid succession, so rapidly that it is claimed for the camera that the three-colour-sensation exposures may be made within a total period of time short enough to allow of snapshots being taken. Also the shutter mechanism may be adjusted for giving time or bulb exposures. The sensitive film is obtainable either as a daylight loading spool or in lengths for loading of the camera in the darkroom. In the first form a spool for nine successive exposures, or rather sets of triple exposures, costs 2s. In the latter form, 1s. 6d. It will be understood that the apparatus is designed for the making of negatives from which three-colour prints or enlargements are prepared by the customary assemblage methods such as Raydex,

Pinatype, etc.; and the camera certainly represents a new and greatly simplified form of mechanism for this purpose. Its price complete with f/6 lens is £6 15s.

EXPOSING AUTOCHROME PLATES ON INTERIORS IN WINTER.

The exposure of an Autochrome colour plate indoors, under the weak light that obtains in winter, is a very different proposition to that of attempting the same work during the spring or summer. I have lately been conducting a number of experiments in this direction and—incidentally—wasting a number of precious and costly plates, ere I at last obtained really fine results.

First, as to the focussing. As the light is much less powerful far more care should be expended on this, otherwise, it is commonly found that some part of the plate is slightly "fuzzy," instead of absolutely sharp. Focus with the lens at full aperture and adjust until as much of the centre of the picture as possible is fully defined. Now work round the outside, constantly making small adjustments of the swing back and front until the whole is as definitely defined as can be accomplished. Patience expended in this way is amply repaid in the finished result, for it is really astonishing how much can be done to focus sharply by small adjustments, and the sharper the picture can be made—without stopping down—the greater the amount of light that passes and, consequently, the shorter the exposure necessary.

After the utmost has been done with the swing back and front, recourse must be had to stopping down the aperture of the lens, though this should on no account be done beyond the largest stop that will give accurate definition.

Colour rendering is not altered by stopping down considerably more than is actually needful, but the exposure is greatly lengthened, and it is difficult to develop fully the detail in the shadows without sacrificing the high-lights.

As an experiment on this point, I chose a dull, clouded day, and in an ordinary room, with large windows on one side facing west, focussed my camera. After obtaining the sharpest definition, I doubled the stop necessary to secure this, with the result that, on the ground-glass screen, the best lit and most prominent objects could only just be discerned on the glass. I then calculated my exposure and found it ran into some hours, so that I opened the slide and shutter, closed up the room and went away. When the time had elapsed I returned, closed the shutter and slide, and took it straight to the dark room and immediately developed. The finished picture gave me strong and vigorous rendering, but with less of the finer detail in the darker portions than another picture, taken under the same conditions, of the same subject, with a sufficiently small stop only to ensure good definition.

This leads one to the conclusion that the light is not only weaker, but lacks penetrative power, even when it is allowed to act for a proportionately longer time.

Calculating the correct exposure in winter, especially when the sky, as is usually the case, is overcast, cannot be judged by ordinary methods. The Autochrome plate, we are told, needs an exposure of 50 to 60 times that necessary for an ordinary plate, in order to obtain a fully exposed and correct rendering in colour of the object or scene photographed, but, in addition to this, we must add roughly six times the exposure needed when the sun is shining to compensate for the lack of penetrative power. Experience has convinced me that in winter, not only must we first obtain an approximately correct exposure, but that, whenever the sky is cloudy, it is essential to add five or six times the additional time needful under a clearer light. And, in addition to this, double or treble the whole. One cannot do more than hint on this point, for the speed of a lens varies so greatly, and the matter can only be correctly solved by making an experimental exposure or two for oneself. Controlled development must be followed to obtain an accurate result.

Temperatures, etc., vary so greatly at this season, with their accompanying result on chemical action that no other way is possible. One may have had absolutely correct exposure, but even then the plate may be spoiled if the automatic (2½ minutes) method is employed, because the development does not commence and is not carried on so vigorously as under warmer conditions. It is a good plan to have the dark room at a temperature of 60 degrees for working, and also to keep all solutions, etc., in a warm place, but be careful to test these with a thermometer when ready to use. My experience of the Autochrome is that it will not fog or frill readily under proper treatment, but too warm a temperature of the developer brings both these troubles at once.

Watch your development carefully by rapid examinations of the plate from a light fitted with Virida paper. Do not subject it to long exposure even to this; examine quickly and cover either the source of light or the tray containing the plate. It is a great temptation, where one can see the development, to carry this too far as more and more fine detail seems to be building up, but, if this is done, the resulting picture will be poor, washy, and thin in its rendering.

Remember that it is being examined by a very diminished light, and rapidly at that, and there is a great deal more detail there than can be recognised. Parts of the plate that seem to be only just faintly tinged with greyness in the developer will, after reversal and re-development, be found to contain vigorous and correct colour, while if this first development be prolonged to obtain more detail, we shall really be getting less in the finished picture.

Yet another hint, do not develop later in the day than can be helped, for the strongest light-action possible is required in reversal and second development to ensure the best result. In winter it is best to carry the plate in the tray, immediately it is immersed in the reversing solution, into the open air, so that the fullest and clearest light possible is utilised in the chemical action.

H. W. Canning Wright.

The Bleach-out Process.—Dr. G. Plotnikow, in a work, "Lehrbuch der Photochemie," a chapter of which is quoted in advance by "Photographische Industrie," makes the following observations on this much-investigated but now greatly neglected process of colour photography:—The lines along which the bleach-out process has hitherto been developed appear to give little promise of success. In the processes which have been brought forward the basis is the photo-chemical oxidation of dyes by the oxygen of the air or by other oxidising agents, such as hydrogen peroxide, organic peroxides, etc. The chemical process is therefore of the following type:

$$F+A=P$$

where F is the dye, A the sensitiser, and P the product which is obtained. A and P require to be colourless substances. In the case in question A is oxygen or some other oxidising agent, and F the light-sensitive substance. But inasmuch as oxygen is always present, that is to say, the substance A cannot be eliminated from the reaction, artificial means, the so-called fixing, require to be used in order to bring the reaction to an end. This fixing consists in reacting upon the dye with other substances which render it fast. Such reagents are, however, not easy to find, and new bodies produced by their action exhibit a difference of light absorption, so that there is an alteration of the appearance of the prints. It therefore appears that very little practical success is likely to come from the methods which have so far been recommended. There is, however, another form in which the process might be developed. The dye F could be one of a fast character in respect to oxidation, forming a colourless product in the presence of a colourless substance A. We then have conditions as follows:—After exposure had taken place the substance A would be removed by washing, evaporation or chemical decomposition. There would then remain only the light-fast dye F, and there is no reason to suppose that the colour-rendering would then be different from that originally produced. The difficulty of such a process consists in the discovery of suitable fast dyes of the required properties, and of corresponding compounds to react with them. It would be immaterial whether the reaction took the form of a synthesis, decomposition or other process. Inasmuch as this field has not been investigated, it cannot be said at the present time which dyes are adapted for the purpose. The organic chemist may be able to indicate them, and it is not impossible that quite new classes of dyes may come into existence which will provide the solution of the problem.

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THE BRITISH JOURNAL OF PHOTOGRAPHY

MONTHLY SUPPLEMENT

ON

Colour Photography.

CONTENTS.

THREE-COLOUR LANTERN TRANSPARENCIES.

[With the introduction of the Autochrome and Paget processes the making of three-colour transparencies by the older assemblage processes has largely lost the interest, so far as practice is concerned, of colour workers. The practical details of these processes even tend to be forgotten; and therefore it is good to find two American workers, Messrs. C. K. Teamer and E. E. Miller, in the "Camera," doing the best thing to keep them alive, viz., describing their own practice in the making and printing of the three separate colour-sensation negatives. The following is a reprint of the chief portion of their paper.—EDS. "Colour Photography Supplement."]

THE apparatus required, taking it for granted that you have a plate camera, is not great. An anastigmat lens is a valuable asset, but, except for the most critical work, a long focus R. R. lens will answer, only the centre of the field being used. A single lens will not make a set of plates, the positives of which can be accurately superimposed.

The plate holders to be used should be carefully examined for accuracy, as the three plates made of the subject must lie in the same plane otherwise the images will not be exactly the same size. This, if it occurs in the red or blue printing plate, is very noticeable on projection. Also it is preferable that the holders be used as for vertical pictures, as there is less danger of moving the camera while changing slides.

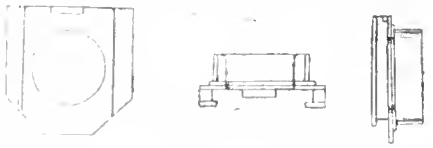
While any panchromatic plate will probably make a good set of separation negatives, we use and will give directions exclusively for Cramer's Spectrum Plates used with Cramer's Tri-colour Filters. Do not attempt to use the filters of one make on the plates of another, or *vice versa*, and then blame us or the plate maker for the poor results. "Adopt one brand of plate and stick to it," is very good advice that is often given and seldom heeded. The Cramer tri-colour filters, size 2 in. square, are at present $12.50 per set, which is the only expensive article required. Beside the filters the following will be required: Kodelon or some other make of paramidophenol hydrochloride, bichromate of potassium, alum, strong ammonia water. One ounce each of methylene blue, tartrazine and basic fuchsine. We will also require one dozen 8 by 10 Eastman positive film for printing the positives. The following are convenient, but not essential. Four 1,000 c.c. flasks (slant), three 800 c.c. beakers (tall pattern), two dozen wooden photo clothes pins or slips to be waterproofed in melted paraffin wax.

A filter holder will be needed, and can easily be made. Procure from the druggist a pill box slightly larger than the lens to be used. The lid is the part required. Glue to the top a two and one-half inch square of heavy card; when dry, cut a hole through both corresponding to the diameter of the lens, line the box with velvet till it is a snug fit on the front cell. On the two sides of the two and one-half inch card, glue strips about one-quarter inch wide and equal to the thickness of the filters and on top of these a slightly wider piece to form a track in which the filter freely slides. A small piece of card fastened at the bottom to keep the filters from dropping through, completes the holder. This is not elaborate, but answers the purpose. The sketches fully illustrate its construction.

It is always best to expose the plates through the filters in a certain rotation (red, green, blue is satisfactory), which, if always used, will avoid confusion.

We will assume that lantern slides are to be made, and give instructions accordingly.

For the first attempt a rather simple subject is suggested, a fruit group containing an orange, a banana, a red and a green apple. These can be placed on a coloured or plain dish, but one of white or containing too much white should be avoided. A suitable background should be used; a rather



dark one gives the most pleasing results. Have it sufficiently long so that it can be placed under the dish and then curved upward to form the background. The lighting should be as uniform as possible, as deep shadows, unless one has experience in this work, are sure to cause trouble. The colour contrasts will give sufficient brilliance to the finished slide. We have not mentioned that each sheet or 8 by 10 film cuts into nine pieces—approximately 3 3-16 by 2 3-8. Therefore, when composing the view it is best to use a mask not larger than 2¾ by 2. Just outside the actual picture space place a sheet of white paper, as this is essential for future reference. Focus sharply through the red filter, which is visually the brightest, and stop down till all is needle sharp.

The factors for Cramer filters with Cramer Spectrum Plates are fairly constant, only the red changing. The red is usually eight times normal, the green sixteen, and the blue four times. The use of an exposure meter (such as the Wynne, Watkins or Imperial), which actually tests the light, is urged. Having

decided the normal exposure, expose the plates each under its proper filter and mark the holders so that they can easily be identified. As these plates are extremely sensitive to red, only a green safelight can be used, and this cautiously.

The following developer gives especially good results on the above-mentioned plates:—

Water	8 ozs.
Kodelon	15 grs.
Sodium sulphite	60 grs.
Potassium carbonate...	70 grs.
Potassium bromide, 10 per cent. solution, (only if necessary).	5 drops

With a soft pencil, mark the edge of the plate exposed under the red filter with one line on the emulsion, that through the green with two lines or a corner may be marked with (R, G, or B) the letter designating the filter used. This will positively identify the plates if no mistake has been made in removing them from the holders. Place all three plates in one tray and pour on the developer, being sure to cover them quickly, as this developer is very rapid. At 65 deg. F. develop for exactly two and one-half minutes and transfer without washing to an acid fixing bath. When the plates are fixed, examine the images of the white paper, which should be the same density on all three plates. If this is not the case, make another set of negatives, but alter the filter factors. Once these are established they are correct for all plates of one emulsion number. A very slight difference in density will not noticeably affect the final result; in fact, the image of the red filter plate is often slightly less dense than that of the green. The appearance of these negatives will probably be disappointing, for they will be very thin, but that is the condition required. Also the exposure is better if over than under, as there must be no clear glass in any shadows.

We will now suppose that the fruit group mentioned is the object photographed. The first to be examined is the image of the white paper. Under a good light place a magazine page, holding the negatives about four inches above the page, the printing should just be visible through the portions of the white paper forming the highest light; a white paper in a shadow will, of course, be less dense. Now take up the red filter negative. The banana (if ripe) will be about the same or a trifle less dense than the white; the orange slightly less dense than the banana; the red apple (if very dark red) will be thinner than the orange; the green apple will be very thin. The green filter plate will show the banana about the same as the red filter plate; the orange will be much thinner; the red apple almost clear glass, and the green apple nearly as dense as the white. The yellow filter plate will show the banana, orange, and green apple very thin, and the red apple slightly denser. This appearance of the plates is only approximately correct, as the actual tint of the fruit varies, and the densities above given, while correct for the three plates we have before us, would in all probability vary with another group.

Sensitising the film for printing is the next step. As we do not depend on the silver in the emulsion we can open the film in any light. Do not expose it unnecessarily long to daylight, as it will, of course, darken, and this would affect the contrast of our print. Cut one sheet into three equal pieces. Immerse one of these in the following sensitiser, being careful to remove all air bubbles:—

Water	... 35 ozs.	1,000 c.c.s.
Potassium bichromate	... 315 grs.	20 gms.

When dissolved, add ammonia water till the colour changes from orange to lemon yellow. The solution should be stirred while the ammonia is being added. The sensitiser will slightly retain the smell of ammonia when the proper quantity has been added. The film should be bathed for five minutes at 60 deg. F. After required bathing, drain, and with a wad of cotton carefully wipe the back or celluloid side. This is very important, as any drops that may form on the back will affect the finished result. All these operations can be performed by gas or other artificial light, as the film is only sensitive when dry or nearly dry. Only sensitise as much film as is actually needed, as it will only keep for about three days, but for the first print it may be as well to sensitise more, for until you are acquainted with the printing and developing some is sure to be spoiled.

Carefully clean the back of the negatives. Make a Solio (P.O.P.) print from the red filter negative. When the highest light shows the slightest tint it is finished. Keep accurate printing time, as this is the test for printing the film. It is to be preferred that the print be made in the shade. If all the negatives are practically the same density only one test need be made. Now carefully clean with a soft cloth the celluloid surface of the film; any dirt or lint left on thia surface will show, as the print is made through the celluloid. Now cut the strip into three and place one of these pieces celluloid surface in contact with the gelatine surface of the negative and print for exactly the same time that you printed the Solio proof. Make prints in the same way from each of the negatives and place them in a box. As it is impossible to tell from the appearance of the film before dyeing, one from the other, it is necessary to mark them. When the print from the red filter negative is removed from the frame, cut a small piece from one corner: that from the green filter negative should have two corners cut. It is advisable to use as small a printing frame as possible. Around the edge of the frame build up to a height of about 6 in. a wall of black card or paper. This will prevent all but the direct light from acting on the print and will tend to give slightly sharper images.

The developing of these prints is done in hot water. It is of some importance that the temperature should be between 100 deg. and 112 deg. F. Heat the water to 112 deg. F., remove one film from the box, and clip in the centre of one end with a spring clip. Hang this on the edge of the vessel so that the film is entirely below the surface of the water. In about a minute the upper surface of the gelatine will be softened and begin to peel off, and by moving it gently about in the water all the gelatine not hardened by the action of the light will be removed, and the white image will gradually assume the proper contrasts. When the highest light is practically clear the development is finished, and should be checked by holding the film under a gentle stream of cold water. Now transfer the print to a dry clip and hang on a line to dry, being sure to remove all drops of water from the back of the print. Proceed with the others in the same way. If the films have been properly exposed they will develop only so much and then stop. This can be ascertained by holding the film above the water and watching the water that drops from a corner. This should show only the slightest traces of the gelatine emulsion. If under-exposed there will be large patches of clear celluloid showing where the lightest and middle tints should have been. If over-exposed the whites will not clear unless the temperature of the water is raised. Do not raise the water above 120 deg. F., as it is almost certain to crinkle the celluloid and render it useless. Under no condition should the gelatine surface be touched, as it is so soft that the slightest contact will mar the surface.

When the films are dry they are ready for fixing and staining. The fixing may be done in any convenient fixing bath that may be handy, but a weak solution of plain hypo with a small crystal of red prussiate of potash dissolved in it is to be preferred.

The dye baths are made as follows:—

Blue Dye Bath.		
Water	... 1,000 c.c.s.	35 ozs.
Methylene blue ...	... 2 gms.	3 grs.
Sodium carbonate ...	... 1 gm.	15 grs.
Red Dye Bath.		
Water	... 1,000 c.c.s.	35 ozs.
Basic fuchsine	... 2 gms.	3 grs.
Sodium carbonate ...	... 1 gm.	15 grs.
Yellow Dye Bath.		
Water	... 1,000 c.c.s.	35 ozs.
Tartrazine	... 3 gms.	4 grs.
Glacial acetic acid ...	... 10 c.c.s.	3 drms.

The dyes should be carefully dissolved in about 3 ozs. of warm

water and filtered into the larger quantity of water. After the films are fixed and washed they should be suspended in their proper dye baths. Be sure to move the film gently in the dye so that it will stain evenly. The film printed under the red filter negative (one corner cut) is to be stained blue, that under the green filter negative (two corners cut) is to be stained red, and the remaining film yellow. The staining requires some little time. If the dye baths are too strong the prints lack gradation, the lighter tints being heavy. If the dyes are too dilute the required depth of tint cannot be obtained, except by prolonged soaking. The blue positive is unlikely to give trouble. When stained to what seems to be the desired tint, dip a few times in clear water to remove surplus dye. If the whites are slightly tinted, bathe in water until they are clear and hang up to dry.

The red positive usually appears rather flat and heavy unless the dye bath is so dilute that the time of staining is unduly long. If it is too flat, bathe in clear water until the proper contrast and clearness of the whites is obtained; a little borax in the water will hasten this.

The treatment of the yellow film differs slightly from the others. The dye is very easily washed out; care should be taken that too much is not removed. When it appears correct, place in a solution of acetic acid, No. 28, 1 oz. to 10 ozs. of water. This serves to set the dye.

When the films are dry, place the yellow on the blue and carefully match the outlines. Hold with two clips and then register the red on the new green image. If all the steps have been carefully followed out, the transparency will show with startling accuracy the colours of the subject. If the tints are not correct it is usually an easy matter to pick out the trouble. If the entire transparency is of the correct or desired density, but shows a decided reddish or bluish cast, reduce them by washing. It is practically impossible to give instructions for corrections, but a little practice will enable one to pick out the faults and correct them. When familiar with all the details of the process it is very seldom that trouble will be experienced in adjusting the colours, as you will be familiar with the appearance of the different tints required to make any desired shade.

The mounting is done in the following manner: Dissolve some scrap celluloid in acetone or amyl acetate until the resultant solution is about the consistency of syrup. Cut from the black paper in which the film is packed a mask with the proper-sized opening. Carefully clean one side of a cover glass and fasten the mask to the glass by applying a small amount of the above cement to each corner. Adjust the blue print, gelatine side down, on the mask, and fasten in position temporarily with two clips; when in desired position cement the corners to the mask. After the cement has dried, carefully clean the celluloid surface of the blue print and superimpose on it the yellow print. It is best to use a magnifying glass to be sure that the two images exactly coincide. Cement this yellow print to the blue, and in the same manner adjust the red print, then bind up in the usual manner.

There appear in different publications the opinions of various writers as to the value of intensifying or reducing sets of tri-colour negatives. The various theories against the process do not seem to hold good. A negative that is too thin may give a slide that will be good in its values but still lacks the vigour and depth of colour desired; the obvious thing to do is to intensify. The tendency will be to overdo it, and here let us caution you that a very slight intensification is all that is required.

The following has been found to give excellent results, and may be repeated if the first treatment does not give sufficient density:—

Water...	4 ozs.
Potassium bichromate	20 grs.
Hydrochloric acid	40 minims.

Bleach thoroughly in the above solution; then wash in clear water until all traces of yellow chromate stain are removed, and develop in any developer you may have on hand. If pyro is used, give it an extra dose of sulphite so that the plate will not be stained. A short washing completes the process. Excessive density is best reduced by bleaching and washing as above and then partially developing the image. When developed to what you think is the correct amount, fix as usual and then wash. All these operations may be carried out in strong artificial light or screened daylight.

If the reader does not wish to go to the expense of purchasing the Cramer filters, the gelatine filters of Wratten and Wainwright will answer temporarily. These filters and the Wratten and Wainwright Panchromatic plates can be purchased from nearly all Kodak agencies.

The filter factors for the A.B.C. filters are given on a card which will be found in each box of plates. These plates have rather high filter factors, causing unduly long exposures, and are backed. This backing may be of advantage, but it certainly is messy.

The developer and time of development given on the card will probably produce more contrasts and density than desired, but if you wish to use it, use only one-half the quantity of each of the three solutions or use twice as much water. There is no reason why these plates will not produce results, but we have always used and had good results with Cramer's, and saw no reason for making a change.

No doubt the reader will consider this too much trouble, judging entirely from the lengthy explanation, but we assure him that the process is not a difficult one. We have, perhaps, gone more thoroughly into details than the average articles on colour processes, but there is much more that could be added were it not for making this too lengthy.

Our advice to anyone is to try the process. Time spent in making a successful slide is well spent, and perhaps you will conclude, as we have, that black-and-white pictures are no longer worth while. If the reader has at his disposal an electric arc light he need not wait for, or depend on, daylight for any of the operations of this process; in fact, for making the plates any light will be found suitable with the exception of the mercury-vapour light, which contains no red rays. If one has electricity, a properly arranged battery of nitro-tungsten lamps will give a beautiful light for the purpose. Those with a clear or ground bulb are desired, as the newer blue-tinted bulb acts as a filter, cutting down the red rays. The mantle gas lamps will also be found satisfactory, but rather slow.

The filter factors for Cramer filters using the Northern Arc are: Red, 8 times; green, 7½ times; and blue, 8½ times. For printing, the arc will be found more satisfactory than daylight, for if the distance in printing from the carbons is kept constant, the printing time for a set of negatives, once established, will always be right.

C. K. Teamer.
E. E. Miller.

Autochrome Reproductions.—The March issue of the "National Geographic Magazine," which is almost exclusively devoted to an illustrated account of the Ross-Smith aerial voyage to Australia, contains a section of full-page reproductions in colour of Autochromes by Miss Helen Messinger Murdoch, whose magnificent work in the Autochrome process was a feature of R.P.S. exhibitions a few years ago. Miss Murdoch has travelled over a good part of the world, and her colour photographs made in Ceylon and India, which here lighten the monochrome pages, provide an illustration of her skill in landscape as well as in portraiture. The half-tone three-colour reproductions have been exceedingly well done, though necessarily are not comparable with the originals for brilliancy and fidelity of colour rendering. The magazine is published at Hubbard Memorial Hall, Washington, United States.

A NEW GREEN SENSITISER.

[In the following note, published in the current issue of "Photographische Rundschau," Dr. E. König gives the first particulars of a new colour-sensitising dye which has special and greater sensitising properties in the green part of the spectrum, and is found to confer an advantage in practice in the making of the colour-sensation negatives for processes of colour photography or colour cinematography.—Eds. "B.J."]

At the present time there is no lack of red sensitisers. The red-sensitiveness of plates sensitised with pinacyanol or similar dyes fulfils all the requirements of photographic practice. Our aim of late years has, therefore, been not as formerly the improvement of red-sensitive plates, but the discovery of a specific sensitiser for green. From both the scientific and practical standpoints this long-desired dye has now been obtained in a new colouring matter to which the name of pinaflavol has been given.

Pinaflavol belongs to an entirely new class of basic dyes, and was prepared in the photo-chemical laboratory of the Höchst dye works by Dr. Robert Schuloff. The dyes of this series are characterised by their yellow colour and by their specific sensitising properties for the green part of the spectrum. Their behaviour towards acids is similar to that of the pinacyanols; they are stable towards acetic acid, but are decolourised by mineral acids.

Dr. J. M. Eder writes of the new dye as follows:—"In Pinaflavol we have obtained the long required green sensitiser, having a maximum at about the line E (wave length 530 $\mu\mu$) falling sharply to D and extending without gaps to F. In comparison with the eosine dyes Pinaflavol does not exhibit the unfortunate minimum in the blue-green, but yields a strong, even spectral band over the whole of the green, blue and violet."

As regards the sensitising curve of Pinaflavol, the rapid fall of the sensitiveness at D (in the yellow) is of special interest. In practice this fact is shown that in making an exposure on a coloured chart with a medium yellow filter the yellow-green is obtained stronger than the yellow. In orthochromatic photography there is, of course, no advantage in this, since yellow is visually lighter than green. Thus, for the preparation of orthochromatic plates the older sensitisers, erythrosine, ethyl-red or Pinaverdol are to be preferred. But in processes of three-colour photography the advantage is proportionately greater. As is well known in making a set of three colour-sensation negatives the red printing plate exposed through the green filter requires the longest exposure. The isocyanine or erythrosine plates hitherto used all possess a considerable sensitiveness to yellow and even to orange. It is, therefore, necessary to damp down the yellow and orange by means of the green filter in order to obtain the better effect of the green. But a green filter, on account of the density of all green dyes, absorbs a good deal of light, and, therefore, considerably prolongs the time of exposure.

Owing to its favourable sensitising curve, Pinaflavol allows of the red printing negative being made with a yellow filter; the filter requires only to fulfil the purpose of cutting out violet and blue. Inasmuch as yellow filters are of a high degree of transparency, the time of exposure can be reduced to at least one-half. This shortening of the time of exposure is of considerable value, not only to makers of three-colour process blocks, but also to those practising photography in natural colours, and particularly in colour cinematography, where any reduction of the period of exposure is an important advantage. It will thus be seen that Pinaflavol is an important addition to the available colour sensitisers, and represents a notable piece of progress in colour photography.

Pinaflavol is used in the same manner as the cyanine and isocyanine sensitisers The sensitising bath is made as follows:—

Distilled water	100 c.c.s.
Pinaflavol, solution of 1 part in 1,000 parts of water	2 c.c.s.

Plates are bathed in this sensitising bath for about two minutes in the dark, or by red light, allowed to drain thoroughly and dried. The sensitising bath compounded with a mixture of alcohol and water, as is largely employed with the isocyanine dyes, may also be used, but yields plates of a lower degree of sensitiveness. Experiments made in the way of combining Pinaflavol with other sensitisers have so far failed to yield good results. Pinaflavol is also suitable for the sensitising of collodio-bromide emulsion, for which purpose about 20 c.c.s of a solution of 1 gm. Pinaflavol in 1,000 c.c.s. alcohol are added to 1 litre of emulsion.

DR. E. KÖNIG.

IVES'S MEDICO-CHROMOGRAMS.—Mr. F. E. Ives announces that he has introduced a sufficiently truthful, simple and inexpensive system of colour photography for making records in medical hospitals, comprising a special stereoscopic colour camera, a simple fixed-focus copying camera for making transposed-image colour transparencies, and the Verak Stereoscope for viewing them in natural relief.

Technically a "two-colour" process, it is in reality a two-colour-*plus* process, by virtue of Mr. Ives's invention of the dichroic red-to-yellow print from the green-blue negative colour record, and truthfully renders the colours found in the class of subjects for which it is recommended.

The stereoscopic feature is most important in this kind of work, and involves no complication in the operation of the process. The images as seen in the Verak stereoscope are convincing re-creations of the subjects photographed, without "structure," and in true relief and perspective.

Two identical panchromatic plates are exposed simultaneously and developed simultaneously, producing the stereoscopic negative colour record, and the colour positives are made from these negatives by Mr. Ives's original and most simple photographic mordant dye process, converting the silver image to a transparent variety of silver ferrocyanide, which in turn mordants the respective colours from basic dye baths. Any desired number of the stereoscopic colour prints can be made from the original negatives; also lantern slides and paper prints. Particulars and prices are obtainable from Mr. Ives, 1,327, Spruce Street, Philadelphia, U.S.

AUTOCHROME PORTRAITURE.—M. Hervé, one of the veterans of the French Photographic Society, recently delivered before the latter body a short talk on the attractiveness of Autochrome portraiture by natural light out of doors or in the studio. While admitting that exposures ranging from 10 to 40 seconds were necessary in his experience for successful work, he nevertheless found that there were numerous graceful poses in which sitters found no difficulty in remaining motionless for such times. He advised that colours in the costume should be neither too dark nor too pale; light blue and mauve are especially to be avoided, whilst Japanese blue, dark green and bright red yield excellent results and a bright note of colour if used with discretion. He advised that direct sunlight should be avoided. Whilst in an open courtyard or garden an exposure of 10 seconds may be considered a normal one, 4 or 5 seconds will suffice on a sea beach, but in woodland surroundings, where the reflected light is predominantly green, 25 to 30 seconds will be necessary. M. Hervé gave these data as purely arbitrary and not in accordance with the indications of an actinometer. Yet in his experience they had proved a useful guide for relative exposures under different conditions. When using a lens of aperture *f*/10 or *f*/12, he would consider 20 seconds as approximately the normal exposure, which naturally could be greatly reduced by the use of modern lenses of larger aperture. A great deal of his work had been done, however, with a Dallmeyer lens of about *f*/10 aperture. He found it of advantage to make a pretence of exposing a plate in order to put the sitter at his or her ease through a long exposure. He found that sitters experience no difficulty in remaining still for the necessary length of time after having once or twice realised how long it was.

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COLOUR RENDERING IN THE SCREEN-PLATE PROCESSES.

The taking of photographs in natural colours has become a fairly simple matter, but if these photographs are to have any value from the commercial, scientific, or pictorial point of view, it is most important that the colour rendering should be a faithful one. Colour degradation is often very pronounced in colour transparencies, due not to inherent shortcomings of the screen-plate processes, but rather to the neglect of fundamental principles in the technique of this branch of colour photography, and it is thought that perhaps some notes upon the causes adversely affecting the purity of colour rendering, and some hints upon the prevention of colour degradation, may be of use to those who are not very far advanced in this branch of work.

The defect most frequently met with in screen-plate colour photographs is colour degradation, due to the effect of coloured light-rays emanating from near objects finding their way to the plate, where their action adds a local, or general, tint to the transparency, to the detriment of the colour rendering as a whole. This phenomenon must always be watched for by the colour photographer, yet many seem to be almost unaware of it, especially when the action of the coloured light has affected the whole of the transparency. Colour degradation is often regarded as inseparable from the screen-plate colour processes, and though this is to some extent correct, the defect can be prevented to a much greater extent than it is.

Some time ago I was photographing a flower study, as is my usual custom out of doors, using an Autochrome plate screened in the ordinary way. When the finished transparency was examined, I was surprised to find that over the lower half of the picture there was a decidedly blue tint. At first leakage of light round the filter cell, or some small pin-hole not previously noticed in the bellows of the camera was suspected, but subsequent examination showed that the transparency was not fogged, or locally over-donse, as would be the case in the affected portion if either of the possible causes mentioned was responsible. There was nothing in the composition of the picture itself that could have given the blue tint. I noticed that a pale-blue twill background that I sometimes use lay rolled up just under the base board of the camera, and it was afterwards found in such a position that when the Autochrome was exposed it reflected a shaft of coloured light across the lens of the camera, giving rise to the colour degradation referred to.

If the colour contrasts of the subject are inclined to be weak, or the colours are among those best described as indefinite, or are mixtures of the primary colours, there seems to be a tendency for the more difficultly-rendered colours to lose their purity; such as when photographing a sitter in a white or cream dress against a lawn or hedge of a pronounced green colour. More often than not, the flesh tones, or the colours of the dress, will assume a decided green tint, caused by the strong coloured light reflected upon these weaker colours, from adjacent surroundings that may, or may not, be included in the picture. At the same time, I must point out that unless very difficult subjects are being photographed, or those presenting great extremes of contrasts in colour, a full exposure will often prevent this possibility. The worst cases of degraded colours that I have seen were upon plates obviously grossly under-exposed, and I would further add that the possibility of colour degradation is far greater when brightly-coloured objects are close to the lens than when they are included in the composition itself.

The great secret of preventing degradation of colours through the cause mentioned lies in having the lens adequately hooded, to such an extent in fact, that all light-rays are cut off that are not actually needed to form the picture. Not only must the photographer be on the watch to prevent coloured reflected light from near objects from spoiling the purity of the colouring of his picture, but in these days of anastigmats made to cover larger plates mounted in shallow mounts and fitted upon modern cameras possessing only the minimum bellows construction, scattered light in the camera, reflected upon the plate, has a very bad effect upon the perfection and purity of the colour rendering. This possibility can be prevented by having the lens well hooded. Many colour photographers seemingly ignore this to their own disadvantage.

The lens itself is not often looked upon as having any real bearing upon faithful colour rendering, and any of the modern anastigmats by reputable makers may be regarded as beyond question in the matter of its colour corrections. The R.R. lens, particularly if an old instrument, may give rise to trouble, by reason of the fact that it will not be fully corrected. In colour photography, more than in any other branch of work, the lens should be so corrected that *all* light-rays are brought to the same focus. The old R.R. lens will probably be hardly corrected for red rays at all, but the more modern instrument of this type may be satisfactory enough. In illustration of the shortcomings of a very old, though otherwise satisfactory, R.R. lens, in the matter of colour correction, I may mention that I once possessed one of these instruments that gave curious purple tones in certain areas of a colour transparency, while in compositions

containing red, such as a landscape with a few flowers of this shade in the foreground, these were always out of focus in the picture.

Another cause of false, or poor, colours in screen-plate colour-transparencies may be traced to the use of an improper colour screen, or one perhaps that has altered in its tint, owing to too much exposure to bright sunlight. A few hours' exposure to bright sunlight upon the front lens of a camera is sufficient to alter the tint of the filter used for at least one well-known colour process, showing the advisability of using the filter upon the back half of the lens, where this possibility is avoided. While on the subject of filters, I may point out that a lens filter suitable in every way for ordinary subjects and conditions of lighting may under exceptional cases be quite inadequate in its compensating power, thus allowing an excess of violet or other rays to pass through. When dealing with subjects that contain an excess of one colour, it has been found a good plan to supplement the deficiencies of the filter by the addition of another. In the case of a snow scene, for instance, the ordinary Autochrome filter needs to be supplemented by another, such as a K.2, in order to prevent the excess of ultra-violet light reflected by the snow from degrading the latter. This is a case where the lens hood is essential in preventing colour falseness from the excess of light. When dealing with subjects that contain extremes of colour contrasts, it has been suggested, as a good plan for preventing colour degradations and excessive green tint, to insert a special filter, with a view to absorbing the excess of that particular colour, for a certain portion of the whole exposure. I cannot speak from experience of this method, but recently M. Schintz, at a meeting of the French Photographic Society, demonstrated the value of various filters that he had employed for the purpose of correcting any general blue-green tint ("B.J." Col. Supp., February 4, page 8). This idea seems to be well worth following out. The filters used for colour photography are certainly open to improvement, and the plan mentioned above seems to suggest a useful field for experiment.

There is still another often unsuspected cause of poor colours upon screen-plate colour transparencies. I refer to fogging of the plate by too much exposure to the dark-room lamp during loading or development. Most workers hold the plate far too near the lamp. I firmly believe that the light-rays from the lamp, shining through the colour screen upon which the Autochrome emulsion is coated while the plate is still highly colour-sensitive, is often responsible for the viridian tint that so many colour transparencies possess. Though an Autochrome plate has a decided dip in its spectrum curve in the region of blue-green, many photographers are far too prone to take liberties in this direction. In conversation with a colour photographer recently, he remarked that his transparencies always had a green tint and therefore were unfaithful in their rendering. He was in the habit of developing his plates in the dark room, by the Virida light, and I suggested that this was probably the cause of the trouble. He replied, No, because the plates were not fogged. Subsequent conversation and the examination of his results proved that it was over-exposure to the dark-room lamp, and nothing else, that was responsible for the defect. I would emphasise the fact that if an Autochrome plate is slightly fogged through holding its colour screen through too close or too long an examination against the light of the Virida lamp, the effect of this fog or veil will be a tint of the same colour. In other words, what would be a slight veil upon a panchromatic plate will upon an Autochrome be invisible in this character, but will appear after reversal as indicated. All colour plates should be kept at least 6 ft. away from the dark-room lamp, using only the *reflection* of the light upon the glass side of the plate in order to see which side is which when loading or commencing the development of plates. After development has well started it will be time enough to note its progress; when the plate will be no longer so highly sensitive though even then caution is necessary. I always advocate tank development of colour plates, when the exposures are known to be correct, using a reliable time and temperature system. The plates may then be loaded into slides or the developing tank in complete darkness; in this way the risk of gog is minimised.

ROBT. M. FANSTONE.

THE PRIZMA PROCESS OF COLOUR CINEMATOGRAPHY.

For the first time films in colour, prepared by a photographic process and ready to show in any cinematograph projector, have been exhibited. They are by the Prizma process, which has been in commercial operation in the United States for the past two years and was recently introduced to British exhibitors at a private view at the Alhambra Theatre, and, a week or two later, to members of the P.P.A. Congress.

It must be emphasised that the process is a triumph of cinematograph colour printing. That is its most distinguishing feature. At the Alhambra the colour films were continuously projected for two hours, and represented a very wide range of subjects, from Niagara Falls and the Kilauea Volcano of the Hawaiian Islands to the making of a fashionable gown. Yet we must confess that the very first film, one entitled "If," biassed us against the process. It represented studies of fruits and flowers alternately in monochrome and in the Prizma colours. We have rarely seen such bad monochrome films. With so much to its credit, it was a very great pity that the promoters of the process should have thought it necessary to better their case by disparaging the monochrome cinematograph version. In controversy it is sometimes advised that if you have a bad case—abuse the other side. The maxim is rarely a good one, and considering how much there is to the credit of the Prizma films, more was certainly lost than gained by adopting it.

The leading feature of the process is, as we have said, that the films may be hired ready for exhibition in the projector of any cinema theatre. They are shown like any black-and-white film without the use of rotating colour screens or other special appliances. Therefore, providing that the process is capable of recording the picture plays which form the staple of cinema exhibitions, it follows that we are on the threshold of a revolution in the making of the pictures which form the entertainment of thousands of people every night of the week, a change; in fact, from monochrome to colour. Unfortunately, the films which so far have been shown—or at any rate those that we have seen—do not supply proof that the process can be applied to the making of picture play films. On the contrary, it would seem that the process is not yet adequate for this purpose. In every picture play film there is rapid movement, if not of the figures as a whole, at any rate of arms and legs, in even the quietest of comedies or dramas. It is a common defect of cinematograph colour processes that rapid movements in parts of the subject are accompanied by a fringing of strong colours along the outlines of those moving parts, due to want of identity between images which should be identical. Hence we naturally looked for this phenomenon in the Prizma projections, and could not help being struck by the fact that where human figures formed part of the subject their movements were most deliberately slow; or,

alternatively, if they were ordinarily rapid, were accompanied by this distressing colour fringing. Thus it would seem that so far as the making of the negatives is concerned, the Prizma process is still susceptible of improvement as regards obtaining identity in the pairs of images which in the subsequent positive film require to be brought into perfect register.

But as regards the technique of printing the promoters are certainly to be most heartily congratulated on having proved the practicability of producing colour-printed films on the commercial scale. The process by which the result has been obtained is a most ingenious one, and is a variation of the additive screen-plate principle embodied in the Autochrome or Paget plate, but so contrived that in the course of printing the structure of the screen is eliminated. It is not possible to describe the process in a few words, and there is, in fact, no object in attempting to do so, since the particulars are given in the patent specification, No. 129,638, of Mr. W. van Dorn Kelley, published in this Supplement only so recently as December 3, 1920, p. 47. The process has evidently passed through several stages of development since the date of the original patent of Kelley and Raleigh (No. 22,921 of 1914. "B.J.," June 2, 1916, p. 319). We have from time to time noted its progress in these pages (e.g., "Colour Photography" Supplement, April 6, 1917, p. 14; February 1, 1918, p. 8; and May 2, 1919, p. 20). Since so much progress has been made, it seems reasonable to suppose that those responsible for the technical development of the process will be able to bring the negative making to the same pitch of commercial perfection to which they have undoubtedly brought the printing.

PRINCIPLES OF COLOUR PHOTOGRAPHY IN SIMPLE LANGUAGE.

In a recent issue of the "Kinematograph Weekly," among the technical notes contributed by Mr. Colin N. Bennett, appears the following article on the basis of the so-called additive and subtractive systems of colour photography. Mr. Bennett so lucidly describes what is a stumbling block to many in the apprehension of colour processes that we must not let pass the opportunity to find a place for his paper in our pages.

With the resuscitation of efforts to commercialise colour cinematography questions arise in our minds which normally would not trouble us. We hear talk of "three-colour," and may wonder why the number of colours is thus arbitrarily kept down to three. Occasionally an inventor will write of "four-colour," or of multi-colour cinematography, and we then feel tempted to surmise he has *ipso facto* gone one better than the mere "three-colour" man, and that he will in consequence be able to show on the projection screen many pretty intermediate tints, which the worker with three colours only must necessarily miss.

Anyway, we ask, what is three colour? And why *three*-colour, seeing that the colours of nature are infinite in their gradation of shade and tone? With "Kinemacolor" we even had a two-colour process which, while by no means true to nature, was "not so bad." Certainly it showed on the screen more colours than two. All this is rather puzzling even to the experienced black-and-white worker who has never had to tackle colour theory. It is made still more intricate by there being for each colour process, two-colour, three-colour, or multi-colour, two ways of building up the colour effects. One way is to use coloured lights, and this is called the Clerk-Maxwell or additive method. The other way is to use coloured dyes or pigments. That is the Du Hauron or subtractive method. Moreover, the projection or printing lights or colours used with each method are entirely different. The Clerk-Maxwell additive colours are spectrum primaries. The Du Hauron subtractive colours are "minus colours," or reciprocals of the primaries, inasmuch as they are the tints which remain on subtracting one or other of the single primaries from white light. Thus, the man who plunges into the middle of three-colour theory without preparing his mind by a little suitable working up to it need not be surprised if he feels like a student starting upon the sixth book of Euclid before studying the other five.

The key to the whole problem of three-colour is in the very beginnings of it, and those beginnings were never connected with colour photography at all. To understand three-colour and the allied colour processes one must approach the theory as it was originally approached, not as a problem of picture-making, but as the explanation of a function of the human eye. The three-colour theory was originated by Dr. Young, an English oculist, about the year 1820, and further elaborated by Von Helmholtz some six years later. There is no evidence that either one was a photographer, and it is even doubtful if either would dare claim to be the "inventor of cinematography."

The Young-Helmholtz three-colour theory, as it came to be called, laid down that though the colours of nature are many, perception of them in the human brain is brought about by colour-sensitive elements in the retina of the eye, which elements are primarily able to differentiate no more than three colour-sensations, namely, bright ruby red, green, and deep blue-violet. According to this theory, yellow exists in nature, and may be isolated in the spectroscope as a pure colour, but for the human eye to transmit the sensation of yellow to the brain it has to adopt the device of equally energising the red sensitive and green sensitive retinal elements. In the same way, a blue-green would be communicated to the brain as a combined energising of the blue and the green-sensitive retinal elements. Dim colours such as "sad" green and bronze, are communicated to the brain by slight and simultaneous energising of all three colour-sensitive retinal elements in different proportionate amounts, according to the colour of the object.

So now we begin to see where "three-colour" gets its name. It is an acknowledgment of the Young-Helmholtz hypothesis that, whatever the original colour may be we see it is as a ringing of the changes on the proportionate energising of no more than three colour-sensitive components of the eye, and that these nerves are sensitive respectively to red, to green, and to blue-violet.

Not until 1861 did Clerk-Maxwell come on the scene and give the theory its photographic turn. Then he propounded that, acting on the Young-Helmholtz theory, if you could make a negative photographic record by red light, another by green light, a third by blue-violet light, and if you could project positives from the three records, so made one over the other on a projection screen, using lights of the same colour as those by which they were taken, you ought to be able to get what *to the eye* would appear to be a complete reproduction of the colours of nature. Clerk-Maxwell worked out the three slices into which the spectrum should for preference be cut. He made up appropriate colour filters (or screens of coloured gelatine which, on passing light through them, would filter out the colours not wanted), and he actually succeeded in demonstrating that his idea was intrinsically workable in practice.

Du Hauron, coming some fifteen years later, was more lucky, for he lived and worked in the time of the early beginnings of orthochromatism, or colour-sensitive emulsion making. The Du Hauron principles are at the bottom of all those present-day methods of three-colour where the image is built up not by mingling of coloured lights, but by the super-imposition of coloured pigments or dye images. His way was to work down from white to black instead of up from black (darkness) to white. So, instead of using simple primaries, he took from white light one or other of the primary colours, and worked with the colour which remained as the result of withdrawing that primary. If you take from white light its red component you are left with blue-green. If you take from white the blue component you are left with yellow, and if you take from it its green component you are left with pink. And so in ordinary three-colour book illustration, or when building up a "subtractive" film picture having the actual colours visible upon it, instead of arranging that the red record image shall be projected by red *light*, and so on, you arrange that the red record negative shall have a print taken from it in minus-red, or blue-green colour, that the green record negative shall have a print taken from it in minus-green, or pink, and that the blue record negative shall have a print taken from it in minus-blue, or yellow. With the Clerk-Maxwell method we have explained that the three beams of primary coloured light are projected, so that the coloured light images come in super-imposition, but with the Du Hauron method the pink, the blue-green, and the yellow image are printed, or placed, in accurate register one on top of the other.

And here we may see why the Clerk-Maxwell method is called additive, while the Du Hauron method is called subtractive. For with the three-coloured lights, it is the addition of one light to the other which builds up intermediary tones, and finally it is the addition of all three light beams together in the requisite proportions which gives *optical* (or simulated) white light, whereas with the Du Hauron method things are just the other way about. The

light coming through the high-lights of the Du Hauron colour film is an actual unobstructed white, while its filtration through the colour images one after the other, layer on layer, successively subtracts from this white light primary colour after primary colour.

And about four-colour and multi-colour? If what has gone before is correct, more than three separate colour sensations should not be necessary to build up the optical effect of every colour in nature. Nor would they be if it were not for the fact that both the green sensitive and blue sensitive retinal element are slightly sensitive to other primaries than those which serve as their main excitants. Of these, the green primary colour sensation is by far the worst (or most mixed). In other words, the eye does not see even the purest green as a single colour sensation, but as a multiple, or white-diluted sensation. The equivalent to it in subtractive colour work is that greens on their reproduction are apt to be bronzed, or rendered with an overlying sheen of browny-red. Hence arise numerous efforts to get greater purity of colour reproduction by sub-dividing the spectrum into more than three parts. It is a departure from the Young-Helmholtz theory, and partial return to the Wollaston theory, in the interest of the technics of colour reproduction by photography. Similarly, the two-colour process of colour cinematography, commercially called "Kinemacolor," was an heroic and quite remarkably successful attempt to blend the separate green and blue colour sensations into one for the sake of photographic and mechanical simplicity. Except for the fact that in this way you had to say good-bye to pure yellow, to pure blue, and to any pretence of violet, it did pretty well.

In Du Hauron four-colour, as applied to book illustration, the fourth "colour" is usually not a colour at all, but a grey or "neutral" key impression, its function being to supply body and outline to the colour printings that blend with it.

COLIN N. BENNETT

MECHANISM OF COLOUR PROCESSES.

AT the Royal Photographic Society, on Tuesday evening last, Mr. H. S. Watkins, a member of the Richmond Camera Club, delivered a lecture in which coloured lantern-slide diagrams were used more profusely and effectively than has previously come under our observation for the explanation of colour phenomena and the rationale of processes of colour photography. Some years ago Mr. E. A. Salt published drawings which explained the mechanism of the Autochrome process in the most explicit manner. But Mr. Watkins has had the ingenuity and patience to prepare coloured perspective drawings, making clear the principle of subtractive colour printing, by no means the easiest thing to do. And in respect to the Autochrome and Paget screen-plate colour processes he showed a series of enlarged lantern-slides with the filter units appropriately coloured for the purpose of exhibiting the structure of these mosaic colour plates.

The latter part of a lecture, delivered at a high speed, dealt briefly with the practical working of the processes, and the subsequent discussion ranged round a number of points of manipulation.

Mr. J. C. Warburg described the method he preferred to adopt for developing Autochromes, viz., in a glass dish placed so as to allow of illumination from below momentarily by means of a pocket torch lamp fitted with a green filter. It was thus easy to follow the change of appearance from negative to positive as development proceeded, but a developer which partially desensitised the emulsion was necessary.

Mr. D. E. Benson, referring to the defect of most colour processes in records of green sensation, drew attention to the need of investigation of the degree of variation in the gamma of negatives with the wave-length of light.

Mr. Raymond Crowther spoke of the superior smoothness of small stereoscopic Paget transparencies as compared with Autochromes.

Mr. Luboshey said he always used the pyro-ammonia developer for Autochromes because he required to see what he was doing, and he believed the ammonia had the effect of desensitising the emulsion.

Mr. K. Hickman pointed out the extra blueness of screen-plate transparencies was due to some red transmission by the blue filter units. He recommended cementing the transparency and viewing screen in the Paget process with Canada balsam.

Mr. Colin N. Bennett mentioned that phenosafranine acted excellently as a desensitiser of Autochrome plates.

A remarkably fine series of Autochrome and Paget colour transparencies by Dr. Rodman, Mr. Nelson Clarke, and Mr. F. R. Newens was shown.

News and Notes.

TRIADOCHROME COLOUR PROCESS.—In the "Acton Express" of April 29 last we find a reference to a process of colour photography which has been invented by Mr. John Frederick Shepherd, of 10, Derwentwater Road, Acton, formerly official photographer with No. 8 Squadron in German East Africa, and afterwards sergeant-instructor at the Air Force School of Photography, Farnborough. Little technical information regarding the process is given, but it is to have the name "Triadochrome," a designation which perhaps may have something to do with the principle upon which it is based. It is stated that many fine examples of the process have been shown in the shape of prints, among them colour photographs of West-end shop windows and of fashion studies. It is further claimed that the process is of such simplicity that the ordinary photographer will be able to print coloured photographs straight from his own negatives.

AUTOCHROMES AT BOSTON, U.S.—Boston, U.S.A., was fortunate, indeed, when, on March 18, in Steinert Hall, Fred Payne Clatworthy, the well-known Autochrome specialist and landscape photographer, with a studio at Estes Park, Colorado, gave an illustrated lecture on Autochromes. Mr. Clatworthy has made, during the past eight years, a large number of notably beautiful Autochromes of scenery in the National Parks of California, Arizona, Colorado, and elsewhere, forming a collection of 5 x 7 Autochromes which he values at $10,000. On the occasion mentioned he projected, on a nine-foot sateen-screen, eighty 5 x 7 Autochromes selected from his large collection. They were principally of Southern California, the Desert, and the Grand Canyon of Arizona. These Autochromes were remarkable for accuracy of detail and colour, particularly the most delicate shades of purples, browns, blues and other predominant colours. The plates of the Grand Canyon were unusual on account of their delicate blue, obtained during the early morning and the late afternoon. Remarkable for extraordinary fidelity and beauty was a series of sunsets with the ruddy disc of the sun just about to disappear and, having gone, colouring in a fiery red the underside of a bank of clouds.

Mr. Clatworthy prefaced his exhibit by projecting the first successful portrait Autochrome made, in 1907, by the Lumières, of a prominent merchant of Lyons, France, which, on account of its remarkable accuracy of flesh-tints and the hair and beard of the model, evoked hearty applause. This valuable historical Autochrome was presented by Antoine Lumière, head of A. Lumière & Sons, to Wilfred A. French, Editor of "Photo-Era," on the occasion of the banquet given by the latter in honour of M. Lumière in Boston, November 1, 1907. Although the plate has been shown to friends many times, by Mr. French, its colours retain their original brilliancy, purity and fidelity. Then followed projections of 5 x 7 plates of flower-gardens, ocean-views, mountain-scenery, old Spanish missions, cacti and wood-interiors, in great variety and of surpassing beauty—each evoking hearty expressions of approval.

Mr. Clatworthy has been giving a series of illustrated lectures on Autochromes in the East—the Brooklyn Institute of Arts and Sciences; the Columbian University, in the Camp-Fire Club and other clubs, New York City; and the University and Museum of Fine Arts, Philadelphia. He considers the Autochrome plate as the ideal process of rendering simply and faithfully the colours of Nature, oil-paintings, water-colours and all objects in colours.—"Photo-Era."

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ON

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REMARKS ON RAYDEX.

Many failures in working this process, now successfully overcome, have taught the writer the mistakes usually made by novices. Raydex demands far more scrupulous accuracy in working than any other photographic process, with which I am acquainted, but, worked properly, it is absolutely reliable.

These few notes are written to supplement the official instructions, issued by the Raydex Company, in the hope that those who, up to the present, have not been successful, may be induced to give it another trial. We will therefore presume that the worker is all ready to commence operations with his three bromide prints, fully developed, fixed and washed, each on a separate piece of glass, standing on the work table within easy reach. The first step is soaking the colour sheets, and these should remain in clean water for four minutes after they have uncurled. Insufficient soaking at this stage makes the hot-water development difficult later on. Care should be taken to brush away airbells in this and the subsequent sensitising bath, as they give rise to insoluble spots on the finished colour positive. In all operations care should be taken to give all the colour sheets identical treatment, and, if we work in the order blue, pink, yellow, this order should be adhered to till the end.

When the soaking is completed, each colour sheet is pinned up to drain while the sensitising solution is made up. Trouble must be taken to measure out the two solutions *exactly*, and remember that chemical action between them starts at once, and therefore they cannot be made up until the moment that they are required. The first colour sheet (blue) is immersed in the sensitising bath, and, when cleared of airbells, pink, and finally yellow, may be put in, rocking the dish and turning over the sheets for the required time of sensitising, *i.e.*, two minutes. The whole secret of Raydex lies in the correct application of the colour sheets to their bromides, and the correct method is as follows:—

Remove the colour sheet with the right hand, coated side down, thumb on top. In this way it can be held firmly, but take care not to squeeze it, or it will be marked. Drain it from one corner for a few seconds, and take the glass holding the corresponding bromide in the left hand, fingers underneath, thumb on top ready to hold the colour sheet in position, once it has been applied.

Have a good flat squeegee ready to hand, lying across one corner of a dish containing clean water. The bromide is immersed, and at the same instant the colour sheet is slid under water, gripped in position by the left hand thumb, and the whole removed as instantaneously as possible, draining the water into a sink or a big dish placed conveniently for the purpose. Squeegee the two together, commencing from halfway down the colour sheet. Beginners at this process seldom realise how important it is to keep the water clear from colour sheet drainings. The solutions act very quickly, and even in a dilute form will gnaw away the half-tones, though the action is not visible on the bromide print. A good deal of practice with two pieces of paper is recommended in order to obtain the requisite dexterity in manipulation.

When all three bromides have been treated they are removed from their glasses in the correct sequence and superfluous moisture removed with blotting paper or chamois leather. They are then hung up for about twenty minutes. At the expiration of this time, the first colour sheet is separated from its bromide, the latter being placed straight away into clean water. The colour sheet is also dipped into cold water, and, held by both hands in a loop, is lowered on to the celluloid support and squeegeed lightly with a flat squeegee. The celluloid should then be placed on a hard, flat support—glass is excellent for the purpose—and the back of the colour sheet is most thoroughly dried with a roller squeegee and blotting paper. As soon as this is done it goes into the hot water. By the time the next colour sheet is ready for development the paper backing may be stripped from the first. Yellow is best developed by itself, but blue and pink may be developed together. Development is carried out by holding up the celluloids occasionally and draining off the soluble gelatine. In this development there are two important "don'ts."

(1) Don't always drain off from the same corner. The soluble gelatine partly protects the image underneath, and if we always drain from one corner the image would be perceptibly weaker in the remote corner. For this reason development in a vertical tank is not recommended.

(2) Don't have a lamp under the developing dish. The image under the heated part would be much thinner than elsewhere. The temperature can be raised by adding hot water from a kettle.

Frilling in development is caused by not having a safe edge round the colour sheet or by insufficient drying of the back before development. The remaining operations of Raydex are amply described in the firm's booklet, and it only remains for me to emphasise the necessity for a thorough cleaning between each transfer. Three applications of petrol should be made to make the transfer safe. I most cordially recommend the double transfer process, and those who have tried it will not willingly return to single transfer. There is one small point about double transfer, and that is to remember that the gelatine coating on the temporary support is very soluble and may be melted by the heat of the hands. For

this reason, when registering the second and third transfer, always endeavour to keep the hands off the image; and if this is impracticable, it is advisable to place a piece of paper between the fingers and the support.

It is only fair to Mr. Manners, the originator of Raydex, to state that all the foregoing information is due to him, and I feel that I should like to make some acknowledgment of the invariable help and courtesy I have always received at his hands. I am sure that other workers will experience the same.

H. E. RENDALL.

LIGHTING AND EXPOSURE IN AUTOCHROME WORK.

THE beginner in colour photography by the Autochrome process will not work very long without finding out how very important it is to give the correct exposure for each plate. Autochrome plates of necessity have a very thin film and consequently very little latitude in exposure. Correctness in this respect is of far greater importance than in any other branch of photography, since a slight error of a degree that would make but very little difference in the production of a good monochrome negative may be sufficient to cause the loss of the transparency in Autochrome work.

An exposure meter should always be used, preferably one of the Watkins or Wynne pattern, with a special dial adjusted to suit the needs of Autochromes, and the photographer should aim at great exactitude both in testing the actinic value of the light and also in giving the exposure indicated One of the peculiarities of the Autochrome plate is that in sunlight it gives a better colour rendering of the subject with very slight under-exposure, which saves the "burnt-out" or weak colours that are often in evidence with Autochromes taken in brilliant sunshine. When the light is weak, however, slight over-exposure will be necessary to produce correct contrasts. The meter makes a proper guide in this direction, and its reading should always be adhered to.

Some photographers I have met were under the belief that it is only possible to make good Autochrome pictures when bright sunlight is falling upon the subject, but experience has taught me that this is far from being the case; in fact, some of the best plates that I have ever taken were exposed in dull light. Also, a dull lighting tends to remove troubles from over strong contrasts in the lighting of the subject, since a dull or diffused light will be found to illuminate more evenly both shadows and high-lights. It must be kept in mind, however, that a dull light tends to soften the colours of the composition; but though this may be the case, the general effect, the delicate nuances and aerial perspective will be far better in their rendering, and possibly a dull light is what the pictorial colour photographer will choose.

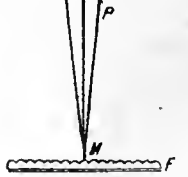
One fact must be kept in mind in connection with this. The Autochrome plate demands considerably more exposure between dull and bright light than is the case with ordinary plates, or, in other words, it is slower in dull light than under conditions of sunshine. This fact must be kept fully in mind when exposures are being made indoors; in fact, Messrs. Burroughs, Wellcome and Co., in their list of plate speeds issued for use with their "exposure calculator," give an indoor factor of 24, against an outdoor factor of 12 for Autochromes.

Under-exposure is fatal, since there is no cure for it; and this, in my experience, is the mistake usually made by beginners, and to which most of the failures in Autochrome work may be traced; and when the worker is in any doubt, more, rather than less, exposure should be given. An over-exposed plate will, of course, produce a thin transparency, weak in colours, though these may nearly always be restored by intensification. Some Autochrome workers always over-expose their plates, and rely upon intensification to bring the pictures up to the requisite quality. In my own experience, this is the only course when extremes of lighting compose the illumination of the subject.

Many workers using Autochrome plates are not perhaps aware that backing the plate with the white instead of the black side of the protecting card when in the dark slide reduces the exposure very slightly, an advantage when these slow plates are being exposed upon animals or objects liable to movement. I cannot say that I have tried this myself, so the exact extent that the exposure is decreased I cannot say from personal experience; and other workers with whom I have discussed the point seem more or less in doubt on the question. Dr. Lindsay Johnson, in his book "Photography in Colours," says the white card in contact with the film reduces the exposure to about three-fifths.

DYE-TONING IN COLOUR PRINTING.—A full patent specification, No. 160,137, by W. Van Dorn Kelley, inventor of the Prizma process of colour cinematography, has recently been made open to inspection before acceptance. It relates to the process of obtaining colour transparencies by bleaching the silver image and subsequently dyeing it. The silver image is bleached in a bath that will transform the silver into a compound which is not redevelopable by a reducing agent or developer, and then dyed in an acid or azo dye bath, which is mordanted only at the places *in situ* with the original silver. The silver image is first hardened by a formaline bath. The bleaching bath contains a copper or chromium salt or both. A bath instanced contains potassium bichromate, potassium bromide, copper sulphate, and hydrochloric or acetic acid. The image may then be treated in an acid fixing bath of hypo and sodium metabisulphite, or this may be done after dyeing. The dyes used are acid or azo dyes and ponceaus, fast reds, acid fuschine; and dyes such as used in wool dyeing, are instanced and give a choice of pure non-dichroic colours and a very transparent image. To brighten the colour a bath of ½ per cent. solution of sulphurous acid may be used. The process is used to obtain one or more of the component colour elements in a two- or three-colour photograph or cinematograph film. The components may be on separate films, or in separate coatings on one film, either on the same or on opposite sides.

A REFRACTING SCREEN-PLATE.—According to a recent patent, No. 158,511, open to inspection but not yet accepted, A. Keller-Dorian, Mulhouse, France, has claimed the following :—For colour photography there is interposed between the lens H and a plate F having a number of microscopic refracting elements M, a system of relatively inclined surfaces producing an interference spectrum. In the arrangement shown, a reflecting-prism P and optical flat L are used. Instead of being flat, the plate L may be slightly convex and touch the prism at the centre. Alternatively a set of thin reflecting-plates may be used, such as are obtained by the Lippman process.



TONING WITH METAL SALTS, PLUS DYES, IN COLOUR PROCESSES.

A REMARKABLE pink-toning process for the preparation of the red or pink component in a two-colour or three-colour assemblage method is described in a recent patent specification (No. 160,540) of W. Friese-Greene, J. N. Thomson, and Colour Photography, Ltd. The process is for use in colour-toning of one element of a resulting coloured photograph.

The term "foundation" as employed is used to denote any opaque or transparent negative or positive representation of the original object; and the purpose of the invention is to colour appropriately such a positive or negative foundation which has been obtained as the result of originally exposing a sensitive surface to the influence of light of one colour or one group of colours, and which is to be used as one coloured element in a two- or multiple-colour photographic process.

According to the invention, a toning solution comprises in admixture ferricyanide of potassium, nitrate of uranium, rose bengal, naphthol yellow, acetic acid and water together with iodine, and, in addition to or in place of the iodine, an isocyanine dye such as pinacyanol or Sensitol Red.

The invention further includes toning solutions in which the ingredients are in admixture in certain specific proportions.

It will be seen from the following description that some of the ingredients employed are dyes, whereas others are such as to have a chemical action by which the foundation is coloured in the required manner.

Two particular embodiments of the invention for the colour treatment of a foundation which it is desired to colour, broadly speaking, over a range of colours extending from yellows to deep reds are as follows:—

Ferricyanide of potassium	½ oz.
Nitrate of uranium	½ oz.
Rose bengal	¼ gr.
Naphthol yellow	¼ gr.
Iodine	¼ gr.
Glacial acetic acid	½ oz.
Water	40 ozs.

The rose bengal and iodine are together dissolved in 1 oz. of pure alcohol. The naphthol yellow is dissolved in 1 oz. water distilled, and these two solutions are then added to a solution obtained by dissolving the other ingredients in the 40 ozs. of distilled water.

In the second example the ingredients are present in the following proportions:—

Pinacyanol or Sensitol Red	¼ gr
Ferricyanide of potassium	½ oz.
Nitrate of uranium	½ oz.
Rose bengal	¼ gr.
Naphthol yellow	¼ gr.
Iodine	¼ gr.
Glacial acetic acid	½ oz.
Water	40 ozs.

It is not essential to the present invention that iodine be present, as it may be omitted entirely from the solution, but if it is present the above quantity is preferred.

It is preferred that the pinacyanol or Sensitol Red, rose bengal, with or without iodine, are together dissolved in 1 oz. of pure alcohol. The naphthol yellow is dissolved in 1 oz. distilled water and these two solutions are then added to a solution obtained by dissolving the other ingredients in the 40 ozs. of distilled water. For each ounce of solution used, add 10 drops of glacial acetic acid.

It is found that the solution described in the second example results in an improvement in the red colour tone obtained.

In either event, after the foundation has been toned with one or other of the above solutions according to the nature of the foundation, it will then be fixed by treatment in the following solution:—

Hyposulphite of soda	½ oz.
Metabisulphite of potassium	60 grs.
Water	20 ozs.

The above toning or colouring solutions are given as examples for the treatment of a foundation obtained as the result of originally exposing a sensitive surface which has been rendered specially or mainly susceptible to red light-rays; that is to say, the negative (or the positive) produced under these conditions will be acted upon mainly by those portions of the object, or by those objects, constituting the subject of the picture from which red colours, or the warmer-toned colours, emanate. Moreover, the solution is particularly applicable in those cases where a normal exposure under good light conditions has been made. The relative proportions of the ingredients in the solution will, however, be varied to suit the varying conditions under which the original exposure may have been made.

The resulting colour of a foundation treated with the solution above described will be generally, in normal cases, in the region of a rose-pink colour and can be used in a two-colour process in conjunction with companion foundation, to be superimposed in register upon it and coloured generally a blue or bluish-green.

It can also be used in a multi-colour process with other appropriately-coloured and superimposed foundations.

COLOUR PRINTS BY COPPER-MORDANT DYE-TONING PROCESS.

THE specification of a patent, No. 147,005, recently granted to Dr. Arthur Traube, relates to the process of dye-toning by means of a copper-mordant for the production of colour prints and transparencies. The original application, in Germany, under the International Convention, was made early in 1916, since which time working details of closely similar processes have been published by Mr. F. E Ives. Dr. Traube, it will be remembered, was the originator of the "Diachrome" dye-toning process, in which the mordanting substance was silver iodide. Apart from his present claim, his specification is of interest for its references to earlier work in the same field.

There is a known process for converting silver pictures into coloured pictures by application of organic dyes. Silver iodide is the best silver compound for the purpose; after the picture has been dyed with basic dyes it is fixed by an operation which removes the silver iodide and leaves a picture in dye only.

This separation of the silver iodide and the fixing of the dye in the form of a lake impairs the definition of the picture. By this invention it is possible to make a coloured picture from the silver picture, which, besides being highly transparent, has an undiminished definition.

It has been proposed (Patent No. 3,666, of 1915, "B.J.," Feb. 18, 1916, p. 103) to tone silver pictures with vanadium chloride and to colour with a basic red dye the yellow picture obtained. This process is only described for obtaining a complementary colour to bluish-green, but not for other colours, the latter being produced by inorganic toning without using organic dyes, the use of which would be in fact impossible. The present process allows the use of all basic dyes of every tint. It has also been proposed (Patent No. 10,893, of 1904, "B.J.," March 31, 1905, p. 254) to tone silver pictures with manganese salts and colour the obtained picture with aniline hydrochloride. The latter is not a dye, but an uncoloured chemical compound, the colour is produced by a chemical conversion of the aniline by the action of a manganic salt.

In the present process a similar chemical process cannot exist. Even if other manganese salts be used (Patent No. 21,584, of 1906, "B.J.," April 12, 1907, p. 275) the colours are produced by chemical interaction. The pictures with manganese compounds are only suitable for paper pictures, not for transparent three-colour pictures.

It is found that pictures made by toning the silver picture with copper consisting of already coloured silver double salts with copper, may be dyed with organic, basic dyes, the original colour tints being changed in any desired direction.

In particular, copper-toned pictures, which contain copper ferrocyanide as colouring matter, may be dyed strongly in this manner with organic dyes, the peculiar red-brown colour of the copper toning being suppressed by the majority of the applicable dyes, the colour of the latter prevailing exclusively in the picture. In consequence of this abnormal capacity of copper ferrocyanide for being dyed, the silver picture must be kept quite thin and soft if it is to be sufficiently transparent for projection purposes. The dyeing may be complete in about five minutes in dyes solutions of 1 : 1,000. The copper picture necessary for obtaining a powerfully coloured dye picture is so thin that separation of the copper compound is superfluous. At the same time, the definition of the original silver picture remains undiminished, and this basic picture which is dyed by the dye may remain in the finished picture.

The transparency of the coloured copper picture is very high. It may be still increased if the silver ferrocyanide, simultaneously produced in the action of known solutions, is dissolved by means of a weak soda fixing solution; the coloured copper picture is in no way affected thereby. When the silver salt is not separated, pictures of highest transparency and purity of colour may be made by coating the layer with a varnish, for example, a solution of dammar in benzene.

By way of example: After the silver picture has been converted into a copper-toned picture, it is dyed in a solution of methylene blue (1:1,000), advantageously containing some acetic acid, until the back of the plate shows that the picture is dyed through.

For projection pictures this happens on the average in five minutes. For thicker pictures some minutes longer are required. A short washing of the picture follows, to separate the excess of dye stuff from the gelatine layer.

It may be remarked that the process is very suitable for making pictures in natural colours by the three-colour principle; they are remarkable for their brightness, high definition and transparency.

In a later patent, No. 147,103, of Dr. Traube's, the use of the following classes of dyes is claimed in conjunction with the copper-mordant process. Thiobenzenyl, thiazines, pyronines, safranines, oxazines, and acridines.

INVENTORS' REWARDS IN COLOUR PHOTOGRAPHY.

A CERTAIN strain of thought which runs through the following appreciation of the French inventor, Ducos du Hauron, by Dr. D'Arcy Power in his magazine, "Camera Craft," is worth emphasising for the benefit of those attracted by the possibilities of invention of colour processes. Dr. Power stresses the slight rewards which pioneers in photography have obtained. It is a common fate, not in photography only, and particularly in colour photography. It arises not only from the conditions of our civilisation, but from the failure on the part of most experimenters to recognise the gulf which separates first an idea from its successful experimental accomplishment, and then, again, this latter from commercial success. In colour photography especially, this road from beginning to end bristles with obstacles, yet inventors as a rule ignore them, or see them through rose-coloured spectacles. Therefore, while it is far from our wish to discourage experiment, we are confident that we are giving good advice when we say: Count the cost; expect nothing; if anything comes to you, pocket your windfall and be thankful. But unless you have large backing, and can afford to be indifferent to money losses, forget your invention as a money-earning scheme. As an occupation for your leisure and surplus cash it will give you much happiness; as a financial speculation, the chances at Monte Carlo are to be recommended in preference. Within our own experience there have been many instances where this advice first has been ridiculed, and its value admitted after a few years.

The history of inventions is usually a tangled skein of ideas and experiments leading over devious ways to the final results, and when we state that this man invented the steam engine, this man the telephone, and that man the aeroplane, we usually are referring only to the final perfection.

In the history of photography something of the same sort is manifest, and yet more than in other cases it is possible to put our finger on certain names, and say without much contradiction, these are they who have made possible what we now possess. If we go back nearly a hundred years, we may point to Nicephore Niepce, and say, "Here is the man who first made a photographic image and laid the basis of photo-engraving as we practise it to-day"; to Daguerre, and say, "Here is the man who gave us photographic portraiture"; and when we speak of Louis Ducos du Hauron, even more emphatically may we state that to him almost alone we are indebted for the whole development of colour as a part of photographic processes.

It is an interesting fact that, whatever may be the doubt in regard to the history of discovery, that of discoverers is in no such obscurity, and one of the most notable things is that very few of them have personally benefited by their work. These thoughts arise on reading of the death of Ducos du Hauron, who died recently in great poverty in France. When we think of the enormous capital and profits realised from photo-engraving, and learn that Niepce's son was only too glad to receive from the French Government a miserable pension of three hundred dollars a year for his rights; that Daguerre was content with very little more; and that Ducos du Hauron, with a contribution to practical science and wealth production that is covered by the whole field of three-colour printing, Lumière plates, Paget plates and all the modifications of these that are yet to come, was given the starvation sum of two hundred and forty dollars a year, we have ground for believing that public appreciation and justice, in so far as inventors are concerned, is rather diminishing than otherwise.

What was it that Ducos du Hauron did? As a young man of twenty-five, back in the early sixties, he perceived that the only way in which the problem of photography in natural colours could be solved was to analyse the luminous image, register the different coloured rays, and, by their re-combination again, form a replica of a natural object. Whether this were to be by mixing the rays themselves, as we see in the Ives chromoscope, or by superimposing three colour images, as is done in three-colour half-tones, or by superimposition of coloured films, as in the Sanger-Shepherd transparency, or by the many modifications of these fundamental methods, or lastly, by the entirely successful intermingling of colour elements, as seen in the Lumière Autochrome, the Dioptochrome and the Paget colour plate, the ground principle is the same, and Ducos du Hauron not only laid this down as a basic theory, but foresaw the various way in which it was to be ultimately applied to give us the practical methods of to-day. Every inventor from that day to this has worked on his basis, and yet he himself was hardly known, even to the average photographer, and his reward was neglect and poverty. We have shown what the Government did for him—the manufacturers who realised their great profits did, it is true, throw him a pittance from time to time; but the fact remains that he died a poor, almost hungry, old man. If it be asked how such a condition was possible, we have to reply, for two reasons: his thought preceded the conditions that could make it practicable, for, while he demanded colour-sensitive emulsions, there were none available at that time; secondly, he had no commercial ability, nor the persuasiveness to induce those who had the capital to use it in the development of his ideas, nor had he protected them from those who ultimately exploited them. In this he but repeats the story of inventors in many other fields. If there be one thing which is demanded in justice to the men who think out the future, and to the benefit of society at large, it is that the present system of patenting, or the present patent laws, be revised, and that the State be obligated to help those who are developing useful ideas, and to reward those who can demonstrate their claim to prior invention, whether the commercial application has been brought about by themselves or others. Lastly, we have to thank Ducos du Hauron for laying down the principles of the motion picture, whose final perfection in colour is again a product of his prevision.

The details of his life are unimportant to us, but its results are a stimulus to every serious worker in photography, for the problems of the present and the possibilities of the future are no less alluring than the successes of the past.

CLOUDS IN AUTOCHROMES.—It is generally known that one of the weak points of the Autochrome process lies in its rendering of cloud effects, and very few indeed are the transparencies seen with really good sky renderings. Of course, this is largely caused by the smaller margin of latitude in exposure allowed by the Autochrome plate. Cloud formations, when very distinct, may sometimes be retained if a very exact exposure is given, and if care is taken not to develop the plate too far in the first bath, the requisite density and brilliancy of colour in the transparency being obtained by intensification. This plan, however, is more or less risky. A good way of preserving cloud forms is to paint over the sky portions of the plate with 10 per cent. potass bromide solution, using a sable brush very lightly charged with the solution. This should be done before the time of development as a whole is half complete. This is not an easy matter in the dim Virida light, though it should be remembered that by the time development has reached the stage mentioned the plate has lost much of its sensitiveness, and no harm will result if quite a bright light is used, provided the plate is not held too near. This method applies only in part to sunset sky effects, when, as a rule, the exposure is made with a view to including the clouds only, the landscape as part of the subject being of little importance, its effect being for the most part suggestive, as a silhouette foreground. Yet this must not be overdone, or an untruthful effect will be produced. Unless the landscape foreground is a very open, distant one, no details of it should be hoped for, since the quality of the sky effect would of necessity be sacrificed. In sunset sky effects, compromise with regard to exposure could be productive of successful truthful, or even convincing, results, and the usual exposure rule should be reversed to suit the case, viz., "Expose for the high lights, and let the landscape take care of itself."—R. M. F.

No. 176. VOL. XIV. JULY 1, 1921.

THE BRITISH JOURNAL OF PHOTOGRAPHY

MONTHLY SUPPLEMENT

ON

Colour Photography.

CONTENTS.

COLOUR CINEMATOGRAPHY BY ADDITIVE PROJECTION.

[A recent patent specification, No. 156,980, of Mr. E. C. S. Parker describes the details of an instrument serving for both the taking and projecting of two-colour or three-colour cinematograph film-pictures. The two- and three-negatives (impressions from which are afterwards united) are taken simultaneously.—Eds., "Colour Photography Supplement."]

The cinematograph film—hereinafter for convenience called the "film"—is commonly made of some standard width. The width of the picture is somewhat less than the width of the film itself. The height of the picture, measured in the line of travel of the film, is equal to the extent of forward movement of the film at each projection exposure. Projecting machines are commonly built to operate a film of standard width over a certain distance at exposure. To illustrate, at the present time films are usually made 35 millimetres, and the pictures thereon 25 millimetres in width. The height of the picture is 19 millimetres, and the extent of movement of the film at each projection exposure is the same.

It will be apparent that given unit film area and projecting machines built in accordance therewith, changes either in the width of the film or in its extent of movement at each exposure will require changes in the projecting machines, which for economic reasons it is desirable to avoid.

The first condition of the problem is that the film width and its extent of movement—or, in brief, the unit film area—must be kept unchanged.

The second condition is that there must be produced on the film the largest possible picture—or, in other words, the whole unit film area must be utilised.

The third condition is that the final picture projected on the screen shall result from a recomposition of several pictures of the same object simultaneously, and not successively, projected.

The fourth condition is that the projected picture shall be in natural colours.

The fifth condition is that the apparatus, which used as a camera produces the picture on the film, may also be used as a machine for projecting the pictures.

The sixth condition is that the optical parts of the apparatus, namely, the lenses or prisms and the light-filters, shall be stationary.

The seventh condition is that the parts of the apparatus shall be few, simple, easily adjusted and inexpensive to manufacture.

All of these conditions (it is claimed) have been met by the invention which comprises first the simultaneous production of similarly deformed pictures of the object side by side upon each unit area of the film, and then the simultaneous projection of deformed pictures through a deformer to reconstruct the final projected pictures in normal proportions. By interposing light-filters of different colours in the path of the light-rays which produce the deformed pictures, and projecting the deformed pictures through similar light-filters, the projected pictures are also reconstructed in natural colours.

In carrying out the invention the deformed pictures show the object as of reduced width but relatively unchanged in height. They are disposed side by side transversely across

Fig. 1.

Fig. 2.

Fig. 8.

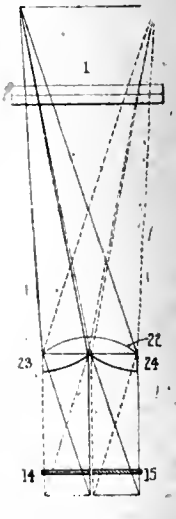


Fig 9.

the film and each picture is modified to transmit light rays of a different colour.

It has been proposed to reduce the size of pictures on cinematograph films, either in the transverse or longitudinal direction, to half the size of those at present in use, with the object of decreasing the cost of production of such pictures, and this has been effected by the introduction of cylindrical lenses or by one of several prisms into the optical system; each unit area of the film thus contains two different pictures, allowing two or more different subjects to be pre-

sented on a single film of normal dimensions, which partial images on each unit area of the film obviously could not be used for re-constituting a single projected picture in natural colours. In the present invention two or more deformed pictures of the same object are disposed side by side on the film and the two or more deformed images are simultaneously produced and simultaneously projected.

In the drawings—fig. 1 is an optical diagram, showing the apparatus arranged to produce two pictures simultaneously upon the film and to reproduce the pictures as a single picture in colours on the screen. Fig. 2 is a similar diagram of the apparatus arranged to produce three pictures, and to reproduce the same in like manner. Fig. 3 is a perspective view of lens 1. Fig. 4 is a perspective view of one of the lenses 2 or 3. Fig. 5 shows a portion of a film on which is a single picture of the object (here the letter X) photographed in the usual way, with relative dimensions unchanged. Fig. 6 is a portion of a film on which are two pictures of the object, of which pictures the height is unchanged but the width is reduced one-half. Fig. 7 shows three pictures, with their

Fig. 3.

Fig. 4.

height, as before, unchanged, but their widths reduced to one-third.

Fig. 8 is an optical diagram similar to fig. 1, showing a modified form of apparatus. Fig. 9 is an optical diagram, as before, showing another modification. Figs. 10 and 11 illustrate certain lenses of the apparatus of fig. 9. Fig. 12 is a modified arrangement of the dividing lenses of fig. 9 to produce three pictures, and fig. 13 shows a mode of producing the lenses of fig. 12. Fig. 14 illustrates a portion of a completed film as produced and projected.

Similar numbers of references indicate like parts. 1 is a

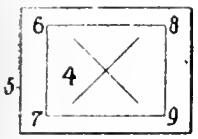


Fig. 5.

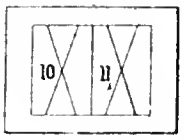


Fig. 6.

Fig. 7.

double convex cylindrical lens, 2 and 3 are similar lenses but of less width, placed parallel to one another and perpendicular to lens 1, as shown. In fig. 5 there is shown a single picture 4 produced on the film 5 in the usual way. The optical field is represented by the area 6, 7, 8, 9, which contains the object here represented by the large letter X.

The area 6, 7, 8, 9 is termed for brevity, the "unit film area." With the lenses disposed as stated, the light rays from the object will be divided into two pencils or groups, one of which will produce the picture 10 and the other the picture 11 on film 5, as shown in fig. 6. The height of the object in these pictures is the same as in the picture 4. The width of each object is reduced to one-half the width of the picture 4. The width of each object is reduced to one-half the width of the picture 4. Consequently the two pictures 10, 11 unitedly occupy exactly the same unit film area as does picture 4. The width of film 5, therefore, remains the same, the extent of movement thereof at each projection exposure remains the same, and the same projection machine will project the two pictures simultaneously upon a screen.

If three lenses 2, 3 and 12 are used, as shown in fig. 2, then three pictures 10, 13, 11, fig. 7, will be produced on the film in the same unit film area, but, of course, reduced in width to one-third of that of picture 4. And so, generally, we can add to the number of similar dividing lenses as we may desire, thus increasing the number of pictures in the same unit film area as that covered by picture 4.

All of these multiple pictures are deformed—here reduced in width—in the same way and to the same extent. All are produced simultaneously, and all are projected simultaneously. All—no matter how many their may be—occupy the same

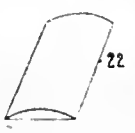


Fig. 10.

Fig. 11.

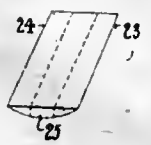


Fig. 13.

unit film area. The individual pictures of the group within the unit film area are motionless with respect to one another.

In order to project the pictures of a group occupying the unit film area, the projecting light-rays are first caused to traverse the pictures and then pass through the lenses, thus reversing the former direction of the rays from the object through the lenses to the film. The two deformed film pictures will thus be again deformed, and so caused to reconstitute the single picture of the object, as shown at 4, in normal relative proportions.

In order to cause this single picture to appear in natural colours, there is interposed in the paths of the rays light-filters 4, 15 of different colours. Thus filter 14 may be red glass and so cut off green rays, and filter 15 may be of green glass to cut off red rays. One of the pictures 10, 11 will, when traversed by the projecting light, stop out the red rays at certain parts, with the result that the final single picture on the screen will appear in natural colours as closely as can be approximated by the reproduction of the reds and greens in the object and their combinations. When the third lens 12 is added, a third light-filter 12* of some other colour—say blue—is supplied. The resulting screen picture will then reproduce these three colours of the object and their combinations. As each picture of reduced width, in the unit film area, gives the whole optical field of the object—more or less narrowed—it will be apparent that the greater the number of pictures produced in the unit film area, the greater the number of light-filters also used; so that the number of colours may be increased, and in this way the final single picture may be caused to reproduce with increasing accuracy the colours of the object.

As the pictures on the film will be negative, they should be changed to positive in the known way before projection.

The apparatus described may be modified in various ways to produce the same results. In the form shown in fig. 8, in addition to the double convex cylindrical lens 1, a single

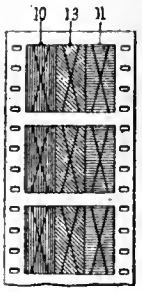


Fig. 14.

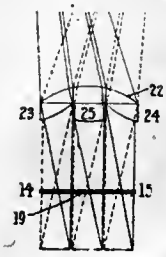


Fig. 12.

cylindrical lens 2 is used, in rear of which are two prisms 16, 17, with their corresponding edges opposed and separated by a gap 18. The rays passing through the portions of the lens overlapped by the prisms are deviated thereby, while the remaining rays pass directly through the gap 18 to the light-filter 19. In the paths of the two outer pencils,

there is disposed prisms 20, 21, which deviate the pencils and direct them respectively through the light-filters 14, 15. Here three narrowed pictures are produced on the film, which are projected as a single picture in natural colours upon the screen in the manner already described.

In the form shown in fig. 9 a plano-convex cylindrical lens 22, fig. 10, is employed to the plane side of which are cemented two lenses 23, 24. These lenses are alike and are produced by dividing a plano-cylindrical lens, as 22, into two longitudinal half sections on the dotted line as shown in fig. 11. The lenses are placed with their edges abutting as shown in fig. 9, each lens then covering one half of the plane surface of lens 22. The light from lens 1 traversing the lenses 22, 23, 24 will then become divided into two groups or pencils of rays, and hence, as before, will form two narrowed pictures on the screen. The light-filters 14, 15 are placed as before, and the operation of the apparatus is the same as already described.

In fig. 12 is shown a modification of the dividing lenses of fig. 9. To produce these, the lens 22 is divided longitudinally (fig. 13) into three sections 23, 24, 25, and the section 25 is placed, as shown, between the sections 23, 24. The rays are thus divided into three groups, and traverse three colour filters 14, 15, 19 to produce three narrowed pictures on the film.

Fig. 14 represents a portion of the completed film with three groups I., II., III. of three pictures. The film is fed through the projecting apparatus in the usual way—the group II. succeeding the group I., the group III. succeeding the group II. and so on. The colour rays which the differently light-filtered picture of each group will allow to pass when projected are indicated by vertical, diagonal and horizontal line. Thus the pictures 10 will allow only red rays to pass (vertical lines), the pictures 13 only green rays (diagonal lines), and the pictures 11 only blue rays (horizontal lines). Hence when the film is fed onward a red picture of one group is followed by a red picture of the next group, and so on for the other colours. It will, therefore, be evident that the colours on the screen are not produced by the superposing of different coloured pictures belonging to different groups and requiring a feeding movement of the film to effect this; but that, on the contrary, the pictures of each group are simultaneously projected to produce the final coloured picture.

The pictures of each group occupy the unit film area—the same as occupied by a single picture 4, fig. 5, produced in the ordinary way. No increase in the length of the film over that normally used for such single picture is, therefore, required. No change of any kind is made in a standard film adapted to receive single pictures, or in the mechanism in common use to project such a film. In event of breakage of the film, there is no more possibility of error in rejoining it than in any monochrome single picture film. The relative position of the several pictures 10, 13, 11 forming a group is invariable, so that there is no way of displacing one with reference to another and so throwing out the synchronisation, as inevitably takes place when breakage occurs in films where the constituent colour pictures are successively superposed upon the screen. Finally, but one shutter is required.

PICTORIAL PHOTOGRAPHY IN COLOURS.

Many workers regard colour photography only from the purely technical or scientific point of view, and few indeed are the transparencies or colour prints seen in the exhibitions that possess any great value as pictorial photographs, or indicate that their producer has endeavoured to infuse any artistic feeling into his productions. Certainly here and there we do find exceptions to this almost invariable rule, but the fact of the matter is that the practice of colour photographic processes may be traced almost entirely to an interest in the technical side, followed possibly by a fuller realisation of the value of good technical colour photography applied to some scientific branch of work very far removed from the artistic, which perhaps appeals only to the few. Another reason for this fact is that the photographer who works from purely æsthetic motives has not often the requisite technical knowledge or the inclination to acquire it, that is essential to successful colour photography. At the risk of entering upon a controversial topic it may be said that many embryo pictorialists seek to produce pictorial photographs before they have fully mastered the technique of their craft, and many of their results show technique so manifestly bad that the photographs produced actually give far less æsthetic pleasure to some than do the really beautiful technical photographs by a skilled commercial worker. This is a digression, but I think that such is necessary in order to point out that in attempting pictorial photography in colours successfully a sound knowledge of photographic technique in general is an absolute essential. The other aspect of the subject I propose to deal with very briefly in the following paragraph.

The photographer who has a grasp of pictorial precepts and has made some essays in the production of photographs that are distinctive in their conception and treatment will find upon attempting to express himself in colour, that he has different ground to cover, much to learn, as well as much to unlearn. As photographers we are so intent upon viewing our pictorial compositions through a mental vision that is devoid of colour considerations that the reverse order presents considerable difficulties in practice. Frequently we come across subjects, very attractive in themselves, that are quite impossible as monochrome simply because their appeal lies in the subtlety of their colouring. It might be thought that these are the ideal subject for representation by colour photography, but this is certainly not the case. Rare indeed are the occasions when a subject has been passed over as a monochrome composition, will it for the same reasons be ideal as a subject for a fine colour picture. Often it will be found that if a subject is attractive in monochrome it will also be of value for colour photography, always provided that it does not cover too large an area. The distant panoramic view is no more likely to be successful as a pictorial colour photograph than it would be as a monochrome subject; in fact, in this latter case the chances of success are all the greater, since hand work may be introduced, or combination printing may be adopted, with a view to putting in some foreground object that would "throw back." The distance of such does not conveniently come within the angle of the lens at the time of exposure.

The ideal subject for pictorial representation by colour photography must be discovered by every worker for himself, since only very general rules can be given. Care must also be taken in selecting the material for colour compositions, not to overlook the technical demands of the process, since the production of perfect work will depend to a very great degree upon the technical quality, no matter how attractive the subject itself, which may be beyond the capabilities of the process employed, for reasons too lengthy to be entered upon here. In regard to the pictorial aspect, one or two main points may be indicated as essential.

Both the subject itself and its composition should be simple, that is to say it is better to concentrate attention upon a single tree or bush of distinctive contrasting colours than to include in the composition a sketch of woodland of varied

hues. An area of a few yards will often furnish a more distinctive colour picture than some vista of beautiful colouring, no matter how satisfying to the eye this may be. Colour photography cannot express in a few square inches what in nature occupies perhaps several hundred thousand feet in extent: the reduction of each individual spot of contrasting colour is so great that unless very brilliant or distinctive the contrast cannot be as strongly emphasised as it is in the original. In cases like this the most satisfactory course will be for the photographic pictorialist to take some part of the composition, such as the effect of light, or colour contrast, upon a bough or group of flowers and foliage. If the worker will consider this carefully, he will, I am sure, see the force of this argument, also bearing in mind that old dictum pressed upon the beginner in pictorial photography, about the part being greater than the whole. Of all the failures in colour photographs, from the pictorial standpoint, most could be attributed to the photographer attempting what is obviously more than his medium is capable of producing satisfactorily, while of all the colour photographs produced and exhibited during the last few years those depicting quite simple subjects have been more consistently successful than those that attempted to portray large expanses of landscape, such as a painter would immortalise upon a large canvas. For this reason, a simple study of still life or a simple, though studied arrangement of flowers of contrasting colours, is often far more attractive as a colour-photograph than a landscape subject, and this class of work is ideal for pictorial photography in colours. I may mention that this branch of the subject was dealt with at some length in an article published in the "British Journal" "Colour Supplement," November 5, 1920.

The colour photographer seeking pictorial compositions will have another distinct point to keep before him. When producing monochrome photographs, only "form," and, to a lesser degree, tone, in rendering the contrasts and colours of the subject has to be considered, but in colour photography, from the pictorial point of view, there are also in addition to the lines forming the picture, the harmony, contrast, and balance of the colours composing the picture, which will have a very decided bearing upon the success of the work from the artistic point of view. Monotony in any form is to be avoided, such as would be produced by large expanses of the same colour, with no contrast or the relief afforded by other colours, or even by lighter or darker shades of the same. Many landscapes, for instance, are composed simply of tones of green. In Nature, of course, there is plenty of contrast in such expanses, but when reduced down to the modest dimensions of a colour plate, such pictures are apt to give an "all-over-one" colour effect, if the term may be coined. That is unpleasing and monotonous in the extreme. Only last summer I was seeking for colour subjects along the banks of a disused canal and several quite good compositions had to be passed over for this reason. I then came upon a group of weeds (the name of these I am not enough of a botanist to know) blossoming in spikes of reddish-pink, combined with yellow coltsfoot, and though these occupied quite a small area in the composition they were sufficient to produce the required colour contrast and relieve the monotonous effect. Figures also help a landscape, and, if introduced, care must be taken to see that on the one hand they assume sufficient prominence, while on the other the mistake must not be made of over-emphasising the presence of the figure. A touch of colour may often be supplied by the introduction of a figure, and for this reason all models should wear bright and distinctive coloured clothing, such as will photograph well.

The pictorial colour photographer will do well not to neglect a careful study of the masters of painting, both new and old. I mean, of course, those who paint with fidelity to nature; and though some geniuses may appeal to the imagination of some with lavender sunsets and effects never yet seen by the vision of normal man, these are useless for our purpose. The value of a careful study of the old masters is difficult to over-estimate, since it brings a good idea of form and composition, a sense of colour and decorative design, which cannot but assist the photographer to a very great extent in seeking beautiful subjects.

Enough has been said to show that though the production of pictorial photographs in colours is not an easy matter, and not to be approached without a very considerable self-culture and education in artistic principles, there is a real possibility that, given care in the selection and treatment of the right kind of subject, works of the highest quality and of great beauty may be produced. Few of the best known of our pictorialists have seemingly credited the colour-photographic processes as of much value as a means of expressing the beauties of nature, and, as before pointed out, there is certainly room for a decided improvement in the pictorial quality of much of the colour work shown. Perhaps some pictorialist of the artistic cult will exercise his skill and discrimination in the pictorial side of colour photography and let us see something really worth while.

ROBERT M. FANSTONE.

News and Notes.

IMPROVING AUTOCHROMES.—It may interest colour workers to know that Autochromes which are weak and lacking in brilliancy can often be greatly improved by binding them up with a second colour screen, instead of the usual piece of plain glass. These I have obtained from old and useless Autochrome plates by simply washing off the positive, or film, under the hot-water tap. The layer containing the starch granules does not run, and when dry it is bound up, film to film, with the Autochrome. The positive is thus sandwiched between two colour screens. The result is a more granular and denser rendering than the original, but the colours are more intense.—L. M. LEVENTON, L.R.C.P.S.I.

COLOUR CINEMATOGRAPHY.—The daily papers have been telling us of a new process to be worked by Mr. J. Stuart Blackton. The "Star" man tells us in his report that "It may not be generally known that every dress worn by film artists has to be designed for colour most carefully. The light pinks, blues, greens, mauves, etc., may all photograph alike; but if the colour scheme is wrong in the dress, the result on the screen would be blotchy. Unless one has actually seen these dresses in the studio, one can have no idea of their beauty. The colour schemes will no doubt have to be slightly altered, but that will be an easy matter. The producer to-day knows what effect he wants to gain, and he has to blend his colours accordingly, often using colours different altogether from these he has in his mind. In the new colour photography this arrangement will be unnecessary. To give an example. A butler, or waiter, will wear the regulation outfit in the new film. In the studio to-day he looks a weird individual. His shirt front is khaki, so is his collar; so are his cuffs; so is his serviette. Dead-white material sets up 'halation'—a glittering effect—yellow photographs white. Our natural colours are far richer than those in America, and better results should be obtained."

DIRECT COLOUR PHOTOGRAPHY IN MEDICINE.—The demonstration of coloured lantern-slides at the Section of Dermatology of the Royal Society of Medicine (says the "Lancet") showed the possibilities of this new method for purposes of illustration and teaching. Uvachrome diapositive lantern-slides are made from the original films employed in a new process of natural colour-photography in which no screen is employed; the minutest details can thus be projected upon the sheet without the loss in accuracy caused by disintegration of the colours. The dyes used in the preparation of the films reproduce the original colours with remarkable accuracy. The process does not lend itself to mass production, but it is found to be of the greatest value for scientific purposes. The slides are at present prepared by the Austrian State Institute of Photography, which keeps expert photographers at the disposal of the Viennese hospitals and clinics, so enabling accurate colour photographs to be made of cases of special interest. The negatives provide a record for the hospital archives, and furnish medical lecturers with the slides of individual subjects which they need. It is proposed to carry out the same work in England for the benefit of medical authorities in the hospitals and universities. If, as the makers claim, the films can be satisfactorily reproduced on paper, they should prove very valuable for use in text-books and in original articles on rare diseases.

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ON

Colour Photography.

CONTENTS.

DESENSITISING AUTOCHROMES BEFORE DEVELOPMENT.

In consequence of their great colour-sensitiveness Autochrome plates have hitherto required to be handled in a very weak dark-room light. Even when the Virida safelights, which we have regularly recommended, have been used, it has been necessary to take every precaution for avoiding fog by protecting the plate, as far as possible, from the dark-room illumination, and, in fact, exposing it to this latter for no longer than is necessary for noting the time at which the image begins to appear. Even this observation, which is necessary for ascertaining the correct time of development, is of some difficulty owing to the weakness of the light.

It is, therefore, evident that it is of considerable interest to employ a process by which the colour-sensitiveness may be destroyed immediately before development, without affecting the latent image, and so allow readily of noting the action of the developer in a relatively bright light.

As is well known, this desensitising has been rendered practicable by Lüppo-Cramer through the employment of phenosafranine. The remarkable action of this substance has led us to carry out a wide series of experiments on the chemical substances which exhibit this property ("B.J.," June 17 and 24, 1921). After having examined a number of dyes and other various mineral and organic substances, we failed to establish any definite relation between the chemical constitution and the desensitising property, but we discovered that certain other compounds possess the power of desensitising. Among these are aurantia (the ammonia salt) in 1 : 1,000 solution and picric acid in 1 : 100 solution. In the case of aurantia the desensitising effect is comparable with that of phenosafranine, but without certain drawbacks. The staining of the gelatine film with phenosafranine is more persistent than that with aurantia, which is very rapidly washed out. On the other hand, phenosafranine not only retards considerably the appearance of the image and of development, but this retardation is not constant for a given exposure. With aurantia, however, development takes place practically in a normal and uniform manner.

The desensitising action of picric acid is distinctly less than that of the preceding substances, particularly for red and green rays, but nevertheless it is sufficient for conditions of lighting indicated below.

Comparative experiments with these three desensitisers have been carried out as follows:—The method of development based on the time of appearance of the image, was employed in conjunction with metoquinone developer and with plates which had been exposed under identical conditions, except that the exposures varied from one to another according to the values, $\frac{1}{3}$, $\frac{1}{2}$, 1, 2, 4, 6, etc., the time of exposure required for a normal result being taken as 1.

Each plate thus exposed was cut into two. One-half was developed under the usual conditions and the other was immersed for 30 seconds in the desensitising bath. Development of the desensitised plates was continued so as to obtain a result as close as possible to that yielded by the normal treatment.

In ascertaining the time required for the appearance of the image a diluted developer was used; that is to say, 5 ccs. of the normal stock solution of metoquinone or chloranol were diluted with 80 ccs. of water.

The stock solution is:—

Metoquinone or chloranol	15 gms.
Soda sulphite, anhydrous	100 ,,
Potass bromide	6 ,,
Ammonia, 22 deg. B.	32 ccs.
Water	1,000 ,,

Times of exposure compared with normal.	Development without desensitizer.			Development after desensitizing.					
				Aurantia.			Picric acid.		Safranine.		
	Time of appearance of image.	Total time of development.		Time of appearance.	Total time.		Time of appearance.	Total time.	Time of appearance.	Total time.	
	seconds	mins.	secs.	seconds	mins.	secs.	seconds	mins. secs.	seconds	mins.	secs.
6 to 8 times normal ..	13	1	15	17	1	30	20	1 45	23	1	55
4 ,, ,, ..	16	1	45	19	2	—	22	1 55	26	3	—
2 ,, ,, ..	19	2	15	21	2	30	35	3 40	40	4	10
Normal	25	3	—	24	3	—	39	3 55	47	5	—
½ ,, ...	29	3	30	33	3	30	42	4 10	50	5	30
¼ ,, ...	36	4	30	40	4	30	48	5 —	60	6	40

In dealing with plates which had been treated with the desensitisers, the illumination employed was either that of a candle or Pigeon lamp at a distance of 20 in. from the dish, or obtained with a 16 c.p. bulb in a dark-room lamp fitted with six Virida yellow safelight sheets and placed 1 metre (40 in.) from the dish.

After having counted the number of seconds which elapsed after insertion of the plate in the developer for the appearance of the first outlines of the image, 15 ccs. of concentrated developer were added, and development continued, whilst also continuing counting, with the back of the plate turned towards the source of light, when it is not indispensable to observe the image in order to note the progress of development.

The times required for the production results as close in character to each other as possible are set out in the accompanying table. The figures shown for phenosafranine are averages, since the results with this desensitiser varied considerably from one plate to another, although the conditions of manipulation remained constant. The table thus emphasises the fact of the considerable advantage of aurantia for the desensitising of Autochrome plates over other desensitisers.

A. & L. Lumière.
A. Seyewetz.

RELIEF PROCESSES FOR COLOUR WORK.

Little attention seems to have been paid to any other process for obtaining reliefs for colour transparencies and prints except that founded on the action of light on dichromated colloids, as in the carbon process. But there are three others which merit practical trial and with which excellent results are obtainable. The following notes have been compiled for another purpose, but it was thought that possibly there might be some who would be interested in the subject. The full references which have been given will enable anyone specially interested to go to the fountain sources in all cases.

The first process may be called the peroxide or etching process, as one uses hydrogen peroxide as the chief agent and the gelatine is etched away by the same. The first suggestion of such a method was made by R. E. Liesegang,[1] who found that a concentrated solution of ammonium persulphate so acted upon gelatine, in which finely divided silver was embedded, that it became soluble in warm water; but he also found that the action was a little unreliable. This action had been observed both with gelatine-chloride and bromide prints; bleaching took place, and on placing the treated prints in warm water and gently rubbing with the warm hand the gelatine was dissolved on the exposed parts and there was thus left a relief. Colonel Waterhouse informed Liesegang that he had made repeated trials,[2] and failed, and the latter also had the same experience. In the first instance he had used an old solution, and in his later trials a freshly made one. He found that a solution that had been freshly made was useless, and suggested that it was advisable to make a saturated solution and keep it for a fortnight in an uncorked bottle; if the solution was too old the whole film might dissolve. The negative to be used must not be intensified, and better results were obtainable with slightly under-exposed plates developed with a non-staining developer. The use of paper negatives was specially commended, and Liesegang said that the reliefs obtained could be stained up for making colour pictures.

M. Andresen[3] improved upon this method in that he abandoned the use of ammonium persulphate and used hydrogen peroxide. He also pointed out the shadow-reducing action of this liquid, obviously speaking of prints. He says "by the action of hydrogen peroxide on the silver image, produced in gelatine, the densest parts are first attacked, and in such a way that from the surface of the film there appears a gradual solution of the silver with the gelatine in which the silver particles are embedded. This processes can be utilised for the reduction of gelatino-bromide negatives that have been developed too hard. Of far greater importance, however, appears to be the fact that gelatine-silver images treated with hydrogen peroxide show when dry a marked relief, which can find application in the collotype process."

The solution recommended by Andresen was the commercial 3 per cent., to which was added 2 per cent. of pure hydrochloric acid. The negative should be immersed therein, and on rocking the dish there will begin, after about 5 or 10 minutes, a dissolution of the gelatine image, first in the densest parts, and the process will be complete in about 20 minutes. If there are somewhat large surfaces of density, then it is advisable to soak the negative in 5 per cent. alum solution first. The process is claimed for application to both negative and positive images.

I commenced to experiment with ammonium and potassium persulphate in 1910, and then tried out the peroxide and found that better results were obtainable by adding a very small quantity of bromide to the solution, and finally came to use cupric bromide. The work was dropped for a short time, and in the meanwhile a French patent[4] by E. Belin and C. Drouillard was published, which again roused my interest. These inventors cited the state of the prior art and the difficulties that had been met with, and pointed out that the action of the peroxide varied with the temperature of the solutions, and that the gelatine was dissolved the more quickly the higher the temperature. And, they stated, "one is induced to cause this rise in temperature in the molecule itself, and by the oxidation of the silver, which is embedded in the gelatine. It is evident that an oxidising agent or reagent creating a rise in temperature of the exothermic reaction would enable one to conduct the attack so that the points of the same opacity shall be dissolved before the regions less opaque are attacked. With this combination there will be obtained an etching of the phototype proportional to the opacities, and executed in a moderate time and under control, whilst the white parts are not attacked. At the same time it is possible to introduce into the action agents which shall swell and harden the gelatine in such a way that finally the cliché will be eminently suitable for galvanisation, which may be carried out in any well-known way. There will result then directly, without transfer, printing, retouching or other long and costly operation, a cliché immediately ready for printing. The solvent solution adopted at present as giving the best results is composed of hydrogen peroxide, nitric acid, potassium bromide and cupric sulphate in convenient propor-

1. "Phot. Archiv.," 1897, *39*, 161; "B.J.P.," 1897, *44*, 774; 1898, *45*, 646; "Jahrbuch," 1898, *12*, 457; 1899, *13*, 538; "Phot. Korr.," 1898, *35*, 562.
2. "B.J. Almsnac," 1899, 935.
3. D.R.P. 103516, 1898, granted to the Aktien-Gesellschaft f. Anilinfabrik. Silbermann's Reproduktionsverfahren, 1907, *1*, 145; "Jahrbuch," 1899, *13*, 538; 1900, *14*, 582; 1901, *15*, 685; "Phot. J.," 1899, *39*, 329; "Phot. Korr.," 1899, *36*, 260; "Phot. Chron.," 1900; "Houzel, Photography," 1902, 813; "Phot. Woch.," 1902, 386; "Jahrbuch," 1903, *16*, 386, accidentally discovered a process by which gelatino-bromide images could be converted into carbon images. A number of prints, which showed green fog, were placed in a solution of hydrogen peroxide diluted with three times its volume of water, and were left therein overnight. The next morning the images were seen to have completely disappeared, but on drying it was seen that the whites were covered with gelatine, whilst in the deep shadows there was no gelatine. The whole surface of the print was then painted with a brush charged with Chinese ink and dried. Then the paper was treated with warm water, on which the gelatine dissolved and carried the ink with it, whilst the shadows remained black, there was thus developed a correct carbon image. The process was found applicable to most papers.
4. F.P. 423150, 1910; "Le Procédé," 1911, 141; "Jahrbuch," 1912, *26*, 488; D.R.P. 230386, 1909; "Jahrbuch," 1911, *25*, 631; 1912, *26*, 580; "Phot. Chron.," 1911, 438; "Chem. Ztg. Rep.," 1911, 88.

tions. The nitric acid may be replaced by any other acid, such as sulphuric, acetic, etc. The following composition is particularly suitable for a regular etching:—

Hydrogen peroxide	12.5	c.c.s.
Cupric sulphate	50	gms.
Nitric acid	0.06	c.c.
Potassium bromide	0.02	gm.
Distilled water	1000	c.c.s.

Every developer can be used provided that the oxidation products do not tan the gelatine in the reduced parts. Ferrous oxalate mixed with one-third its volume of water is the best."

It was also suggested that if the iron developer were used the negative should be rapidly rinsed and the plate again immersed in the above solution, and the iron then retained in the depths of the film would be converted into ferric iron, which would harden the film. It was also proposed that a preliminary etching could be effected before development was complete, and then, after further etching, development proceeded with, and that this would enable deeper etching to be secured and that the gelatine would be at the same time so hardened that gentle friction with a swab of absorbent cotton could be resorted to without damage to the relief. The reliefs were applicable to photo-telegraphy and various other applications mostly of a photo-mechanical nature, and, amongst others, to tricolour typogravure. The claims of the patent are "A certain and rapid etching of photographic clichés (gelatino-bromide of silver) by the action of a bath of hydrogen peroxide, acidulated and mixed with a salt of copper and potassium bromide in convenient proportions. Application of the clichés thus produced and galvanised to all processes of reproduction."

H. Lüppo-Cramer[5] dealt with this subject, and called attention to the fact that the silver itself is not attacked when hydrogen peroxide alone was used, and that the addition of halogen ions showed a peculiar effect. The addition of bromides or iodides hastened the action considerably, and in such a way that by this addition a practical use of the reaction could be produced for the formation of reliefs. To elucidate this remarkable action he examined the reaction between silver and peroxide more closely, and found that the silver acted catalytically, in exactly the same way as iron or cupric chloride. According to Lüppo-Cramer's ideas there is formed, in the decomposition of the peroxide, oxygen in a highly dispersed form, and because of this and in consequence of the protective action of the extremely finely divided gelatine, the oxygen has an unusually strong oxidising action on the gelatine. The catalytic action of the silver is, however, adversely influenced if the silver at the limiting surfaces with the gelatines goes into solution, even if only in traces. This solution of the silver is prevented by the halogen ions, and these are thus indirectly the cause of assisting the velocity of the catalytic liquefaction of the gelatine.

Strips of glass plates were coated with colloidal silver gelatine and immersed in test tubes filled with the following solution: (*a*) 20 c.c.s. of 3 per cent. peroxide solution, plus 1 c.c. of 50 per cent. sulphuric acid; (*b*) the same solution mixed with a few drops of 10 per cent. solution of silver nitrate; (*c*) solution *a* mixed with a few drops of 10 per cent. solution of potassium bromide. Whilst the addition of the silver nitrate produced a strong acceleration of the dissolution of the silver and decolouration, in *c* the decolouration of the brown silver-gelatine did not take place at first, but there appeared in approximately five minutes a liquefaction of the gelatine, so that not only the plate alone but the whole solution in the tube became brown. Only after the whole film was dissolved did there appear a conversion of the yellow silver into white silver bromide. This experiment shows that the addition of bromide retards the solution of the silver but accelerates that of the gelatine.

The author's experiments with this process have shown that it is one well worth the attention of colour workers. It is, of course, obvious that, as with all other relief processes, great changes may be rung on the actual composition of the etching bath to suit individual requirements; but it must be recognised that Lüppo-Cramer's deductions hold good, and, therefore, the acceleration of the etching and its violence is easily under control. A moment's thought will at once show that this is an inverse process, that is to say, as it is the densely silver-covered parts that are etched, one must use a negative to obtain a positive relief image; and for this very reason the process seems to be more suitable for the amateur who desires to make either superimposed film pictures or imbibition prints.

The dense parts of the image being eaten away, there is left a relief in gelatine that corresponds to a positive, and, on dyeing up, the colour is absorbed in exact ratio to the quantity of gelatine present, and this dye-image can be used as a constituent of a superposed transparency or print or used for the imbibition process, that is, it may serve as a print-plate, and one does away with the tedious work of making both transparencies and print-plates, as in the Pinatype process, if one uses the original negative. It may be advanced, and rightly, that one destroys the original negative and that one cannot use the same for other printing; but as a matter of fact the dyed positive may be temporarily converted into a black or dark positive by the temporary use of a complementary coloured filter, and thus a duplicate negative can be easily made.

The gelatine being dissolved under the action of the bath where there is or was silver the final relief is never quite free from silver halide, and the plate or film should be fixed in a chrome alum fixing bath, then, after washing, treated with a 5 per cent. solution of formaline and superficially rinsed and dried. This treatment removes the last trace of silver salt and leaves a colourless relief, which would be quite invisible but for a slight turbidity of the gelatine; this treatment, especially with the formaline, is not absolutely essential, but I have found it to be advantageous, as the gelatine is rendered much harder, and in many cases the staining up appears to take place better, possibly due to some mordant action. With regard to the turbidity, this is the best term that one can use, and it is caused by the pitting of the gelatine; as each individual particle of the silver image is surrounded by gelatine there is left a pitted film, each little silver grain leaving a little crater or hollow, and these may be looked upon as acting like microscopic lenses, which cause different refractive effects, or possibly diffraction. This causes no trouble either when the results are superimposed as prints or as transparencies, and in the latter case there is no visibility on the screen, normal magnification being, of course, assumed. It may happen that a slight reticulation of the gelatine makes its appearance, but this is only occasionally noticeable, and usually disappears after the formaline bath. The main trouble, and this only appears when working with some plates, is the stripping of the film in the greatest densities, and this is obviously due to the silver deposit being so deep in the film that the etching action loosens the adherence of the gelatine to the glass, but this can be overcome by the use of the alum bath as suggested by Belin and Drouillard. In film work this is never met with. There is, as will have been gathered, no hot water treatment, and there is consequently with films much less chance of distortion and want of register through irregular expansion and contraction of the base.

Developed Relief Processes.

Probably the inception of the idea of obtaining relief images by development is contained in J. W. Swan's patent[6] for producing photo-relief plates, in which development with pyrogallol and ammonia is described, and the plate subsequently placed in warm water, when the parts unacted upon

5. "Phot. Korr.," 1911, *48*, 466; "Jahrbuch," 1912, *26*, 487; E. Constet, "Mon. Phot.," 1903, 251; "Phot. J. Amer.," 1916, *55*, 389, recommended developing with ferrous oxalate and immersion of the negative in ammonium or potassium persulphate till the image bleached, and then gentle friction with a brush to remove the gelatine, the immersion in an alum bath and drying, and subsequent staining up and the transfer of the dye to gelatinised paper

6. E.P. 2969, 1879.

by light and developer swelled up. But L. Warnerke[7] protected a process "for the production of negatives and transparencies where the parts unacted upon by light and development are dissolved away." For producing the film a colloid, such as gelatine or dextrin, should be supported on paper or other suitable material, and the sensitive salt might be produced by the emulsion or bath process, and exposures might be in the camera or otherwise. The developer recommended was a mixture of pyro, ammonium bromide, ammonia, citric acid and glycerol, alcohol and water. The image might be fixed or not, but in the whole treatment care must be taken that no substance, such as alum, is used that would produce general insolubility of the gelatine. When dry, the picture was placed in contact with glass and plunged into warm water. The picture adhered to the surface, and that part of the film that bore no image dissolved away. The image would be reversed, but that could be overcome by the use of transfer paper. Enlargements could be used and insoluble pigments might be added to the emulsion if desired. For relief elichés to be used in printing surfaces the sensitive film must be sufficiently thick, and a grain might be produced by adding an inert powder.

It will be noted that Warnerke used no sulphite. The reason for this was that he desired to obtain the full effect of the tanning by the oxidised pyrogallol, and this naturally leads to the conclusion that if the oxidation of the developing agent is more or less prevented, there will be control of the height of the relief. Silbermann[8] points this out, and says that it is well known that in the development of negatives there is produced a more or less marked relief, which, among other things, depends upon the developer. Pyrogallol, eikonogen, hydroquinone, and amidol give a strong relief; metol and di-amidophenol a low one, and glycin and rodinal practically none. There does not appear to be any connection between the constitution of the developer and this fact, but *p*-amidophenol is not suitable for relief formation. That the insolubility of the gelatine is dependent on an oxidation process is clear from the fact that the presence of sulphites is prejudicial to the formation of the relief. Although Silbermann does not quote any authorities, we must not overlook the fact that A. Haddon and F. Grundy[9] found that pyro solution had no tanning action on gelatine, but when the pyro was oxidised and became brown it exerted a strong tanning action and the gelatine became quite insoluble in hot water. After exposure to air, glycin and rodinal (*p*-amidophenol) did not affect the temperature at which gelatine dissolves in water; metol and amidophenol raise the temperature; hydroquinone, pyrogallol, eikonogen and amidol make the gelatine insoluble in boiling water. It was found that if glycin and rodinal were oxidised by bromine or similar agent the products tan the gelatine thoroughly, and the conclusion was that these two agents are not oxidised by air. When large proportions of sulphite are used in the developer the organic compound is very little oxidised, the gelatine is left soluble, and the relief of the image is very small. An image in high relief is formed under conditions which permit of the oxidation of the developer at the points at which it reduces the silver bromide, the gelatine at these parts being tanned by the oxidation products. This subject was also dealt with by A. and L. Lumière,[10] but it is not necessary to abstract their paper, which in the main confirms Haddon and Grundy's conclusions. The only point that is brought out is, that the oxidation product of *p*-amidophenol is insoluble in water and only slightly soluble in sulphite, therefore, the non-tanning action is explained.

E. J. WALL, F.R.P.S.

(To be concluded.)

7. E.P. 1436, 1881; "Phot. J.," 1881; "Phot. News," 1881, *25*, 248; "Phila. Phot.," 1881, *18*, 187, 214, 218, 246; "Silbermann's Reproduktionsverfahren," 1907. *2*, 141; "Phot. Mitt," 1881, *18*, 65, 98, 236; "Handbuch," 1917, *4*, II., 278. Demonstrations were later given by Warnerke of his process as applied to photo-engraving, "Phot. J.," 1894, *34*, 94; "Photography Annual," 1896, 222; "Bull. Belge," 1898; "Bull. Soc. Franç Phot.," 1898, *35*, 301; "Phot. Woch.," 1898; "Jahrbuch," 1899, *13*, 587.

8. Silbermann, *loc. cit.*

9. "B.J.," 1896, *43*, 356; "Photography Annual," 1897, 189; "Phot. Rund.," 1896, 313; "Phot. Crbl.," 1896, 269; "Jahrbuch," 1897, *11*, 402, 511.

10. "B.J.," 1906, *53*, 286; "Bull. Soc. Franç Phot.," 1906; "Jahrbuch," 1906, *20*, 500.

News and Notes.

AIRCRAFT AND COLOUR.—Modern aircraft—aeroplanes, airships, and balloons—does not make pleasing screen-plate pictures, mainly because of lack of strong colours, and many colour workers no doubt read with great interest details of the vivid pink aeroplane which has been made for the Rajah of Morvi, and pictured in their minds colour-screen pictures of a blue sky filled with aircraft of various colours. The Rajah's aeroplane will no doubt be most effective when upon the ground, but, as a writer in the "Daily Chronicle" points out, at any altitude exceeding 2,000 ft.—which is quite low as aeroplanes fly nowadays—it is impossible to distinguish the colour of an object in the sky.

COPPER-MORDANT DYE-TONING. — Two patents of addition, Nos. 163,336/7, to patent No. 147,005 ("B.J." Colour Photography Supplement, June 3, 1921, p. 23) have been filed in London by Dr. Traube and are open to inspection before acceptance. According to No. 163,336, the pictures are treated, for the purpose of correcting and enfeebling the dyeing, with a dilute acid or for the purpose of intensifying the colour with a dyestuff solution. The reduction may be made before drying, but it is best to intensify only after drying. According to No. 163,337, the copper picture which is to be dyed is made by using a bath containing less than half the copper compound and potassium ferricyanide formerly usual. To further increase the transparency more potassium ferricyanide than the copper compound may be used. In the usual bath about equal quantities of copper sulphate and ferricyanide are used with about ten times the weight of either of potassium citrate.

CHRISTENSEN COLOUR SCREEN-PLATES.—According to patent specification, No. 163,311 (open to inspection but not yet accepted), of J. H. Christensen, the colour elements of a screen-plate are produced by comminuting (as by emulsifying) liquids containing a dye in such a form and under such conditions that mordanting does not take place before the elements have been applied to the under layer, the object being to avoid any decrease in brilliancy and clearness of the screen due to the complete or partial precipitation of the dyes. Also to make the screen water-repellent, the under layer on which the particles are coated is provided with a coating of a cellulose derivative with the addition of a basic substance, as, for instance, a soap, e.g., sodium oleate. For producing the screen elements, instead of aqueous solution of a basic dye mixed with tannic acid, the water solvent is partially substituted by methyl or ethyl alcohol, and in the case of a solution of tungstic acid, molybdic acid or phospho-tungstic acid mixed with a solution of basic dye, the liquids are rendered basic by the addition of ammonia which prevents precipitation. Where coloured basic particles of tungstic acid are used mordanting is effected by a subsequent treatment such as by an acid either in solution, or in the form of vapour. Inert substances such as gum arabic, dextrin, and albumen may be included.

THE PRIZMA PROCESS.—In writing of the trade demonstration of the Prizma process of colour cinematography in our issue of May 6 last, page 18, we referred to the apparent need, in the process, of a camera capable of producing identical images in the case of those negative records of the moving subject which require to be brought into registration when producing the colour film by an assemblage process. We further pointed out that the films themselves afforded evidence of the fact that rapid movement was deliberately eliminated from the subjects for the purpose of avoiding the colour-fringing effect which results from such absence of registration of images. We are therefore interested in hearing from the firm of J. Stuart Blacton Photo-Plays, Ltd., of Bush House, Melbourne Place, Strand, W.C.2, that a camera of this kind has been constructed by Mr. W. Van Dorn Kelley, the inventor of the Prizma process, and is being used at the present time for the production in colour of a drama film entitled "The Glorious Adventure." According to Mr. William T. Crespinel, who is in charge of making the negatives for this photo-play, the lens image is divided into three identical images in such a manner that the camera can be used with the same strength of artificial lighting as is employed for ordinary monochrome films. It is believed that the entire production of "The Glorious Adventure" will show that perfect colour registration has been obtained. If this turns out to be the case, it would seem that this film will be the first to have been produced under ordinary conditions of lighting and action for production in colour on the screen by photographic means.

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Colour Photography.

CONTENTS.

NEGATIVES FOR THREE-COLOUR PRINTING FROM AUTOCHROMES.

In any descriptions of the Autochrome plate, which I have seen, it is assumed that the development of the film is confined to that part of it which lies immediately behind the starch grain which transmits the light. But considerable experience in making negatives for three-colour printing leads me to believe that this is not the case; but that grains adjoining those which transmit the light are also affected by it. And that this is the cause of certain difficulties I have found, which have not troubled me when working direct from nature.

The printing process I use is bichromated gelatine, and artist's colours in fine powder, spread with a brush on paper; printed, and washed off with warm water. But the difficulties would apply to any process. The trouble does not lie in the printing, but in making the negatives.

There are great advantages in using the Autochrome as the original colour record, instead of exposing three separate plates, especially when working from life or on landscape. But I have found that while I could always get a sky to print when working direct from nature I could never do so from the Autochrome until I adopted the device of backing the Autochrome with a very thin negative made by white light. This plan also gave a better separation of the colours in the case of flower subjects and such like. I was led to adopt it when trying to get negatives from a colour chart made by exposing an Autochrome plate to red, green and violet light in overlapping circles. It is a nice, bright chart with a white triangle in the centre, and blue, crimson and yellow outside that, and red, green and violet outside of them. Such a chart should in theory transmit an equal amount of red light through the whole of the red circle. It does not do so, but when examined through a red filter it is seen to pass more light through the crimson and yellow than through the red; and most of all through the white. And so with the other colours. And negatives made from it, even with filters of very short transmission, are more dense in the white than in the crimson and yellow, and least dense of all in the red.

Printing from such a negative—in blue, for instance—when the colour is all washed off the white, there is still some blue left on the red; and development has to be continued till that has been washed off. In the case of a landscape with white clouds and a red roof, if all the blue is washed off the roof too much is washed off the sky, where the development ought to have stopped when the clouds first became white. Working direct on such a subject no such difficulty occurs. In a flower subject you either get a bright red degraded by a little blue and yellow left on it, or, if you continue development until that is washed off, you lose the shadow detail in the white flowers.

By backing such a chart with a thin negative made by white light it is possible to get even density in the resulting negative over the whole of the red circle. But, of course, the backing negative has to be developed to exactly the right contrast to get that result, and therein lies the difficulty of using this device. There seems to be nothing for it but to make another if the first does not look quite right. I have met with some success in this way, but I do not pretend to be able to succeed at the first attempt every time. With practice I think one should do so. A negative much over-developed gives reversal, and can be recognised as likely to do so. But different Autochromes require negatives of different character. One that has had a short first development will want very little correction. But such an Autochrome is too dull to make a pleasing transparency or to be a good guide to the final appearance which your print should have. And, of course, one of the advantages of using the Autochrome as the original record is just that you have it to guide you in the final production of your print.

The explanation seems to be that if a plate is exposed to monochromatic light and developed and fixed, but not reversed, and then examined with a microscope, it will be seen that the starch grain is not entirely obscured with a continuous coating of black, but partially covered with very small black dots, and the adjoining grains, of different colours, also have a certain amount of dots over them; in some cases isolated, in others running in chains from the exposed grain. I do not know whether this is the case with other screen plates. But if it is caused by light reflected from the starch grains it might not occur in a screen of mosaic pattern.

Where there have been two exposures, as to violet and green light, the red grains are more heavily dotted where the two exposures cross, in the blue, than in either the violet or green, though they have had no exposure to red light.

The effect, where one exposure has been made, to one colour of light, is the same as if one grain had had a full exposure, and the other two a partial exposure. But in the case of compound colours, blue, crimson and yellow, two grains are exposed, and each gets a bit extra from the other. And in the case of white each grain gets what is equivalent to extra exposure, from invasion by the other two colours. The total result being the same as if the secondary colours had more exposure than the primaries, and the white most of all. It may be possible to produce a chart free from this defect. But for ordinary Autochrome work I have found my method

of correction a useful aid to getting good negatives. And I shall be glad if it is of use to anyone else.

It amounts to treating the Autochrome as being unevenly flooded with white light. Possibly the more correct method might be to back the Autochrome with negatives made by light complementary to that used in making the final negatives. But such trials as I have made of this plan seem to show that it is not worth the trouble of making three backing negatives, and the risk of one of them going wrong, in registration or otherwise.

As to the filters to be used in working from Autochromes I should be glad of any advice or assistance. I have used filters of short enough transmission to give no overlap. A very good and practical judge of colour printing tells me I should use longer transmissions. But I do not see why, nor have I found any advantage in filters of very short transmissions. After much experimenting with filter dyes I do not believe that a correct set of negatives could be made from colour charts such as mine, by any set of filters, without some such correction as I have used. But I shall be very pleased if anyone will show me a better way, or give any information on the making of three-colour negatives from Autochromes or any other screen plates.

E. A. Burchardt.

RELIEF PROCESSES FOR COLOUR WORK.

(*Concluded from page* 32.)

It is clear that in the use of sulphites we have a means of control of the height of the relief formed. From the author's experiments it seems immaterial whether ammonia or a fixed alkali be used, but for colour work the latter is much to be preferred on account of the more regular action. The actual composition of the developer is again of no particular moment, only such good results have never been obtained with any other reducing agent than pyrogallol. There are one or two points to which attention may profitably be directed. In the first place, the total omission of the sulphite gives a very high relief, which, as will be seen presently, is of no moment, but there is a tendency to the formation of a superficial skin of insolubilised gelatine that may later give a little trouble. The second and more important point is the absence of fog. As everyone knows, fog is metallic silver, and as the deposition of silver is accompanied by insolubilisation of the gelatine, it is obvious that a foggy result will not develop up into such a clear relief as plate that is free from the same; therefore, it is advisable to use a fair amount of bromide in the developer and to allow for this in the exposure, as it is well-known that bromide slows a plate, to use a current phrase.

In this process we have again the old carbon trouble of loss of half-tones, if one works in the ordinary way, that is to say, if one exposes from the front; and, therefore, exposure should be made from the back or through the support. And for this work films are decidedly to be preferred to plates, on account of their lesser thickness.

Stress has been laid, principally by F. E. Ives, on the importance of keeping the relief low, and if this is desirable then the sensitive film may be stained up with a yellow dye prior to exposure. For this purpose tartrazine, thiazol yellow or naphthol yellow can be used, or some other yellow colouring matter.

These three are particularly mentioned because they have been found efficient; the dye used must be of an acid nature, as the basic dyes have so little affinity for gelatine that it is almost impossible with many of them to say whether a film has been immersed therein or not. In the face of the most recent work on desensitising with dyes it is clear that not every one is suitable, but without examination of the question at all I think that most of the desensitising dyes are basic. The height of the relief is of not the slightest importance for superimposed films; when dry, the relief is so low that it is almost invisible, and I have never found any trouble when using such reliefs, even of the highest type obtainable on films in the imbibition process.

There is one point in connection with the use of dyed reliefs that seems to have been generally ignored, and that is the limiting absorption of the dye, and it is for this reason also that the deep reliefs are inocuous. To make this quite clear let us take the case of a filter dye, such as filter yellow K, and assume that we have eight gelatine sheets, all stained to the same depth. Then, placing one such film on a white support and superimposing a second, there will be noted a distinct colour change, and the same applies to the third, and possibly the fourth, this being entirely dependent on the dye density. But on superposing more films it will be seen that the colour change is very slight indeed; in fact, it is impossible to tell whether six or eight films are superposed. This state of things is met with in reliefs: the latter may be so great that the limiting absorption comes into play and the higher reliefs are visually obliterated. This can be best seen by the use of H. and D. strips; if, for instance, one has a strip showing clear densities in all nine sectors and a gamma of about 1.5, the positive here being in mind, when such is converted into a relief the nine steps can be seen, but when dyed up the number will be, perhaps, reduced to six. Practically the three densest reliefs are represented by the same colour visually, and no amount of soaking in the dye will alter this, although some slight variation may yet be detected in these three last dye densities by examination with a complementary coloured filter. This effect varies with the dyes, and it is impossible to state what dye will and will not give this result.

Reverting, however, to the question of the dye, it must also be taken into consideration that the easy removal of this pre-staining dye is advisable, but not essential; should any be left in the reliefs, it will merely make the reds a little more orange and the blues a little more greenish, which is quite immaterial in projection work, and it can be ignored in the imbibition, for if the dye will not wash out readily it certainly will not transfer easily. Another point that is of importance, although so much has been written on the particular dyes that are suitable for superposition and imbibition, that one may almost look upon this as supererogatory, yet it is as well to bear in mind in the temporary superposition of the stained films that examination should be made by the light that they are to be chiefly seen by; some pictures may look excellent by daylight and far too yellow by artificial light, and the difference is very marked sometimes.

Dichromated Relief Process.

This may seem an unhappy title, but I do not know what should be used, recognising that it may convey the impression of an ordinary carbon relief, and although dichromate is used light plays no part as the relief-forming agent.

Howard Farmer[11] proposed to treat developed silver images with dichromate, which he had discovered acted upon the gelatine *in situ* with the silver and hardened it just as though

11. E.P. 17773, 1889. It is quite possible that when using such concentrated solutions of dichromate some softening of the gelatine, not in contact with the silver, might take place, as strong solutions of the dichromates are good solvents for gelatine, and this property was utilised by J. Husnik in his "leimtype" process, see E.P. 73, 1887; 8,946, 1889; D.R.P., 40,766, 1887; 42,158, 1901; "Jahrbuch," 1888, **2**, 247; 1889, **3**, 75; "Handbuch," 1917, **4**, II., 215; "Silbermann's Reproduktionsverfahren," 1907, **2**, 185.

the light had reduced the dichromate; and later he ascribed this action to the catalytic action of the finely divided silver in the presence of the gelatine and dichromate [12]. The dichromate is reduced and the gelatine, by combination with the reduction product, is converted into the insoluble form. The silver itself undergoes no change. The simplest manner, he suggests, of observing this action is to immerse a plate or film with a silver image in a dichromate solution, when, if the strength be fairly concentrated about 20 per cent., the action is practically instantaneous. A more convenient means consists in preparing gelatino-bromide plates, in which the gelatine is retained in a soluble form, and developing the images with ferrous oxalate [13]. On placing the plates for a few seconds into a 20 per cent. solution of ammonium dichromate the gelatine, wherever it is in contact with the reduced silver, becomes insoluble, and the images, after washing, present the same relief as exposed carbon prints do when immersed in water. The chromated images also possess the same properties as dichromated images obtained by the action of light; thus the film, after drying and re-wetting, can be squeegeed to insoluble surfaces and developed with hot water, as is customary with carbon or Woodburytype reliefs, and the results have all the well-defined sharpness of the latter. Further, by heating the films, as in the collotype process, similarly reticulated surfaces are obtained on immersion in cold water. "These examples are sufficient to show that in the reaction I have described we are offered the means of obtaining for the chromium processes the high degree of sensitiveness hitherto only obtainable with the gelatino-bromide process."

Eder[14] considers the catalytic action as not quite satisfactory, as the metallic silver is changed for the most part, as chromic acid and dichromates convert it into chromate, the acid and salt being converted into chromium oxide, according to the following equation:—

$$6\ Ag + 5\ CrO_3 + 3\ H_2O = 3\ Ag_2CrO_4 + Cr_2(OH)_6.$$

This equation is only schematic, and in the presence of dichromate the reaction may be represented as follows:—

$$6\ Ag + 5\ K_2Cr_2O_7 + 3\ H_2O = 3\ Ag_2CrO_4 + Cr_2(OH)_6 + 5\ K_2CrO_4.$$

From numerous experiments I cannot accept Eder's last equation as correct, for although the matter was not especially examined there is no visible change on immersion of a silver image in dichromate solution. Namias[15] gives a much more feasible explanation; the best way of tanning the gelatine is to convert the chromic acid to a lower chromium oxide, and this can be and is done when the acid acts on metallic silver, and silver chromate and hydrogen are formed, according to the equation:—

$$6\ Ag + 3\ H_2CrO_4 = 3\ Ag_2CrO_4 + 6\ H.$$

The hydrogen reduces the excess of acid to chromium oxide, which, in the presence of the acid, becomes chromate of chromium, and it is this salt—

$$6\ H + 2\ H_2CrO_4 = Cr_2O_3 + 5\ H_2O.$$

that is the active agent in producing insolubilisation. The disadvantage of using chromic acid is that it not only suffers reduction locally, but generally also, so that the gelatine not in contact with the silver may be hardened, even if only to a small extent. Namias states positively, thus confirming my views, that the chromic acid in the dichromate cannot attack the silver[16]. It is rather beyond the scope of this note to enter more fully into Namias's paper, which deals with the reactions of the Ozobrome and allied processes, with which we are not directly concerned, though naturally the basis of the action is closely allied.

Namias comes to the conclusion that the best insolubiliser is a 0.5 per cent. solution of dichromate to which 2 per cent. of potassium bromide is added. If a solution of dichromate is acidulated with sulphuric acid, even if only faintly, the action is the same as if free chromic acid were used, and the silver image is rapidly bleached according to the equation:—

$$6\ Ag + 5\ H_2CrO_4 + 6\ KBr = 6\ AgBr + 3\ K_2CrO_4 + Cr_2O_3 + 5\ H_2O.$$

The gelatine *in situ* with the silver is then so hardened that the film may be placed in boiling water without any harm, and the image will stand a fair amount of friction. The effect with a sulphide-toned image should be greater still, because the sulphide must be first converted into sulphate and then into bromide, and there would be a greater quantity of chromium oxide set free, thus:—

$$3\ Ag_2S + 8\ H_2CrO_4 = 3\ Ag_2SO_4 + 4\ Cr_2O_3 + 8\ H_2O.$$

For years this valuable property of the dichromates appears to have lain dormant, and, so far as I am aware, no practical application of Farmer's own patent was made. W. Riebensahm and Posseldt,[17] after referring to Farmer's work, which, as they say, does not make use of a pigmented gelatine, propose to incorporate a pigment with the gelatino-bromide emulsion. The paper was to be exposed like bromide paper, developed in the usual way, and then, fixed or unfixed, immersed in dichromate and repeatedly washed and treated with ammonia to remove the last traces of chromate, and developed, etc., as an ordinary carbon print. The inventors state: "Das Verfahren ist auch verwendbar zur Herstellung von Bildern in natürlichen Farben, indem man nach dem Prinzip des Dreifarbendrucks Bilder in den drei Grundfarben herstellt und bei der zweiten Uebertragung aufeinanderklebt." Anglicised: The process is also applicable to the preparation of pictures in natural colours, as, according to the principle of three-colour printing, pictures in the three fundamental colours are prepared and superimposed in the second transfer.

J. Mézaros[18] patented a process for preparing pigments in monochrome, polychrome or natural colours and printing plates with a silver salt or an emulsion of the same, which was founded on Farmer's process. Ordinary bromide or chloride emulsion could be used and the positives made in the ordinary way, great stress being laid on thorough washing after fixing. The chromate necessary for the preparation of the pigment pictures was added afterwards to the gelatine and not used as a sensitiser. The silver image was immersed in a dichromate solution for three or five minutes and then the plate was immersed in a solution which would dissolve the image and at the same time fix the chromic acid in the film, and this would precipitate the metal in the form of chromate. For this purpose the film was immersed in a 2 to 3 per cent. solution of nitric acid, or the chromic and nitric baths could be mixed. The insoluble chromate precipitated in the image-bearing film in proportion to the shadows, combines with the gelatine, so that the image might be developed with hot water in the usual manner of carbon printing, and only the soluble parts are dissolved. A gelatine relief is thus produced which may be hardened in the usual way, and can be used for printing, or an electrotype can be made from it. The film of the image may be coloured with any convenient colouring matter to obtain a transparency, a negative for printing, or a positive on paper at will; or a precipitate may be produced in the gelatine of any desired colour, for example, sulphate of baryta, to make the image

12. "Phot J.," 1892, *32*, 30; "Brit. J. Phot.," 1894, *41*, 742; "Photography Annual," 1895, 221.

13. Ferrous oxalate was suggested because it was a non-tanning developer.

14. "Handbuch," 1917, *4*, II., 279.

15. "Jahrbuch," 1911, *25*, 140; 1912, *26*, 167; abst. "C.A.," 1913, *7*, 1681.

16. Abegg, "Jahrbuch," 1905, *19*, 108; Abegg and Cox, "Zeits. phys. Chem.," 1904, *48*, 725, state that potassium dichromate on solution in water undergoes dissociation into free chromic acid and monochromate. See also "Jahrbuch," 1912, *26*, 98.

17. E.P. 898, 1904, granted to Riebensahm and G. Koppmann; "Brit. J. Phot.," 1904, *51*; D.R.P. 153,439, 1902, to Riebensahm and Posseldt; "Jahrbuch," 1905, *19*, 456; "Silbermann, *1*, 241; "Phot. Chron.," 1904, 548; "Handbuch," 1917, *4*, II., 280; F.P. 338,170. The Neue Photographische Gesell. D.R.P. 196,962; "Handbuch," *loc. cit.*, 282, claim the addition of a hardening agent such as aluminium chloride to the dichromate bath. The addition of orthochromatic sensitisers is also claimed, E.P. 24,920, 1904; abst. "B.J.," 1905, *52*, 365, 873; D.R.P., 1904; Silbermann, *loc. cit.*, *1*, 280. Paul Pretsch, E.P. 2,373, 1854, used a silver salt in conjunction with dichromate for obtaining sunk or raised designs. Most readers will be familiar with the Carbograph paper which was on the market for a while some years ago.

18. F.P. 352,815, 1906; "B.J.," 1906, *53*, 434.

visible. When pigmentary or coloured images are required the necessary pigments should be added to the gelatine before the coating of the paper. It should be noted also that orthochromatic sensitisers may be added. With the new process it will be possible to obtain polychrome effects by super-imposing several films.

F. E. Ives[19] patented a process of producing multi-colour pictures by a process of "desolubilising" gelatine *in situ* with silver, utilising the action of chromic acid, and the superposition of the reliefs thus produced after staining up. He proposed to use a normal silver emulsion on a transparent support, such as glass or celluloid, and pre-dye it with a yellow dye such as tartrazine, to prevent the too-deep penetration of the printing light. The exposure was made through the back of the support, as would obviously be necessary, and a non-tanning developer was recommended. The hardening bath was:—

Ammonium dichromate	6.8 gms.
Potassium bromide	6.8 gms.
Sulphuric acid	6.5 c.c.s.
Water	1000 c.c.s.

The acid is said to be advantageous, as it enables the action to be washed as the image bleaches. The film was developed with hot water, and the silver salt dissolved out with hypo. The particular dyes recommended are Bayer's alizarine blue AS, equal parts of Bayer's rubinol R and rubinol 3G, and sulphon yellow R of the same make. To make a paper print, the blue constituent image was to be made on bromide paper and toned with cyanotype in the usual way, and this print was to be fixed in alkaline hypo, then rinsed and placed in a strong solution of oxalic acid. Presumably this was to convert some of the iron into hydroxide and dissolve out with the acid.

The author found that this particular bath gave rather strong contrasts, and that it had a tendency to eat out the finest details of the high lights. Namias's bath gave better results. There are, of course, all possible variations to be rung on this bath, and it will be found that slight variations of contrast are thus obtainable, and a few experiments will soon determine that which best suits the operator. It should, however, be noted that Ives's bath on standing, particularly in the light, develops free bromine, and that this may have a prejudicial effect, as it is well known that free bromine tans gelatine; obviously, any other halide may be used.

There remains but one point to deal with, and that is the printing; as this has to be done through the support, it is obvious that parallel light ought to be used, and for small work there is no trouble in rigging up a Mazda nitrogen lamp at the equivalent focus of a lens and getting over this difficulty; but, with films, if a lamp be placed at the bottom of a box about 4 feet deep, the inside being, of course, painted black, and a piece of opal glass be placed over the lamp, the results are so sharp as to bear considerable magnification, as the loss of definition is very little. For large sizes and glass plates one must use parallel light, but it would take up more space than is desirable, and I am afraid that even now this article has run rather beyond reasonable limits, or I would describe the elaborate but cheap apparatus that I have used. For similar reasons all instructions as to the particular dyes to be used has been omitted. Much has already appeared in the pages of the "B.J." on this subject, to which reference should be made.

E. G. Wall, F.R.P.S.

19. U.S.P. 1,186,000, 1916, Ducos du Hauron, Lumière, Sanger-Shepherd and Bartlett, and O. Pfenninger all disclose the use of non-actinic dyes in making carbon reliefs to prevent the too deep penetration of the light; but it may be contended that the two cases are not quite on all fours, as in Ives' patent we are dealing with a development process with a silver halide emulsion. Ives says: "I believe that I am the first to propose a photographic printing process comprising the incorporation with the sensitive silver in a suitable film of an actinic-light restrainer, whereby, upon exposure and development the silver image will be confined to one side of the film." But A. Hernandez-Mejia, U.S.P., 1,174,144, of March 7, 1916, date of application June 21, 1912, thus nearly three years before the date of Ives' application; which was March 13, 1915, says: "The gelatine or substratum, on that side is, if desired, dyed with a contributory colour (as yellow), one which when combined in projection with the red and green to make total opacity or black, a degree of colouring being employed which will not permit the actinic light, or will do so very sparingly, to pass through the film to the opposite side during the printing operation." This is a clear description of the restraining light action by a dye in connection with a silver emulsion.

TWO-COLOUR CINEMATOGRAPHY.

A process described in a patent specification (No. 165,826) of (the late) W. Friese-Greene and Colour Photography, Ltd., is of that type which consists in preparing pairs of negatives on a single light-sensitive surface, such as a cinematograph film, by exposing them in succession respectively to direct white light and through a coloured screen, preparing positives therefrom and thereafter colouring the positives so obtained (for projection) or projecting them through coloured screens.

According to the invention the exposure through the coloured screen is made through a screen coloured yellow, as for example through a screen coloured with flavazine.

For the purpose of projection in colour the entire positive surface obtained from the negative exposed directly to white light is preferably coloured approximately blue-green or is projected through an approximately blue-green screen, and the other positive surface is coloured, or is projected through a screen coloured approximately orange-pink or other colour of reddish-shade

In the preferred method of carrying the invention into effect, the cinematograph film is specially colour-sensitised as described in Patent No. 134,238 ("B.J.," December 12, 1919, p. 728). Alternatively, any other preferred form of panchromatic film may be employed.

The film is exposed in an ordinary cinematograph camera, fitted with a special shutter by means of which alternate exposures are made direct to white light and through a coloured screen or filter respectively. For this purpose either in front of or behind the usual shutter in the camera there is a disc of celluloid, which is stained over one-half with the required colour for the coloured filter. The other half is preferably opaque, and has in it a narrow slit. The disc is revolved with the shutter of the camera to expose successive portions of the film, alternately to white light and through a colour screen. The ratio of the width of the slit to that of the stained surface of the colour-screen is conveniently 1:5, so that the picture taken through the slit is very sharp, and that taken through the colour-screen is not quite so sharp. The result of this is that when the pictures are projected, the flickering usually experienced with motion pictures in colour is considerably reduced.

In the preferred form the colour screen is made of transparent celluloid coated with gelatine containing flavazine by the use of the following dye solution:—

Flavazine	1 oz.
Water	10 ozs.

in which the screen, previously coated with gelatine, is immersed until it obtains the required colour density.

After the film has been exposed, it is developed in the ordinary way, and a positive is prepared therefrom. The alternate exposures are then coloured as already described. The coloured film can then be projected from an ordinary cinematograph apparatus.

For colouring, the following solutions are preferred:—

For the blue-green positive:—

Victoria blue	¼ oz.
Patent blue	¼ oz.
Naphthol green	½ oz.
Water	10 ozs.

For the orange-pink positive:—

Rose bengal	½ oz.
Flavazine	½ oz.
Water	10 ozs.

Instead, however, of colouring the film itself, a black and white positive film can be projected from a cinematograph apparatus fitted with a revolving tinted screen, approximately one-half of which is coloured orange-pink and the other portion blue-green, so that the pictures are projected through the colours.

It is to be understood that the revolving disc, provided with a slit and coloured, may be used in place of the usual shutter, the portion of the disc between the slit and the colouring being blackened or otherwise rendered opaque.

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MONTHLY SUPPLEMENT

ON

Colour Photography.

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AUTUMN FOLIAGE BY THE SCREEN-PLATE PROCESSES.

The brilliantly tinted foliage of various shades inseparable from late autumn have always held a distinct attraction for the photographer, and more particularly for the colour photographer, who looks upon his medium as a means of recording these transient beauties, accurately in permanent form, as colour transparencies. That this is as it should be is amply borne out by the fact that many of the most successful landscape colour transparencies represent autumn subjects. There are, however, some points having a special bearing upon colour photography by the screen-plate processes that are evidently often overlooked by the majority of photographers.

Many colour photographers by the screen-plate processes, when making a first attempt at a rendering of autumn tints, often make the mistake of including too large an area of the subject upon the plate, particularly if the finished transparency is intended for viewing in the hand, and not for lantern projection, in which case a much wider expanse of subject may be included, owing to the fact that the picture is seen upon a much larger scale. In the former case, an expanse of woodland, while very attractive to the eye, is not to be regarded as an ideal subject for colour photography, for in reason the smaller the area included by the lens, and the larger the scale upon which the subject is rendered, the better. A group of two or three beech boles, well placed upon the plate, with a carpet of fallen brown or red leaves, interspersed with patches of green moss, and the rich yellows, reds and browns of the foliage, is often more effective, from the pictorial point of view, than one in which the subject is far wider in area and more varied and interesting. One of the greatest difficulties in selecting a subject for colour photography may be said to lie in a full realisation of what will make a fine colour photograph, as distinct from what has naturally, by reason of its wider extent, a greater appeal to the human eye. The truism that the part is often greater than the whole is applicable to colour photography, to an even greater extent than when the subject is rendered in monochrome.

The next point is that the colours should contrast. For instance, it is possible to select a composition consisting almost entirely of a beautiful shade of yellow. This will only look monotonous, but if the yellow tint can be broken up, as it were, and balanced with brown or red, or even green, a pleasing composition may be produced. The ordinary summer landscape, for instance, formed almost entirely of greens, is for this very reason inclined to be uninteresting, unless a small amount of another colour or colours can be introduced, such as flowers or human figures, wearing light or distinctive clothing, or even the red brickwork of buildings, that serve to break up the monotony. In the same way autumn tints should be as varied as possible, and in this respect the ideal subject needs only a little seeking by the thoughtful worker.

Contrast in the matter of lighting is also one of the problems of autumn landscape photography in colours. Many workers are inclined to neglect the study of this, to the detriment of their results. As is well known, the screen-plate colour processes cannot give a very perfect rendering of very deep shadows and very brilliant high-lights with the same exposure. In most autumn photography under trees and in the woods the finest combinations of colours are usually to be found, where the inequality of the lighting is a factor that demands special consideration. Some photographers, when attempting woodland photography in the natural colours of the subject, seek to obtain pictures in naturally isolated surroundings that will allow of the production of a perfect technical result without seeking to overcome the difficulties that arise when extremes of contrast in the lighting are in evidence. The results in the former case, though accurate enough from the scientific point of view, often leave much to be desired in the matter of pictorial qualities, and the matter of obtaining a good transparency from subjects differing widely in their lighting contrasts is not one that is to be shirked in this way if the worker really wishes to produce something worth while.

In illustration of this I may mention an experience of my own. Only last autumn I was photographing upon Autochrome plates the beautiful tints and colour contrasts of a certain stretch of woodland near my home. In the course of the day I came upon a most beautiful colour composition, both from the point of view of contrast and balance of the colours. The lighting, however, was the problem. Shafts of mellow sunlight striking down through the half bare boughs of adjacent trees lit the golden yellow foliage of a giant beech to perfection and also picked out in rich brilliance the reddish brown of the fallen leaves upon the near foreground. From the scientific point of view the subject was one impossible to transcribe into a perfect Autochrome. The background, consisting of holly and fir trees, received hardly any light at all, while the brief exposure needed, to secure a good rendering of the upper boughs of the beech, would allow of no detail in the foreground, which was, of course, less well lighted. Determining to make the best of things, an exposure was made, after a careful meter test, which, from what I remember, overexposed the lightest part of the picture fully six times, while it left the "second lights," if the term may be coined for the purposes of description, slightly under-exposed, while, of course, the deep shadows were grossly under-exposed. I should

mention, however, that when composing the picture the camera was so directed that as little of the darker background was included as possible. This is a most useful dodge, and may, with a little manœuvring, allow of a presentable rendering of many a subject that might otherwise have to be passed by. The plate was developed with the usual tabloid "Rytol" developer, at the same strength and for the same time as indicated in "The Wellcome Photographic Exposure Record and Diary." After the second development it was found that the transparency, though satisfactory as regards the foreground, was rather weak in the high-lights through very considerable local over-exposure. The plate was then intensified by the chromium method, the result being a transparency of very fair quality. I need only add that it received an award at a large provincial photographic exhibition this last spring. I would advise those who are attempting Autochrome work upon the changing foliage of this autumn not to avoid entirely subjects having fairly great extremes of contrast, but rather to try the effect of a carefully calculated exposure, trusting what latitude in the matter of exposure the Autochrome plate possesses, which is more than some colour workers would have us believe. The point to be noted is, that it is possible to compromise in the matter of the exposure required for subjects where the contrasts of the lighting are not too great and still obtain a very fine result, always provided this is effected without any undue *lack* of the required exposure in the more important of the shadows. This may sound a rather unscientific doctrine, but in practice there are cases where it is worth while following it out rather than pass by an otherwise fine colour subject. One other point may be profitably mentioned, more in the light of a warning. Autumn tints in this country are very transient, and at their best may be looked upon to last only a few days if the weather conditions favour this; while if this is not the case, the foliage may be at its finest only for a matter of a few hours. Many workers make the mistake of making the exposure *before* the foliage assumes its richest colours, while others are inclined to take up too much time in thinking about the suitability of time or subject, so that when they do finally make up their minds the leaves have fallen and the boughs bare, for the finest colours are only taken on by the leaves just before they fall. Another factor that often tends to add to the colour photographer's difficulties is the strong wind that so often accompanies the bright days of late autumn, though if a sheltered wood is chosen any ill-effects that this might have upon the details of the subject while the exposures are being made may be greatly minimised. For my own part, I would advise that, if wind is troublesome, the exposures be deferred to another day; the only result likely is that of wasted plates, since a satisfactory transparency of autumn foliage demands the maximum sharpness of definition.

ROBERT M. FANSTONE.

THE GORSKY PROCESS OF COLOUR CINEMATOGRAPHY.

[A recent patent specification, No. 168,100, describes the method of preparing three-colour films for cinematograph projection, which presumably forms the basis of the system of preparing ready-to-show cinema films which is being worked out in this country by Professor de Procoudine-Gorsky. As will be seen from the following extracts from the specification the process chiefly consists in the production of superimposed colour impressions of yellow, red and blue colours, the two former by a process of dye-mordanting and the latter by chemical toning.—EDS. "Colour Photography" Supplement.]

THIS invention is more particularly applicable to and will be described with reference to the process in which a cinematograph negative is taken through a recurring set of colour filters thereby obtaining a recurring series of colour-record negatives on one film. The three positives are produced by printing in turn from the three different series of colour records, and in printing each positive, the negative is stepped the extent of three pictures at each shift.

The invention primarily consists in a process for the production of such fully coloured positive images from the corresponding negatives, in which the positive images from the negatives of violet-blue sensation are coloured yellow by means of a solution of basic auramine in the presence of basic aluminium acetate, the presence of the latter distinguishing the process from prior processes in which auramine is used either in the presence of acetic acid or in other ways.

The invention further consists in a process as set forth in the preceding paragraph in which the positive images from the negative of green sensation are coloured red by means of a solution of rhodamine in the presence of acetic acid, and the positive images from the negative images of yellow sensation are toned or coloured blue by means of a solution of potassium ferricyanide and ammonia immersed in solutions of ferric chloride and sodium thiosulphate, and finally in sulphuric acid.

The invention also consists in a process as set forth in the two preceding paragraphs, in which the respective negative images have been taken through light-filters of methyl violet 6B, brilliant green and Bengal rose, the ultra violet rays being eliminated.

The invention also consists in a process as set forth in the three preceding paragraphs, in which the use of a protective stratum between the component positives is avoided by treating the layer of gelatine bearing the image with a hardening solution, well washing, and then coating the next layer of sensitive emulsion without drying.

In carrying the invention into effect, a negative emulsion is panchromatised by treatment with ethyl red in the manner described by Professor Miethe, in order to obtain an emulsion having a practical equality of sensitivity to the red, orange, yellow and green rays of the solar spectrum. The negative emulsion (that is, the negative film) is exposed by means of a cinematograph camera fitted with the requisite light-filters, and capable of working at a speed of forty-eight or more pictures per second for prolonged periods. The three light-filters are carefully chosen, and are preferably of methyl violet 6B, brilliant green, and Bengal rose. The first light-filter passes all the red, orange and yellow rays; the second, all rays having a wave length of 500—600$\mu\mu$, that is, the green part of the spectrum, the third light-filter passes the rest of the solar spectrum, that is, the blue, indigo and violet rays, and also the ultra-violet rays.

A sufficient quantity of tartrazine is added to the Bengal rose and brilliant green filters to absorb the blue, indigo and violet rays. An aesculine screen is used in conjunction with the methyl violet 6B filter, in order to absorb the ultra-violet rays. The aesculine, however, must be very pure, and be of the kind produced by Dr. E. König.

The exposed negative film is developed, fixed, and washed, after which a positive is made in the following manner:—From the negative film the pictures first printed upon the positive film are those exposed through the violet blue light-filter. The printing machine is adapted in such manner that the print of every successive image of like colour-sensation on the negative film, which is separated by images of other colour-

sensations, is printed on the positive film in a contiguous and successive series of images of like colour-sensations. When the positive film has received images of like colour sensation, has been developed in the usual manner, and dried, it has to be of the complementary colour to the light-filter through which the negative image was taken. That is to say, the positive images from negatives exposed under the violet-blue filter must be coloured yellow; those positive images from negatives exposed under the red or orange filter must be coloured blue, and those positive images from negatives exposed under the green filter must be coloured red.

In the present instance the positive image of violet-blue colour-sensation having been made first, the positive film is to be coloured yellow. It is immersed in a solution of potassium ferricyanide to which has been added a solution of potassium iodide and ammonium hydrate. Upon immersion in this solution the metallic silver of the image is converted partly into silver iodide and partly into silver ferrocyanide. About three minutes is the average time required for this operation. The film is now washed for about five minutes in running water, and then dipped into a solution of basic auramine in the presence of acetic acid and basic aluminium acetate. The solution of the latter salt should be freshly prepared as it is of the greatest importance for the purpose of obtaining a lake-like substance. Basic auramine if used in the manner already described does not lose depth of tone in colour when being washed, and gives a correct colour rendering. The use of this dye in the foregoing manner involves the formation of a lake-like substance formed by the action of basic auramine on silver iodide and silver ferrocyanide, which is "fixed" in the presence of basic aluminium acetate. The process takes about five to eight minutes, according to the density of the image.

By means of a second washing in running water the superfluous dye is removed, while the greater part of the silver iodide becomes transformed into a lake-like substance; but experience shows that in this process a certain part of the silver iodide remains unchanged, causing an opalescence of the image and does not enter into the formation of the lake-like substance. For the purpose of the present invention all clear parts of the gelatine should be absolutely transparent, and the dye used must be totally removed by the washing. The positive film is further washed in a solution of tannin and glycerine, whereby the whole gelatine coating is tanned by the tannin and the glycerine renders the layer supple, the latter being of importance during the subsequent manipulation of the film. The operation takes about five minutes. The positive film is then transferred into a fixing solution, which removes the small remaining quantity of silver iodide which is not converted into a lake-like substance, and makes the film absolutely transparent; the image remaining a golden yellow colour. The fixing solution comprises sodium thiosulphate in the presence of some of the tanning solution (that which adheres to the film), as experience shows that the presence of the latter solution causes the fixing to proceed more equally. The film is now washed and dried.

The coloured positive image may now be hardened by treatment with potash alum, chrome alum, formaline or other hardening solutions, well washed to eliminate the hardening solution, and coated directly with the next sensitive emulsion without the drying of the treated gelatine coating, but it is very important that the hardening substance should be washed away as far as possible so that it may not have any influence on the lake-like substance of the image or the following coatings of the sensitive emulsion. Alternatively the emulsion may be covered with a gelatine solution to which has been added a small proportion of a hardening solution, dried, and then coated with the next layer of emulsion. If desired, however, the coloured positive film may be protected when necessary from any subsequent chemical manipulations by coating the emulsion side with a protective stratum comprising a very thin but solid layer of a 1 per cent. solution of rubber in benzol. Following this, the emulsion side of the positive film is coated with a solution of celluloid in acetone. A very thin layer which resists any of the applied solutions may be obtained by spraying the solutions on to the positive film by means of an aerograph. When a protective stratum is used it has been found absolutely necessary to use coatings of both solutions, as if only one of them is applied the coating is permeable even in thick layers.

Following the protection or hardening of the yellow coloured positive images, the positive film is now coated on the same side by machinery with a positive emulsion containing a sufficient quantity of silver bromide for the formation of a lake-like coloured image. The negative images taken through the green light-filter are now printed upon the positive film by means of a printing machine adapted as already described. The manipulation of the positive film is now similar to that described with reference to the positive images printed from the negatives of violet-blue colour sensation, the difference being that rhodamine is used in the presence of acetic acid to obtain the red coloured component.

The printing of the negative images taken through the Bengal rose filter is the last printing operation to be carried out by the printing machine, the impression of the images being made upon the coating of the positive emulsion directly coated upon the hardened red coloured images, or upon a coating isolated therefrom by means of a protective stratum. The images so obtained are then coloured or toned blue by a solution of potassium ferricyanide and ammonia, washed in running water, immersed in a solution of ferric chloride, immersed in a solution of sodium thiosulphate and finally immersed in dilute sulphuric acid. After washing and drying, the positive film receives a final protective coating of rubber and celluloid.

From the foregoing it will be observed that the present process affords an exceedingly thin and transparent film which does not scale under the action of heat, and which may be projected on to the screen from standard cinematograph apparatus at the normal speed of 16 pictures per second.

TWO-COLOUR STUDIO PORTRAITS.

WHILE experimental work in colour photography during the last few years has centred chiefly in colour cinematography, it is interesting to find that the application of methods to the making of portraits in the studio is not being neglected. In the "Colour Photography" Supplement of June last we published extracts from a patent specification describing a method of preparing a component image for a colour process by toning with uranium in conjunction with the addition of a certain red dye to the toning solution. Within the last few days we have had the opportunity of seeing examples of this process (a two-colour one) which has been perfected by Mr. J. Newlands Thomson, of 22, Brook Street, London, W. In this process two negatives are made of the sitter, one through a blue-violet screen on an ordinary plate and the other through a specially prepared red filter on a panchromatic plate. From the former a positive transparency is made on a stripping plate. The transparency is toned in the special uranium toning solution in the ordinary manner, yielding an image which is of the reddish-brown colour familiar in the uranium toning process. From the red filter negative a bromide print is made and is toned to a blue by means of a mixture of ferricyanide and ferric ammonium citrate. The two-colour photograph is produced by stripping the reddish image from the transparency plate on to the blue-toned bromide print. It will be seen that the process thus allows of the final colour effect being very fairly gauged, before effecting the combination of the two components, by laying the glass transparency upon the bromide print.

Although it is not claimed for the process that it provides, or can provide, a facsimile rendering of a wide range of colours, and especially of brilliant colours, we were interested in observing the very great degree of success with which complexion tints and the colour of hair are rendered. From a demonstration kindly given to us by Mr. Thomson, it was clear that so far as the manipulation is concerned the process presents no difficulties, and the fact that for a considerable time past portraits made by it have been regularly supplied to sitters by this West-End firm is sufficient evidence of its practicability and of the pleasing character of the results yielded

by it. Mr. Thomson, like other experimenters in colour photography applied to portraiture, does not disguise from himself the fact that sitters frequently wish for a colour rendering which is a distinct variation from a truthful one, and that a colour portrait process does not exclude the employment of a certain degree of hand-colouring of the prints. Most of the portraits are, in fact, finished by hand in the same way as an ordinary photograph is finished, except that on the colour print colour dyes are used, whereas on an ordinary print Indian ink would be used. The cost of production is low, and the commercial possibilities of the process are certainly considerable.

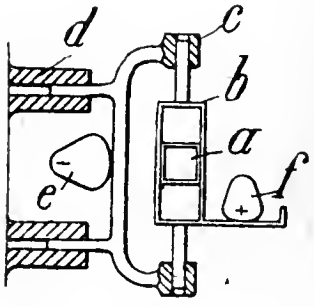
THE ULYSSE PROCESS OF COLOUR-CINEMATOGRAPHY.

A process of cinematography in natural colours devised by M. Pierre Ulysse, Le Val-Pre, Saint-Loup, near Marseilles, is described in Patent No. 100,021.

Each picture area receives several partial exposures through the same colour filter at different times.

By way of example, a known method will be considered in which three selected images are successively taken on three separate parts of a picture space of standard size—namely, 1 in. × ¾ in.—through red, green and blue-violet filters by means of a mechanism which moves the film through three successive exposure-positions at each pause in the unwinding movement of the film, and giving the whole of the desired exposure at each of the three positions.

As modified by the invention, this method consists in causing the film to move through the three exposure positions, not once in each pause in the unwinding movement as hitherto, but several times—for example, four times—giving an exposure at each position which is, for example, one-quarter of the desired total time



Thereby each selected image is made up of four partial exposures, on the same small picture-area of the film, made at slightly different times.

It has been found that by this improved method undesirable colour-fringing and discontinuity of impression in the images projected on the screen are minimised.

The apparatus to be used for producing the movements between the film and the lens may be similar to those which have been proposed hitherto in colour cinematography of the kind mentioned above, with the difference that means are provided for causing the movements to be repeated a number of times, instead of once only, in each pause in the unwinding movement of the film.

The drawing shows diagrammatically such an apparatus, adapted to produce three selected images grouped on the space usually occupied by a monochrome image of standard size, the centres of the three images being at the corners of an isosceles triangle. The gate *a* is mounted in a frame *b* which can slide vertically in a second frame *c* mounted in guides to slide horizontally in the plane of the film. Cams *e* and *f* produce horizontal and vertical motions of the gate *a* in timed relationship to the lens shutter so as to produce the three selected images in succession, and a separate film advancing device (not shown) is employed for the unwinding movement of the film. Instead of the cams *e* and *f* performing only one cycle of movements in each pause in the unwinding movement, they are geared to perform several complete cycles in each pause—for example four cycles.

The invention is, of course, not limited to the particular form wherein the film-gate is moved to produce the successive exposures, as the same effect may be produced in other ways, for example, by interposing a movable mirror device between the lens and the film.

News and Notes.

The Loudine Colour Process.—A recent issue of "Photographische Industrie" contains a brief note on the Loudine colour process, for which, in the years immediately preceding the war, great things were occasionally prophesied. It is stated that Herr Loudine has established a research firm for the development of his process, particularly in application to films. A large film studio in Geiselga Steig, Munich, has attached to it his experimental laboratory. A former collaborator with him has given some few details of the process, but only to the extent of stating that a negative is made in complementary colours and permits of either prints or transparencies being produced in any required number by a process almost as simple as ordinary photography. It is further intimated that the colour quality of the results are immensely superior to anything hitherto shown. The writer in "Photographische Industrie" has had no means of confirming these claims, but he reposes great confidence in his informant, and, therefore, sees no reason to doubt that we are on the verge of a great turning-point in the history of photography. The editor of "Photographische Industrie," however, makes the excellent suggestion that some technical information with regard to the process should be published.

The Modern Craze for Colour.—The growing craze for colour should please those workers in colour photography who complain about the "dullness" of our natural scenery and our home interiors. As a writer in the "Star" a few days ago said, we English people seem to be crazy on colour these days—in our clothes and our houses, at any rate. Now even our gardens have not enough colour apparently, and even the paths must receive attention, as well as the beds. When stones are used, grey paving is no longer considered all-sufficient, for paving stones can now be bought in almost any colour—white, brown, red, slate blue, even green and mauve—and laid in any size and shape, large or small. It adds to the work, however, for it requires constant washing if the colour is not to be obscured.

"Are you one of those people (asks the "Star" writer) who love good pictures, and, being unable to afford them, find the ones you possess a continual eyesore? If so, try making the wall-paper the principal feature in one of your rooms, and do away with pictures altogether. A paper with a black ground and a many-coloured pattern requires no pictures; indeed, they would quite spoil the effect. Even ornaments are not in the scheme, though a very few plain silver bowls and vases on the mantelpiece look extremely well."

Screen-plate Renderings of Fashionable Complexions.—Those workers who are not pleased with the screen-plate renderings of normal flesh tones, or who are unable to manipulate the plates so successfully as to secure pleasing renderings of the human face, will no doubt welcome the latest fashionable fad, which originated a week or so ago at Deauville, namely, that of powdering the face of a colour to match and be in harmony with the hat or frock. It may be only a passing fad it is true, but it is one that brings grist to the colour photographer's mill, and as such is worthy of some attention. According to a fashionable expert (a lady) from Deauville, who was button-holed by a representative of the "Daily Chronicle," the popularity of scarlet hats and gowns accounted for the new colour-schemes for faces. "It is obvious," she said, "that the mauve face powder, which many women cling to, looks dreadful with a red dress. A clever woman, who liked red frocks had," she said, "experimented with powders, and found how very much better powder with a red tinge looked than a neutral or mauve-tinted one. Smart women were, therefore, ordering powder with a peculiar mauve tint for their dresses of the fashionable mauve colourings, red-shaded powders for their red dresses, and blue powder for use with blue dresses."

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COLOUR REGISTRATION DEVICES IN THE PAGET PROCESS.

[We reprint below the major portion of the recent patent specification No. 167,793 of Mr. G. Sydney Whitfield, describing a device for use in an extension of the Paget colour process, which actually is very simple in practice, although forbiddingly complex when set down in the language of the professional draughtsman of patent specifications. It will be seen that by providing supplementary colour patches of adjusted transmission on the taking screen the user of the process obtains a colour indication of correct register when employing a key screen for the purpose of making a set of three colour-sensation negatives.—Eds. "Colour Photography" Supplement.]

In the method of producing photographic prints in natural colours from a "screen plate negative," such as, for instance, one taken through a Paget taking screen, a stop-out or key screen is used, placed in correct register upon the negative so that only the record of one element of the colour screen is used at a time for the purpose of making a print for subsequent use in complementary colour in the composition of a colour print. It is a difficult matter to know when the key screen is in correct register with the screen plate negative to permit only one colour record to appear at a time, and in order to ensure correct registration, without any doubt whatever, it is found advisable to provide on a part of the taking screen a registering device that will be recorded on the negative and to provide a corresponding device on the key screen in such a manner that when the registering device on the key screen is in register with the recorded registering device on the negative, it is assured that the key screen is in correct position on the picture portion of the negative, and is allowing only the colour record of one of the taking screen elements to be available.

Now, as the colour recording negative is of the usual black silver compound and the key screen is in a similar black and white condition, there is great uncertainty, even with the aid of the above-mentioned registering devices, in knowing when the key screen is in exact register with the negative, as the eye cannot (owing to the whole of the registering devices on the colour recording negative and key screen being in a neutral grey of varying intensities) readily perceive slight variations of register when the relative positions of the key screen and negative plate are changed. The object of the invention is to overcome this difficulty.

For this purpose there is employed a key screen having the registering means in certain colours such that when registering it with a colour record negative having registering means thereon produced by the aid of a taking screen having coloured registering means thereon, preparatory to printing a positive, the registering means on the key screen will be seen in a predetermined colour only when the key screen and negative are in exact register, whilst any want of exact register will at once be rendered apparent by an appearance of colour other than that which indicates correct register and can be corrected by relative adjustment of the key screen and negative.

The accompanying drawings show one example of the application of the method of registering when used with the well-known Paget colour process.

In these drawings, fig. 1 represents in face view part of a Paget taking screen embodying the invention. Figs. 2 and 3, shown in vertical section on lines corresponding to lines A A

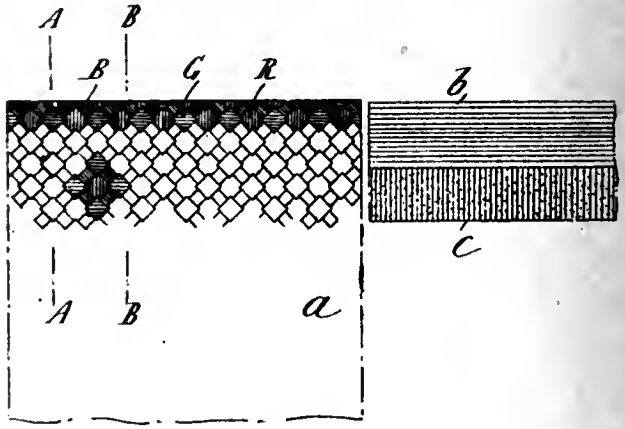


Fig. 1.

and B B respectively of fig. 1, portions of a negative plate and of the taking screen, with a registering device as described below, superposed and exposed. Fig. 4 shows in face view a portion of the negative obtained by such exposure. Figs. 5 and 6 are face views of portions of two key screens embodying the invention. Figs. 7 and 8 show in vertical section portions of the negative plate and the key screen shown in fig. 5, superposed and in different relative positions for registering in two different colours. Fig. 9 is a similar view to figs. 7 and 8, but showing the negative plate with the key screen shown in fig. 6 superposed.

In the Paget taking screen the three-colour pattern usually consists of a series of coloured squares, the red and green

elements, marked respectively R and G, being of the same dimensions, whilst the blue elements, marked B, are of smaller dimensions, the several elements being symmetrically arranged as in the example shown in fig. 1. For distinction, the red squares R are denoted by vertical lines, the green squares G by horizontal lines, and the blue squares B by diagonal lines. In the drawings, the squares constituting the pattern in the taking screen and key screens and the negative are, for the sake of clearness, greatly enlarged.

At opposite ends of the Paget taking screen *a* and on top of the three-colour pattern thereon are placed at each end

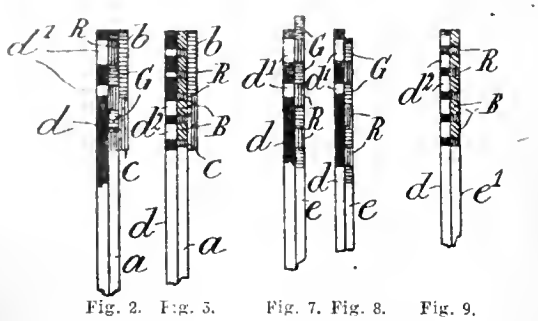


Fig. 2. Fig. 3. Fig. 7. Fig. 8. Fig. 9.

two continuous transparent strips of different colour, indicated for clearness at *b* and *c* to one side of the screen, such colours being those that will transmit, in each case, the light passed by two only of the colour elements of the taking screen, and such that one of the colours transmitted by one strip shall not be transmitted by the other strip. For instance, one of the strips, say *b*, may be a greenish-blue strip, which will enable only the light transmitted by the green and blue-violet elements G and B of the taking screen *a* to be recorded on a negative, and the second strip *c* may be yellow, which will enable only the light transmitted through the red and green elements R and G of the screen to be recorded on the negative. When a negative is taken on a panchromatic plate *d* through such a taking screen and suitable precautions are taken so that the two end portions of the colour screen *a* having the colour strips *b* and *c* thereon receive adequate exposure, a pattern will be produced on each end of the negative (fig. 4), consisting, in the case of the greenish blue strip *b* (fig. 2), of opacity behind the position occupied by the

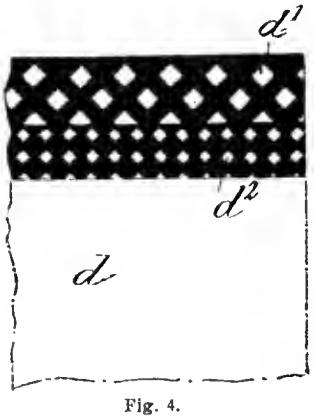


Fig. 4.

green and blue violet elements G and B of the screen *a*, but clear open pattern at d^1 behind the position of the red elements R of the screen. In the case of the yellow strip *c* (fig. 3), there will be produced on the end portions of the negative, as shown in fig. 4, opacity behind the position occupied by the red and green elements R and G of the screen, but open pattern at d^2 behind the positions of the blue violet elements B of the screen.

The key screen *e* (fig. 5) may be of the usual black and white pattern *f* and *g* respectively, suitable to block out the negative colour record of any two of the colour elements of the taking screen *a*, whilst transmitting fully the remaining negative colour record of such taking screen in such gradations as the negative may possess, but at each of its two opposite ends the black and white pattern *f* and *g* is replaced, as shown, by a strip *h* of colour screen identical with that on the Paget taking screen *a* (fig. 1), used in preparing the negative, these two strips *h* of colour screen being arranged in correct relationship with the black and white portion *f* and *g* of the key screen.

On such a key screen *e*, constructed as shown in fig. 5, being placed, as shown in fig. 7, in register with a negative *d* (fig. 4) taken under the above conditions, that is to say, with a taking screen provided at each end with colour registering means *b* and *c* as described, it will be found that those end portions of the negative *d* corresponding to or representing the greenish blue strips *b*, can, by suitable adjustment of the negative relatively to the key screen, be registered at both ends to cause the red elements R of the colour screen *h* on the key screen *e* to come exactly opposite the clear portions d^1 of the negative (fig. 7), thus giving a bright red effect, indicating that the red element record only in the negative is then available for use, and a positive made from it will form the blue element of a tri-colour print.

If the same end portions of the negative *d* corresponding to the greenish blue strips *b*, by relative adjustment of the

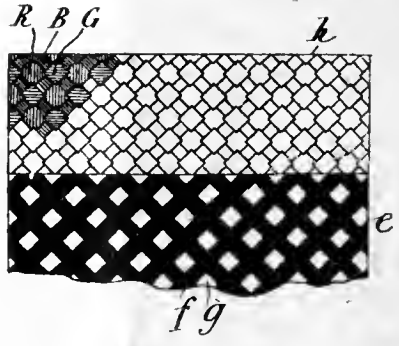


Fig. 5.

key screen and negative, be registered at both ends to cause the green elements G of the colour screen *h* on each end of the key screen to come opposite the clear portions d^1 of the negative *d*, as shown in fig. 8, a bright green effect will be obtained, thus indicating that the green element record is capable of being used, and the resulting positive will form the magenta element of the tri-colour print. Similarly, if the end portions of the negative representing the yellow strips *c* of the taking screen can be accurately registered with the colour screen edge portions *h* of the key screen used so that these portions will give in like manner an even blue tint when the blue elements B of such portions come opposite the clear portions d^2 of the negative, it will prove that the negative is in the correct position to give the positive for the yellow element of the tri-colour print.

One key screen would suffice for making, in the manner above described, three positives of the three-colour record on the negative, if the three-colour elements of the taking screen used for producing such negative were of the same size and shape and symmetrically arranged, so that the key screen would only have to be shifted to block out any two of the colours at each adjustment. Should, however, the size and shape of the three-colour elements of the taking screen differ from each other, two or more key screens of pattern, size and edging suitable to the elements concerned must be used. Thus, when using the Paget taking screen *a* shown in fig. 1 to produce the negative, one key screen *e*, such as shown in fig. 5, will suffice for dealing with both the red and green records of equal size on the resulting negative, but a different key screen e^1, such as shown in fig. 6, corresponding to the smaller blue elements B of the ordinary Paget taking screen, must

be used for dealing with the blue record. In this case, the screen e^1 must be moved endways relatively to the negative d to bring the blue elements B of the colour screen h thereon accurately opposite the clear portions d^2 of the negative, as shown in fig. 9, thus indicating that the blue elements record only in the negative is available for use, and a positive made

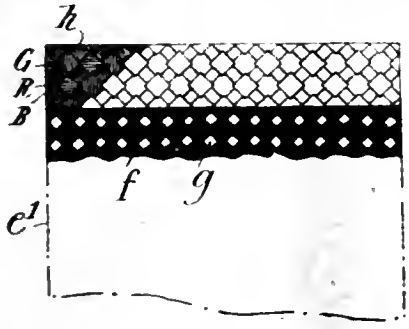


Fig. 6.

from it will serve for the yellow element of the tri-colour print. However many key screens may have to be used, they are all provided with a colour screen edge portion h of a pattern similar to that of the taking screen used.

It will be understood from the above that when, for instance, the red screen element record on the negative is being used and the colour record strips at the edges of the negative and key screen are being registered to an even and complete red, any error of registration will at once be shown by the appearance of a portion of either green or blue violet, and the register may be re-adjusted until the latter colours are entirely removed. Likewise, any appearance of red, when the strips are being registered to a green, would at once be recognised as indicating faulty registration, and must be immediately corrected. The same remarks apply when the strips are being registered to a blue.

The portion of the key screen described as black and white may be of any other character, such as red and white, always providing that the colour used does not transmit light of such a nature that the material used in making the positives will be affected by it.

Instead of providing each end portion of a taking screen a with two differently coloured strips b and c, such as described, one edge portion only may be so provided, and one end portion only of a key screen e or e^1 may be provided with a strip of colour screen h such as described. As will readily be understood, accurate results cannot, however, be so easily attained in these cases as when each end portion of a taking screen and of a key screen are constructed as described, which is therefore the preferred construction.

THREE-COLOUR REFLECTOR CAMERAS.

The only methods at present available for producing natural colour photographs on paper are founded on the three-colour principle, and each finished picture represents the combined effect of three printings, i.e., pink, blue and yellow, the prints being derived from separate negatives taken through complementary colour filters. Usually these three negatives are taken as rapidly as possible one after the other. The disadvantages of this method of taking are obvious. For instance, the light may change, due to passing clouds, or usually the subject moves and the picture is ruined by brilliant colour fringes. In addition, it is not easy to get the relative exposures of the negatives correct. There is far less latitude in three-colour work than in monochrome; in fact, Abney[1] states that exposures should be correct within 2 per cent. Provided, however, that a perfect set of negatives has been obtained, the production of a real natural-colour photograph is not beyond the technique of a good, average photographer. Colour photography would, therefore, receive an immense impetus if a camera were available that could take these three negatives simultaneously with one lens and with the same ease that a monochrome image is obtained. The principal requirements of such a camera are:—

(1) Three images identical in size.
(2) Correct colour separation for each negative.
(3) Relative exposure ratio correct.
(4) Modern lenses giving high speed and diffusion of focus if required should be fitted.
(5) Portability.

The most promising type of camera to fulfil these requirements appears to be one embodying semi-transparent reflectors, which partly transmit and partly reflect the image-forming rays of light. I believe I am correct in saying that Ducos du Hauron was the first to employ this principle, and his reflectors were plain sheets of glass. It is a well-known fact that such reflectors give a double image, and du Hauron was forced to use long-focus lenses, including only a very narrow angle of view. Ives rendered such cameras practicable by employing reflectors of a colour complementary to the reflected image. Thus a greenish-blue reflector might transmit the necessary light to the blue- and green-filter negatives, and its secondary image would be damped out by the red filter. There are three interesting early patents in connection with this type of camera, viz.:—

(1) No. 8,663 of 1896, granted to Walter White.
(2) No. 28,920 of 1897, granted to J. W. Bennetto.
(3) No. 29,353 of 1897, granted to E. T. Butler.

Bennetto's camera had a single red reflector at 45 deg. to the lens axis, the first reflected image falling on two plates, placed face to face. I saw some very extraordinary results obtained by this camera, but the Polychromide camera, on a somewhat similar principle, was infinitely more successful. Incorporated in this camera is rather a curious patent by A. Hamburger, whereby registration is more perfectly obtained by bending the transparent reflector.

Butler's camera is pretty well known, and has two parallel semi-transparent reflectors. These are, of course, coloured to damp out secondary images, as previously explained. In a camera, of which I have a half share, the direct and brightest image is arranged to fall on the green-filter plate, the first reflected image is for the red plate, the second reflected image is blue. The principal difficulty in a reflector camera is that the ratio $\frac{\text{light reflected}}{\text{light transmitted}}$ varies with the angle at which the rays fall on the reflector. The direct and second reflected negatives are apt to be graded in intensity from top to bottom. Mr. Butler corrects this with internal diaphragms in the camera. For the same reason a comparatively long-focus lens is desirable.

I believe, however, that the most successful arrangement of reflectors is that contained in White's patent before mentioned and shown in the accompanying figure. I have good reason to suppose that I have the original model of this camera, which I picked up for a mere song in a pawn-

[1] "Instruction in Photography," 1905 Ed., page 435.

shap As I found it, the colours of the reflectors and light-filters in my model are exactly the same as given in "Photography in Colours."[2]

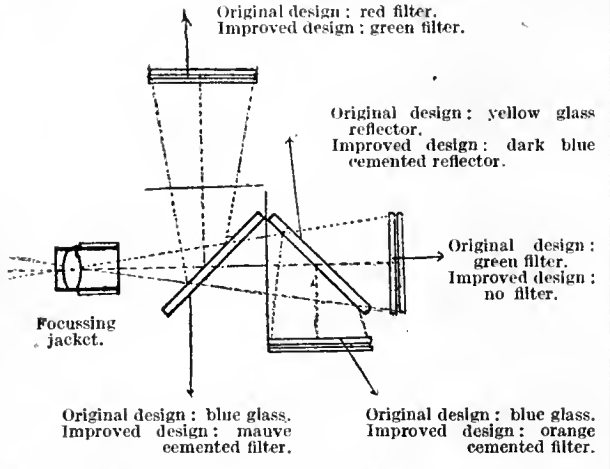
The camera is a curious example of the freakishness of the human mind, which in this case must have lavished quite a considerable sum on a construction which was inherently sound, but which failed owing to a lack of knowledge on the part of the designer. The great advantage of this reflector arrangement is that the tendency to uneven lighting in the direct and second reflected images is exactly corrected by having the reflectors at right-angles. None of my negatives show the least trace of it.

I have spent some time and trouble in adjusting it to work satisfactorily, using the following system of colour filters :—

First reflector, mauve, transmitting red and blue.
First reflected image, green filter.
Second reflector, dark blue.
Second reflected image, red. An orange filter is used as shown.
Direct image, blue filter.

I have adopted really heavy cemented filters, which were made by Messrs. Kodak, Ltd., the glass for the reflectors being specially selected.

The method of adjusting the camera is to focus the direct image, set the reflectors accurately at 45 deg., shift them nearer to or more remote from their respective plates until they give sharply-defined images. The first exposure is made on some symmetrical diagram of lines and circles. Each reflector negative is placed face to face with the direct negative, and it is simple to define in what way the reflected image is distorted. If one corner is expanded it shows that the



Diagrammatic sketch of White's camera in original and improved form.

corresponding corner of the reflector producing that image is too distant from that plate, and *vice versâ*. By a similar reasoning a "long" or a "wide" image may be corrected.

The next problem to be dealt with is equalising the exposures to each plate, and this is done by a film compensating filter in the lens. In my case an Autochrome filter seems to balance the system almost exactly, and I can always develop the three plates simultaneously.

There were two reasons for having the blue image the direct one, the first being that I could make a yellow Raydex print direct on paper and register the pink and blue on it, thus obtaining a finished print with only two transfers; secondly, I wished to have a camera equally suitable for artificial light, in which case the balance filter can be removed, giving the blue plate a very full exposure.

The blue reflector is a very dark blue, cutting out the ultra-violet entirely and some of the visual violet. This is done to avoid the flatness and dullness which is often characteristic of the yellow printing plate. I am so pleased with the results obtained that I advise other three-colour workers to give this filter (Wratten C4 dark) a trial.

With this camera a brightly-lit seascape requires 1 second at *f*/11, and a portrait on a dull day, with the same stop, 12 seconds. I usually use an exposure meter, the speed being estimated at 10 Watkins.

In my experiments with reflector cameras I have had many discouragements and disappointments, nearly leading me to abandon them. I am now convinced that the system outlined above is as near perfection as can be, giving three good clear negatives at one exposure. For portraiture each negative can be retouched. In fact, this usually has to be done to get correct colour rendering, due to the imperfections of the pigments used. I do not think professional photographers would have the least difficulty over this part of the process. The essentials for success in this type of camera appear to be :—

(1) Good solid reflectors of carefully selected glass, with cemented gelatine filters.

(2) Correct design. The thickness of the colour-filters and their refractive indices for the various regions of the spectrum have to be taken into consideration to get the images equal. The focus of the lens used, for red, green, and blue rays, also has to be measured. Mr. Butler informs me that he can adjust his cameras, even for uncorrected lenses.

(3) Rigid construction. A good solid box form must be adopted. I do not think it possible to have any folding construction. Reflectors must be rigidly held down, and if they are thick enough there is no fear of distortion. The camera need not be bulky; my ¼-plate camera is about the size of a postcard magazine camera. A "speed" colour camera for 3½-in. × 2½-in. plates that I am designing is about the size of a ¼-plate magazine.

The reader will have noticed that there is one inherent defect in all such cameras, and that is light-waste when the secondary image is absorbed by a complementary light-filter. He will therefore appreciate the gain and advantage of patent No. 110,089, of February, 1917, granted to Hesse-Ives Corporation for dichroic reflectors, reflecting green light and transmitting red. Eosine is one dye recommended, and is familiar to most readers as the old-fashioned red ink, which used to leave a green glint on the pen or where it dried in any thickness. A thin layer of gold is stated to behave similarly, but to be not so efficient. Further details and claims for this invention can be found in the "B.J." "Colour Photography" Supplement for March, 1918, or in the complete patent specification. It appears to be an invention of considerable value.

H. E. Rendall.

2. "Photography in Colours," Section 2, A. A. K. Tallent, page 278.

Screen-plate Pictures of "Old Masters."—We often hear (writes a correspondent) of screen-plate copies of "old masters" being too yellow or too green, or unsatisfactory and disappointing in other ways. This defect appears to be due to the discolouration of the varnish on the picture, varnish which has, for instance, turned Gainsborough's famous "Blue Boy" into a green one. Thus a screen-plate copy of the picture would show the clothes to be green instead of blue, the varnish appearing to be even more visible to the emulsion, than to the eye. The "Blue Boy" picture, the "Evening News" states, is to be cleaned and made perfect. "It is really quite natural that the picture should have a green tinge," said an expert to the paper's representative, "for if you look at varnish in a bottle it is yellow, and everyone knows that yellow and blue make green. As the varnish gets dirty it becomes more opaque and more yellow. There are probably several coats of varnish on the 'Blue Boy' which will have to come off, for no doubt it will be necessary to get down to the original. There is no fear that the 'Blue Boy' will be spoilt in the cleaning, for paint will not come off after about 80 years (the 'Blue Boy' was painted 150 years ago). A picture can be over-cleaned. A man who did not know his work might take off even the varnish the artist had put on to soften the colours, and they would appear too clean and crude."

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INTENSIFYING AUTOCHROMES.

As a general rule most of the Autochrome colour transparencies made by amateurs are all the better for intensification. Many formulæ have been put forward for this, but most represent difficulties in making up or are uncertain in action. The uranium intensifier, though quite effective in adding density, tends to upset the balance of the colours. Pyro silver has often been recommended and is the formula put forward by the manufacturers, but I must say that in my hands it has not proved very satisfactory. Other workers pin their faith to the mercuric intensifier, but, after a careful trial of most, I prefer the chromium bleacher as introduced by the late C. Welborne Piper, which has several distinct advantages over the others. It is simple to use, its action is certain, and the degree of intensification is easily controlled, and, not least in importance to many, the formula contains no scheduled poison. A description of my own method of using the chromium intensifier for Autochrome plates, though not new, may be of value to others. Many workers assume that the chromium intensifier is not equal in its results to those given by the more complicated pyro-silver, but I can only say that, in my own hands, the results are decidedly better, and, provided ordinary care is taken, the process is absolutely safe and certain even when used by the inexperienced worker.

In the first place, a little discrimination is needed in deciding when an Autochrome needs intensification. If the plate, after being removed from the second developer, seems satisfactory in every way, except that it is thin and the colours have a weak and washed-out appearance due to over-exposure, the qualities of the picture may be made good by careful intensification. This must not be mistaken for the flat, heavy results of under-exposure and the plate intensified under the impression that the additional density gained will put the matter right. For these there is no real cure, though reduction sometimes has the effect of slight improvement. But, in my opinion, these are best thrown away and the exposure repeated, correcting the original error.

Prior to attempting intensification upon an over-exposed plate, the transparency should be put back in the developer for at least another five minutes in strong light in order to ensure that the picture is fully developed. If this is neglected after the final re-development, when the plate is afterwards put in the necessary fixing bath, the action of the hypo upon the reduced silver may leave practically nothing of the picture. It is a good plan in order to ensure that the second development is effective, if the plate is to be intensified, to give the plate a few minutes in a bath of fresh developer.

To proceed with intensification, the bleacher may be made up according to the formula published in The British Journal Almanac, which I quote:—

A.—Potass bichromate, 1 oz.; water, 20 ozs.

B.—Hydrochloric acid, pure, 1 oz. fl.; 1.160 sp. gr. to 10 ozs.

The most satisfactory bleaching bath for Autochrome work is made up of 4 ozs. of A, 3 drachms of B, with 16 ozs. of water, or the tabloid preparation issued by Messrs. Burroughs Wellcome & Co., may be employed. The latter is very convenient, as the process is not one employed very frequently.

The transparency should be taken from the second developer and well washed in order to get the developer out of the film. This, with the thin Autochrome film, takes only a few minutes, when the plate is ready to be placed in the chromium bleacher. The action of this is rapid, half a minute being sufficient to bleach the film thoroughly, after which the plate should be held under a gentle stream of water from a tap for two or three minutes or until the film is fairly free from the yellow stain.

Re-development may then be proceeded with. The old developing solution should not be used, for I have found that there is a tendency for its action to be uneven, and particularly if it has been partially exhausted or discoloured by previous use. Moreover, its action is slow, and with the extreme delicacy of the Autochrome film anything that tends to prolong immersion in any of the solutions is to be avoided. My own preference is for Rytol, though amidol is entirely satisfactory and perhaps advisable if a second application of the intensifier is necessary, though any good non-staining developer will give good results.

If at the end of a couple of minutes in the developer the plate is examined it will probably be found considerably improved in colour rendering. It may, however, be thought that it is still far from perfect, and in this case the process may be repeated even to the extent of five or six times, provided the film does not show signs of leaving the plate or of blistering. Before the plate is bleached again the developer should be thoroughly washed out, for if this is not done there is a tendency for the action of the intensifier to be uneven, or stains may result. I have often intensified a weak over-exposed Autochrome several times and succeeded in the end in producing a passable transparency. Care should be taken not to hurry development by taking the plate out of the solution too soon, and if the solution is a non-staining one the process may be allowed to continue for several minutes, which ensures the image being fully developed out.

It sometimes happens that, after repeated intensification, the whites of an Autochrome plate may become stained and the

colours somewhat dull and brownish. If this happens the plate may be cleared by immersing it in a non-acid permanganate solution. MM. Lumière recommend the following formula :—

Potass permanganate, 15 grs. ; water 35 ozs.

Care must be taken not to mistake this for the reversing solution. If the Autochrome has become too heavy in character, the colours appearing clogged up and thus indicating that the intensification has been too great, it may be reduced by immersing it in the acid permanganate reversing solution used after the first development. This must be diluted to about thirty times its usual strength, or to a pale pink colour. The action of this reducer is rapid, and the plate should not be left in it for more than half a minute. A very short period of immersion in this bath will be found to clear the image very considerably

The next step is fixation. MM. Lumière say that fixing is indispensable when an Autochrome has been intensified. This probably applies more to the silver intensifier, which forms a fresh silver compound, but a fixing bath, if not absolutely essential for the chromium method, does no harm provided the plate has had a full second development in full light. I give my own Autochromes about three minutes in an ordinary acid fixing bath.

All that then remains is to give the plate a brief wash, say, for about five minutes in a gentle stream of running water, this being sufficient to remove the hypo from the film, after which the plate may be set up to dry in the usual way.

The foregoing, I think, deals fairly exhaustively with the advantages derived from the use of the chromium bleacher in Autochrome work. One other point I may add. All intensification should be done when the plate is wet, as an Autochrome that has once been dried, when re-wetted, tends to produce a crop of the green spots that were the bugbear of the photographer in the early days. Also, quite apart from this, the chances are the film may frill or entirely leave the glass. The worker should make up his mind as to the further treatment of the plate while it is still in the second developer, and the work should be at once proceeded with, thus avoiding re-wetting.

It should be the aim of the colour photographer to select his subject and so time his exposure that intensification or reduction will not be needed. There is a danger that the quality of the work may suffer through the photographer becoming careless as to his exposures, thinking that after treatment will put matters right. It may or it may not, though my own belief is that nothing can equal for beauty or brilliancy of colour an Autochrome that has been so exposed that no further treatment is needed beyond the second development. However successful intensification methods may be, they should be the exception and not the rule.

ROBERT M. FANSTONE.

THE CASIERI PROCESS OF COLOUR CINEMATOGRAPHY.

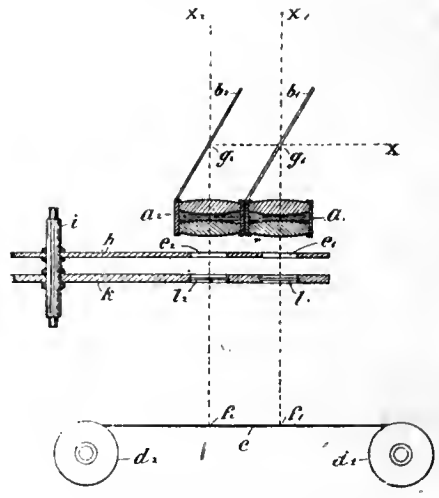
ACCORDING to a patent applied for in Italy in 1918 and now published as a British specification, the inventor, Giovanni Casieri, proposes to obtain cinematograph pictures in natural colours by a process of additive projection according to which pictures are taken in pairs alternately through two pairs of filters, and each pair taken simultaneously appear to have been taken from practically the same point of view.

One arrangement of the optical parts for carrying out the novel process is shown diagrammatically in the drawing, which is a horizontal section taken on a plane passing through the axes of the lenses, through the axes of the spindle of the shutter and through the colour filters.

As shown in the drawing, the lenses a_1, a_2, are mounted with their axes parallel and two glass plates b_1, b_2, are placed in front of them and parallel to one another and inclined at an angle of 45 deg. to the axes of the lenses. Both plates have parallel plane faces, the first of them being partly transparent and partly reflecting and the second totally reflecting. The film c advances in a plane at right angles to that containing the axes of the lenses, while it is drawn from the spool d^1 and wound up on the receiving spool d^2. After each exposure, the film is advanced by an amount equal to twice the distance between the centres of adjacent pictures if every image is of the size of a whole picture, or by an amount corresponding to a single step, if every monochromatic image is half that size.

In order to conform with the size of the films which are generally on the market, it is convenient to place the axes of the objectives at a distance apart of 18 millimetres.

By the arrangement adopted any luminous point x gives two images f^1, f^2, on the film, the first image f^1 being produced by the



partial reflection of the pencil meeting the plate b^1, and the second image f^2 being produced by the total reflection of the residual part of the pencil, passed through the first glass, and reflected by the reflecting surface b^2.

The total effect produced is the same as if there were two luminous points x^1 and x^2 in such a position that

$$x^2g^2 = g^2x, \text{ and } x^1g^1 = g^1x,$$

that is to say, as if the optical axes of both lenses were coincident with the line g^1g^2 and their optical centres were at a distance apart equal to $g^1g^2 = 18$ millimetres, which practically means that both centres are at the same distance from the luminous point, x.

It is obvious that the inclination of the reflecting surfaces at 45 deg. has been chosen only by way of example and as that inclination is the most convenient in practice, but the inclination of the reflecting plates to the axes of the lenses may be any other.

Two complementary light-filters are combined with the two objectives for the selection of the colours so that two complementary images are obtained both lying in the same plane, the plane of the film, and turned towards the same direction, the images being taken simultaneously and practically equivalent to two images obtained from a single point of view.

If the above arrangement were extended to a three-colour process, it would complicate the apparatus considerably, and in practice several difficulties would be encountered. Firstly, if it is desired not to diminish the size of the images, it is necessary to increase excessively the speed of movement of the film between two successive exposures, which would subject the film to considerable mechanical stresses liable to cause the film to break.

On the other hand, as the amount of light which is supplied to every image during the exposure cannot be increased according to the will of the operator, and would thus be reduced, in many cases the ordinary lighting of the subject would prove insufficient for good reproduction.

These difficulties are now all overcome, and the same effects which are usually obtained with three lenses are obtained by means of two lenses only, by substituting two movable pairs of complementary filters for the lenses, which pairs work alternately for taking the pictures as well as for projecting them.

Assume, for instance, that the apparatus comprises two pairs of screens, one of which is red and green and the other orange and blue, and that each pair is brought into operation eight times in a second. On the whole eight images for every colour will be obtained, that is to say thirty-two images, or eight series of pictures in four colours.

For projection, conversely, the images of every pair obtained on

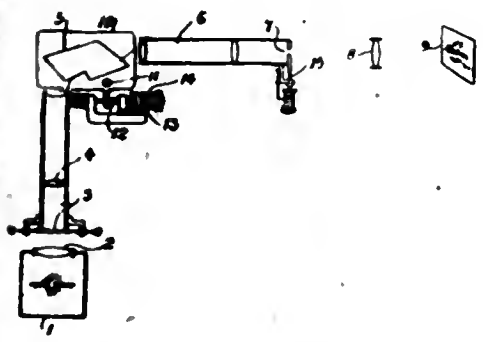
the negative by means of the two lenses and two complementary filters are projected simultaneously, by interposing in front of the positives filters of the same colours which had been used in obtaining the negatives, so that the two pairs of screens are alternately used. In a second, sixteen pairs of pictures in complementary colours will be thus projected on the screen, two by two simultaneously, so that, for instance, if during the first time in which the shutter is open, a pair of images is projected through the blue and orange filters, during the next time, the pair of images is projected through the red and green screens.

The filters in the reproducing as well as in the projecting apparatus are preferably mounted on the same spindle as the shutter, as is shown, by way of example, in the drawing, where *h* is the disc of the shutter and *k* the disc with the filters 1_1, 1_2, both discs being mounted on the same spindle.

SPECTRUM ILLUMINATION IN COLOUR-SENSATION NEGATIVE MAKING.

A RECENT patent specification, No. 166,028, of Adrian Bernard Klein, claims as a novelty the making of colour-sensation negatives by suitable spectral illumination of the subject instead of by the use of light-filters. The patentee deliberately claims the employment for this purpose of regions of spectrum illumination without overlap, and, in fact, alludes to the overlap in absorption of dye filters as an obstacle to satisfactory three-colour work. Nevertheless, it may be of interest to quote that part of the specification which describes the optical arrangement for producing illumination corresponding with any desired part of the spectrum.

The light from an arc lamp or other source 1 is passed through a condensing lens 2 and focussed upon an adjustable slit 3. Thence the light passes through a collimator 4 and through a constant deviation or dispersion prism 5. The light is dispersed by the prism into a spectrum which is then passed through a further collimator 6. After passing through this collimator the spectrum falls upon a surface which includes a second slit 7 which is adjustable in such a manner as to permit the passage of light from any desired portion of the spectrum. This transmitted light is then passed through a condensing lens 8 and thrown upon the object 9 to be photographed.



The prism 5 is preferably mounted on a platform 10 rotatable at a suitable point about a pivot 11 so that any desired portion of the spectrum can be brought into alignment with the second collimator 6 and a fixed edge of the slit 7 by rotation of a micrometer screw 12 the movement of which can be determined by a fixed pointer 13 reading on a drum scale 14 graduated in a suitable manner, as for instance in wave lengths, and the slit 7 preferably comprises a movable shutter operated by a micrometer screw 15 the movement of which can also be determined by means of a scale graduated in a suitable manner. Thus by suitably adjusting the two micrometer screws 12 and 15 the light thrown upon the object may be selected from any desired portion of the spectrum.

The prism 5 is surrounded by a suitable fixed casing (not indicated in the drawings) having apertures registering with the adjacent ends of the two collimators.

Instead of providing a rotatable prism both edges of the slit 7 may be made adjustable, suitable scales or indicators being provided for determining the positions to which they must be adjusted to give the desired divisions of the spectrum. A constant deviation prism is preferably employed owing to the fact that it simplifies the scales employed for the micrometer screws, but any other prism may be employed if desired.

CLERK MAXWELL'S THEORY AND HIS PRACTICE.

PROBABLY everyone, even those not specifically interested in colour photography, knows that to Clerk Maxwell we are indebted for the first suggestion as to the possibility of reproducing the colours of nature by photography. And it would seem as though he had argued this out as a proof of the correctness of his colour mixture theory. It is unnecessary to recapitulate this, as it has been pretty well threshed out in the pages of the "B.J."[1]

But apparently no one has taken the trouble to find out whether there existed any record of the photographic side of the work carried out to obtain the results which were shown at the time of his lecture, and it has been generally assumed that the negatives were made and the positives projected by red, green and blue-violet light.

Possibly one reason for this neglect is that it was practically impossible to carry the process into effect till the discovery of orthochromatism by H. W. Vogel in 1873, and then the main features of the argument were only remembered, and, further, no one but the dry-as-dust historian cares one iota as to the actual data. Even Howard Farmer[2], who seems to have paid more attention to the operative details than anyone else, accepted the familiar triad of red, green and blue-violet.

Having occasion, for another purpose, to refer to the original publications of Clerk Maxwell's work, I found fairly complete details, and was considerably surprised, as actually not only was the negative process a four-colour one, but the positives were projected by four colours also.

The work was carried out by Thos. Sutton, who was the Editor of "Photographic Notes," and also at the time, I believe, lecturer on photography at King's College. He gave an account of the work in his paper, and this was reprinted in the "Photographic News,"[3] and I venture to think that it is of sufficient interest historically to be rescued from oblivion. Sutton says: "A bow made of ribbon, striped with various colours, was pinned upon a background of black velvet, and copied by photography by means of a portrait lens of full aperture, having various coloured fluids placed immediately in front of it, and through which the light from the object had to pass before it reached the lens. The experiments were made out of doors, in a good light, and the results were as follows:—1st. A plate-glass bath, containing the ammoniacal sulphate of copper, which chemists use for the blue solution in the bottles in their windows, was first placed immediately in front of the lens. With an exposure of six seconds a perfect negative was obtained. This exposure was about double that required when the coloured solution was removed. 2nd. A similar bath was used, containing a green solution of chloride of copper. With an exposure of twelve minutes not the slightest trace of a negative was obtained, although the image was clearly visible upon the ground-glass. It was, therefore, found advisable to dilute the solution considerably; and, by doing this, and by making the green tinge of the water *very* much paler, a tolerable negative was eventually obtained in twelve minutes. 3rd. A sheet of lemon-coloured glass was next placed in front of the lens, and a good negative obtained with an exposure of two minutes. 4th. A plate-glass bath, similar to the others, and containing a strong red solution of sulphocyanide of iron, was next used, and a good negative obtained with an exposure of eight minutes. It is impossible to describe in words the exact shades of colour, or intensity of these solutions. The thickness of the fluid through which the light had to pass was about three-quarters of an inch. The collodion was simply iodised, the bath neutral, and the developer pyrogallic acid. The chemicals were in a highly-sensitive state and good working order, producing clean and dense negatives, free from stains and streaks in all cases."

"The negatives taken in the manner described were printed by the tannin process upon glass, and exhibited as trans-

1. See the controversy between Howard Farmer and Ives, "B.J.," 1901, Vol. 48, 47, 63, 68, 77, 127, 141, 154, 172, 190, 223, 430, 512; also A. A. K. Tattent, *ibid*, 15.

2. "Phot. Journ.," 1901, Vol. 41, 303; "B.J.," 1901, Vol. 48, Supp. 63, 503, 504; "B.J. Almanac," 1902, 487, "Clerk Maxwell's Gifts to Photography."; "B.J.," 1902, Vol. 49, 566.

3. "B.J.," 1861, Vol. 8, 272; "Phot. News," 1861, Vol. 5, 375; "Phot. Notes," 1861, June 15, p. 169.

parencies. The picture taken through the red medium was at the lecture illuminated by red light, that through the blue medium by blue light, that through the yellow medium by yellow light, and that through the green medium by green light, and when these different-coloured images were superposed upon the screen, a sort of photograph of the striped ribbon was produced in the natural colours."

As already stated, access to the original has not been possible, but I hope that someone will take the trouble to look up the subject to determine whether any further notes appeared. Speculation as to this departure from the theoretical procedure is possible, but whether it would be profitable is another question. It is, however, of interest to note that the exposure through the red filter was less than that for the green, even although the latter was much reduced in strength, which, one might argue, proves that the sensitive salt, the iodide, was more sensitive to red than to green. Possibly the yellow filter was used to supplement the action of the green.

E. J. WALL, F.R.P.S.

A NEW THREE-COLOUR CAMERA.

(A Note in "Penrose's Annual," 1922.)

THERE have been many attempts to devise a camera for taking the three exposures for three-colour records with a single lens, either simultaneously or in quick succession. A camera designed and patented by Mr. A. Roland Trist falls in the latter category, and it seems to carry out this method of working in a most successful manner.

In external appearance and size it resembles one of the now old-fashioned, box-type magazine hand-cameras, in which the plates are changed internally. On opening the front of the box body it is seen that the lens is fitted with a rotating disc of ebonite with four openings; three of these openings contain the red, blue and green filters, the fourth is blank. Each of the openings containing the colour filters is fitted with an iris diaphragm, which can be independently operated, so as to give an aperture proportional to the exposure factor for each colour. An engraved scale is fixed to the camera indicating the apertures for each filter for a given plate-maker's factor. The camera is fitted with one of the finest lenses for colour work, namely, the Goerz Dagor Apochromatic, working at an aperture of *f*/6.8, fitted with a compound shutter.

All the operator has to do is to place panchromatic plates in the metal sheaths and put them in the magazine holder, then set up the camera, centre the subject in the direct vision finder (there being no focussing screen), and measure distance of subject to lens, racking out the lens until the number of feet is indicated on the scale. The camera is then set by revolving the colour filter holder, so that the blue comes into position for the first exposure. The shutter is set to the exposure determined by a reliable actinometer, and at the side of the camera is a small lever, which, when pressed, always sets the camera to the right position for starting; otherwise the plate may drop before the shutter opens, instead of *vice versa*. Everything being now ready, the operator presses the Antinous release twice; the first push opens the shutter and shuts it, the second drops the exposed plate to the bottom of the magazine, at the same time revolving the colour filter holder to the next colour. The time between the exposures is extremely short, averaging about two seconds, which allows very little time for any change in the light between exposures affecting the results. The camera is entirely automatic, and any photographer can work it without practice, being as simple as using a Kodak. It is quite easy to obtain three negatives of uniform density and sharpness, so that the difficult part of three-colour work is accomplished.

The writer has tested this camera, and found it to be the most perfect yet produced; the negatives were sharp, clear and the density absolutely equal in all three, the register also being perfect.

The inventor has set out with the idea of bringing colour work within the scope of the amateur photographer. The camera so far has only been made in quarter-plate and 5 x 4 size, but there is no reason why it should not be made in larger sizes for studio work, or for process reproduction, and it may become a valuable aid in practical work.

Naturally for such purposes the camera will have to be provided with a focussing screen, and set up on a stand, but there should be no difficulty in doing this; further it would be necessary to make a scale of factors for electric illumination.

W. PENROSE GAMBLE.

Correspondence.

*** *Correspondents should never write on both sides of the paper. No notice is taken of communications unless the names and addresses of the writers are given.*

*** *We do not undertake responsibility for the opinions expressed by our correspondents.*

DYEING SENSITIVE FILMS FOR RELIEF PRINTS.

To the Editors.

Gentlemen,—In the "Colour Photography" Supplement of September 2 (p. 36), Mr. Wall appears to discredit my claim to the first use of a non-actinic dye in sensitive films in the production of photo-gelatine relief prints, for the purpose of obtaining tenuous reliefs. He also says (page 34) that the height of the relief is of not the slightest importance for superimposed films. Mr. Wall mentions Ducos Du Hauron, Lumière, Sanger-Shepherd and Bartlett, and O. Pfenninger as employing this method, but overlooks the fact that it was first disclosed and patented by me (U.S. Patent 980,962, January 10, 1911—application dated April 28, 1910), and afterwards adopted by the parties named without credit to me. I was also clearly the first to dye a gelatine bromide film with non-actinic dye as one step in the production of tenuous relief prints through the medium of a developed silver image, and the claims in my patent are perfectly valid. The tenuous reliefs permitted the production of imbibition prints on hard gelatine paper, such as Velox backing paper, with exquisitely sharp definition, which was not possible with methods previously disclosed. They also permitted of quick dyeing in my patented standardised dye baths (U.S. Pat. 1,121,187, December 15, 1914, pp. 3, 4), with which the depth of colour can be perfectly controlled, being independent of the time of immersion after once dyeing evenly through to the back, and by means of which any desired number of exact duplicates could be and were produced to order in Hicrome and imbibition process prints.

The bleach-hardening solution given in my patent cited by Mr. Wall was improved upon before the patent was issued, eliminating the features criticised by Mr. Wall.

The production of extremely tenuous relief prints was only one element of a completely worked out and perfect system having other notable original features. I am not responsible for the fact that the method is not well known and extensively used, as it should be.—Very truly yours,

F. E. IVES

1,327, Spruce Street, Philadelphia.
November 12.

INVENTIONS IN COLOUR CAMERAS.

To the Editors.

Gentlemen,—In the interest of correct historical record permit me to point out that the type of camera credited to White and to Butler in Mr. Rendall's article on page 43 of the "Colour Photography" Supplement (November 4) was originally patented by me in 1894 (U.S. Pat. 531,940); also that the bending of the transparent reflector to secure perfect registration, which is credited to Hamburger, was originally patented by me in 1898 (U.S. Patent issued April 4, 1899, No. 622,480), and the dichroic reflector is also my own invention.

I think Mr. Rendall would find my "Tripak" system, patented in 1909 (U.S. Patent issued January 10, 1911), far more convenient and satisfactory than the cameras which he mentions. Unfortunately, there has not been sufficient practical interest in these inventions to justify manufacture in this country.—Very truly yours,

F. E IVES.

1,327, Spruce Street, Philadelphia.
November 14.

The British journal of photography